

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

February 19, 2014

The Honorable Allison M. Macfarlane Chairman U.S. Nuclear Regulatory Commission Washington, DC 20555-0001

SUBJECT: 10 CFR PART 61 - REVISIONS TO LOW-LEVEL RADIOACTIVE WASTE

DISPOSAL REQUIREMENTS

Dear Chairman Macfarlane:

During the 611th meeting of the Advisory Committee on Reactor Safeguards, February 5–7, 2014, we completed our review of the staff's proposed rulemaking to revise the Commission's commercial low-level waste (LLW) disposal regulation in 10 CFR Part 61. This rulemaking introduces site-specific performance assessment and human intrusion analyses requirements to Part 61. Our Subcommittee on Radiation Protection and Nuclear Materials discussed this matter during its meetings on November 19, 2013, December 3, 2013, and January 16, 2014. This letter report is our fourth report about this proposed rulemaking.

CONCLUSIONS AND RECOMMENDATIONS

- 1. In our continuing assessment, we affirm the conclusions and recommendations in our earlier letter reports on this matter.
- 2. In the two-tiered assessment approach, the compliance period covering a reasonably foreseeable future should not exceed 1,000 years.
- Wastes disposed in accordance with the existing Part 61 rule at the time of disposal should not be subjected to additional compliance evaluations. We have found no deficiencies in the existing regulations that warrant imposing new disposal requirements.
- 4. The proposed revisions to Part 61 contain excessive implementation detail. These details should be provided in guidance documents rather than in the rule.

BACKGROUND

During the 570th meeting of the ACRS, March 4 - 6, 2010, we first heard from the staff about the status of rulemaking for depleted uranium (DU) and other unique waste streams. Our letter report dated March 18, 2010, contained the following recommendation:

The staff should continue their efforts to risk-inform the regulations for disposal of DU based on site-specific, realistic performance assessments with appropriate consideration of uncertainties.

We received briefings on this proposed rulemaking during our 585th meeting on July 13 - 15, 2011, and our 586th meeting on September 8-10, 2011. Our letter report dated September 22, 2011, contained the following conclusions and recommendations:

- 1. 10 CFR 61 should not be amended in accordance with the staff's recommendations. Rather, the staff should develop a risk informed, performance based LLW site assessment methodology using realistic characterizations of disposed radioactive materials; the features, events, and processes that can disrupt disposed waste; natural and engineered barriers; environmental transport mechanisms; and subsequent human exposure scenarios.
- 2. Implementation guidance for Part 61 should not specify an a priori period of performance. Rather, the performance assessment should develop a period of performance based on the features, events and processes specific to the geohydrological features of a candidate site, the technologies used to isolate wastes, and the controls used to isolate wastes from the environment and humans.
- 3. The approaches in recommendations 1 and 2 are equally applicable to the disposal of depleted uranium as well as other low-level waste.
- 4. Compliance with performance objectives of the disposal system after the institutional control period ends, as well as the possible doses to hypothetical intruders, should be evaluated considering the natural features, events, and processes for a given site for a period of time commensurate with the risk for a specific facility and site.

The Commission issued Staff Requirements Memorandum (SRM) - COMWDM-11-0002/COMGEA-11-0002 on January 19, 2012, providing direction to the staff to revise the proposed rulemaking and supporting regulatory basis and submit it to the Commission within 18 months. The SRM directed the staff to revise both the performance assessment and intruder analysis requirements:

- 1. Allowing licensees the flexibility to use ICRP dose methodologies in a site-specific performance assessment for the disposal of all radioactive waste.
- 2. A two tiered approach that establishes a compliance period that covers the reasonably foreseeable future and a longer period of performance that is not a priori and is established to evaluate the performance of the site over longer timeframes. The period of performance is developed based on the candidate site characteristics (waste package, waste form, disposal technology, cover technology and geo-hydrology) and the peak dose to a designated receptor.
- 3. Flexibility for disposal facilities to establish site-specific waste acceptance criteria based on the results of the site's performance assessment and intruder assessment.

During the 606^{th} meeting of the ACRS, July 9 – 12, 2013, we reviewed draft SECY-13-0075, the staff's proposal to revise 10 CFR Part 61 and the associated draft implementation guidance. Our letter report dated July 22, 2013, contained the following conclusions and recommendations:

- 1. The proposed rule significantly expands the regulatory requirements for the licensing of low-level waste facilities and increases regulatory burden without sufficient justification.
- 2. Our primary concerns about the proposed changes to 10 CFR Part 61 are the requirements to demonstrate compliance for 10,000 years and protection of the inadvertent intruder.
- 3. We plan to hold additional meetings to better understand the technical justification for the elements of concern in the proposed rule.
- 4. Previously disposed wastes should not be subjected to additional compliance evaluations as proposed by the staff.

DISCUSSION

We held three subcommittee meetings to better understand the technical justification for a compliance period of 10,000 years, and the proposed requirements for a site-specific performance assessment and the protection of an inadvertent intruder.

At our November 19, 2013, subcommittee meeting, we heard from representatives of the US Department of Energy (DOE) on the requirements and guidance for approving LLW disposal at DOE facilities as specified in DOE Order 435.1 and its associated documents. The DOE has been using a system for approving LLW disposal for more than 25 years that uses a site-specific performance assessment (PA) which establishes site-specific waste acceptance criteria (WAC). The DOE uses a time of compliance of 1,000 years for measuring compliance with the performance objective for doses to a member of the public from all pathways from the disposed waste as calculated in their PA. The DOE rules do not have a performance objective for protection of an inadvertent intruder similar to §61.42 of Part 61. Instead, the DOE includes calculations for protection of inadvertent intruders in the all-pathways analysis in the site-specific PAs as one metric for establishing limitations on radionuclide concentrations and inventories in the site-specific WAC for their disposal facilities.

At our December 3, 2013, subcommittee meeting, we heard from representatives from the four Agreement States (South Carolina, Texas, Utah, and Washington) that regulate the current commercial LLW disposal facilities in operation in the US, three representatives of commercial LLW disposal operators, representatives from the Electric Power Research Institute (EPRI), and three other stakeholders who have relevant experience in management of commercial LLW disposal. We heard again from representatives of the US DOE about the quantities and characteristics of the DU waste that they currently manage which require a disposal path.

Finally, at our January 16, 2014, subcommittee meeting, we heard from representatives of the staff on the history of the Part 61 rulemaking revisions and the reasons why they proposed the current revisions to Part 61 in SECY-13-0075. They explained that only a small inventory of DU was included in the original analysis supporting the requirements in the current Part 61, and that additional analysis is needed to determine the requirements for safe disposal of large quantities of DU. The staff described the Commission Orders (CLI-05-05 and CLI-05-20) and the resulting SECY-08-0147 leading to the current decision framework for disposal of DU. They also explained that the rulemaking has expanded from its original intent to address new LLW streams that might be generated by blending of LLW and reprocessing of used nuclear fuel.

The staff and DOE representatives both reported on the large quantities of DU (approximately 1.3 million metric tons¹ in the form of depleted uranium hexafluoride) that require disposal at either a commercial or DOE disposal facility. The DOE representatives also reported on their current management responsibility for the DU storage inventory and their continuing responsibility for disposal of newly-generated DU waste from uranium enrichment facilities.

The staff stated that because of the in-growth of progeny from DU, analysis time periods of 1,000 years or less result in significant truncation of estimated risk from disposal of DU, and this is the main reason why they propose a 10,000 year time of compliance for meeting the revised performance objective.

The risk associated with DU continues to grow well beyond 10,000 years. However, despite the long half life and the in-growth of progeny, the risk from disposal of DU in the oxide form which will result from the DOE's processing will be small, and remain small, provided appropriate disposal practices are followed (e.g., no shallow disposal, arid sites, and robust radon barrier). We do not agree that a compliance period of 10,000 years is necessary, practical, reasonable, or consistent with Commission direction to establish a compliance period for the "reasonably foreseeable future."

We continue to endorse an approach for revising the Part 61 regulations that introduces a sitespecific performance assessment and intruder assessment, includes a two-tiered approach, and includes flexibility for disposal facilities to establish site-specific WAC based on their assessment results.

The two-tiered approach should establish a compliance period that covers the reasonably foreseeable future and a longer site-specific performance period. The compliance period should not exceed 1,000 years. The longer performance period should be developed based on the candidate site characteristics (e.g., waste package, waste form, disposal technology, cover technology, and geohydrology) and the peak dose to a designated receptor.

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¹ Total in storage at DOE facilities, plus the staff's estimate of commercial DU over the next approximately 30 years.

The staff has not identified any new or unreviewed safety issues with currently disposed LLW. The staff has reported that existing LLW facilities meet or exceed current Part 61 requirements and continue to show compliance with current safety requirements. The staff has also reported that none of the currently operating sites would be required to perform the longer term second tier analysis as long as they do not take large quantities of DU or other long-lived waste streams.

We understand that previously disposed wastes may need to be included in the revised performance and intruder assessments to comply with a revised Part 61 rule for future disposals. However, wastes already disposed in accordance with the current Part 61 rule should not have any added requirements placed on them by the revisions to Part 61, or be subject to any new compliance evaluations, even if the previously disposed wastes are included in a revised performance assessment or intruder analysis as proposed by the staff.

Several stakeholders communicated that the proposed revisions to Part 61 contain excessive implementation detail. They suggested that some of these revisions could be accomplished by revising Sections 61.12 and 61.13, where the required technical information and analyses for complying with Part 61 are discussed, leaving the existing performance objectives largely unchanged. They also suggested that most of the information in the revised requirements would be more appropriate for implementation guidance. This will allow the Agreement States, who regulate all of the existing commercial LLW disposal facilities, the flexibility to revise their regulations as needed. We agree with these suggestions and find them consistent with the common regulatory practice of including in the regulations what must be done, while consigning how it can be done to implementation guidance.

Additional comments by ACRS Member J. S. Armijo are provided below.

Sincerely,

/RA/

John W. Stetkar Chairman

Additional Comments by ACRS Member J. Sam Armijo

I agree with the conclusions and recommendations of my colleagues, but believe that an additional issue should be considered.

Although the original scope of this rulemaking was the regulation of near surface disposal of large quantities of depleted uranium (DU), the proposed amendments to Part 61 will apply to all waste streams, and will impact all U.S. LLW disposal facilities. As currently proposed, Part 61 will require all licensees, *including those who make no changes in the waste streams they receive in the future*, to perform additional analyses and demonstrate compliance with new performance objectives that are not required by current regulations². They will be required to conduct:

- a site-specific performance assessment [revised §61.13(a)] for LLW disposal to assure that their facility can meet the performance objective for protection of the general public of 25 mrem/yr for a compliance period of 10,000 years (revised §61.41(a)]³.
- a site-specific human intrusion analysis [revised §61.13(b)] that considers the time period after the end of the period of active institutional controls to assure that their facility can meet a revised inadvertent intruder performance objective that limits doses to inadvertent intruders to less than a 500 mrem for a compliance period of 10,000 years (revised §61.42(a)]⁴.

The staff has indicated that each licensee may need to revise and enhance its safety case declaration and obtain approval from their Agreement State. Depending on compatibility requirements in the new rule, Agreement State regulators may either require compliance with the new rule or consider granting exemptions.

Absent a safety concern or benefit, it is not reasonable to impose such uncertainties or burdens on licensees who choose to make no changes in the waste streams they receive in the future. Imposition of more stringent requirements on future disposals could also raise public concerns regarding the safety of low level wastes previously disposed of in compliance with existing regulations. This problem could be corrected by making the new rule applicable only to licensees engaged in the disposal of large quantities of DU.

² Current Agreement State compliance period requirements are summarized in Table 1.

³ Current Part 61 requirements in §61.13 do not specify a compliance period for the technical analysis to assure the §61.41 performance objective is met.

assure the §61.41 performance objective is met.

⁴ Current Part 61 requirements in §61.13 do not require any intruder analysis to assure the §61.42 performance objective is met, and no dose limit is specified in §61.42.

TABLE 1

AGREEMENT STATE LICENSING REQUIREMENTS FOR LAND DISPOSAL OF RADIOACTIVE WASTE: TIME OF "COMPLIANCE" REQUIRED FOR TECHNICAL ANALYSES

Agreement State	Disposal Facility Operator	State Regulations	Compliance Time - Performance Assessment	Compliance Time - Intruder Assessment
South Carolina	Chem-Nuclear Systems	61-63, Title A, Part VII, "Licensing Requirements for Land Disposal of Radioactive Waste."	None	None
Texas	Waste Control Specialists	TAC, Title 30, Part 1, Chapter 336, Subchapter H, "Licensing Requirements for Near-Surface Land Disposal of Low-Level Radioactive Waste."	1000 years or the period where peak dose occurs, whichever is longer	None
Utah Energy Solutions		R313-25, "Licensing Requirements for Land Disposal of Radioactive Waste."	10,000 years for waste with DU None for other nuclides	None
Washington	US Ecology	246-250 WAC, "Radioactive Waste – Licensing Land Disposal"	None	None

REFERENCES

- 1. U.S. NRC, "Proposed Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61) (RIN 3150-Al92)," SECY-13-0075, July 18, 2013. (ML13129A268)
- 2. ACRS Letter, Subject, "Status of Staff Rulemaking Efforts for Depleted Uranium and Other Unique Waste Streams," March 18, 2010. (ML100760264)
- 3. ACRS Letter, Subject, Proposed Rulemaking to Introduce a Site-Specific Performance Assessment and Human Intrusion Analysis Requirement to 10 CFR Part 61," September 22, 2011. (ML11256A191)
- 4. ACRS Letter, Subject, "Revisions to Low-Level Radioactive Waste Disposal Requirements (10 CFR Part 61)," July 10, 2013. (ML13203A078)
- 5. U.S. NRC, Staff Requirements COMWDM-11-0002/COMGEA-11-0002, "*Revision to 10 CFR Part 61*," January 19, 2012. (ML1210190360)

- 6. U.S. NRC, "In the Matter of Louisiana Energy Services (National Enrichment Facility)," Docket No. 70-3103-ML, Memorandum and Order, CLI-05-05, January 18, 2005
- 7. U.S. NRC, "In the Matter of Louisiana Energy Services (National Enrichment Facility)," Docket No. 70-3103-ML, Memorandum and Order, CLI-05-20, October 19, 2005
- U.S. NRC, "Response to Commission Order CLI-05-20 Regarding Depleted Uranium," SECY-08-0147, October 7, 2008. (ML081820762)
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- 10. U.S. DOE, "Implementation Guide for Use with DOE M 435.1-1, U.S. Department of Energy, Chapter IV, Low-Level Waste Requirements," DOE G 435.1-1, July 1999
- 11. U.S. DOE, "Performance Assessment for the Saltstone Disposal Facility at The Savannah River Site," SRR-CWDA-2009-00017, Revision 0, Prepared by SRR Closure & Waste Disposal Authority Under Contract No. DE-AC09-09SR22505, July 2009
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- 14. Memorandum, Frei, DOE/EM-43, to Carlson, Nevada Operations Office, "Disposal Authorization for the Nevada Test Site Area 5 Radioactive Waste Management Site Submittal of Performance Assessment and Composite Analysis Addenda," May 23, 2002.
- 15. U.S. DOE, "Nevada National Security Site Waste Acceptance Criteria," DOE/NV-325, Revision 9, Prepared by U.S. Department of Energy, National Nuclear Security Administration, Nevada Site Office, Waste Management Project, February 2012.
- 16. U.S. DOE, "Integrated Closure and Monitoring Plan for the Area 3 and Area 5 Radioactive Waste Management Sites at the Nevada Test Site," DOE/NV/11718—449, Revision 1, Prepared for National Nuclear Security Administration, Nevada Operations Office, under Contract Number DE-AC08-96NV11718, September 2001
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- 18. U.S. DOE, "Maintenance Plan for Performance Assessments and Composite Analyses of the Area 3 and Area 5 Radioactive Waste Management Sites at the Nevada Test Site," DOE/NV/25946—091, Prepared by National Security Technologies, LLC, Prepared for U.S. Department of Energy National Nuclear Security Administration Nevada Site Office under Contract Number DE-AC52-06NA25946, January 2007
- 19. U.S. DOE, "2011 Annual Summary Report for the Area 3 and Area 5 Radioactive Waste Management Sites at the Nevada National Security Site, Nye County, Nevada, Review of the Performance Assessments and Composite Analyses," DOE/NV/25946—1451, Prepared by National Security Technologies, LLC, Prepared for U.S. Department of Energy National Nuclear Security Administration Nevada Site Office under Contract Number DE-AC52-06NA25946, March 2102
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- 25. Nuclear Energy Institute Letter, Subject, "Request for Public Comment on Preliminary Proposed Rule Language in 10 CFR Part 61 for "Site-Specific Analyses for Demonstrating Compliance with Subpart C Performance Objectives [Docket No.NRC-2011-0012]," June 17, 2011. (ML11172A178)
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- 29. EnergySolutions Letter, Subject, "Revision to 10 CFR Part 61," August 2, 2012. (ML12222A139)
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- 31. LLW Forum Letter, Enclosure: "Comments on the U.S. Nuclear Regulatory Commission's Part 61 Rulemaking Initiative from the LLW Forum's Part 61 Working Group," July 30, 2012. (ML12215A367)
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- 39. EnergySolutions Letter, Subject, "Preliminary Proposed Rule Language, Low Level Waste Disposal-77 FR 72997; Docket ID NRC-2011-0012," January 7, 2013. (ML13014A751)
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