

LOW-LEVEL RADIOACTIVE WASTE FORUM, INC.

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U.S. Nuclear Regulatory Commission (NRC)

NRC Seeks Public Comment re Development of Regulatory Basis for Alternative Means of Disposal of GTCC and Transuranic Waste

On February 14, 2018, the U.S. Nuclear Regulatory Commission (NRC) issued a *Federal Register* notice announcing that the agency is seeking stakeholder participation and involvement in identifying the various technical issues that should be considered in the development of a regulatory basis for the disposal of Greater-than-Class C (GTCC) and transuranic radioactive waste through means other than a deep geologic disposal, including near surface disposal. (See 83 *Federal Register* 6,475 dated February 14, 2018.)

As part of the process, the NRC is requesting that interested stakeholders respond to specific questions contained in the *Federal Register* notice. Comments are due by April 16, 2018. Comments considered after this date will be considered if it is practical to do so, but the NRC is only able to ensure consideration of comments received on or before the deadline.

On February 22, 2018, NRC will hold a public meeting regarding concerns associated with the disposal of GTCC and transuranic waste, as well as about the agency's plans to conduct a very low-level radioactive waste (VLLW) scoping study to identify possible options to improve and strengthen the NRC's regulatory framework for the disposal of the anticipated large volumes of VLLW associated with the decommissioning of nuclear power plants and material sites, as well as waste that might be generated by alternative waste streams that may be created by operating reprocessing facilities or a radiological event. (See LLW Forum News Flash titled, "NRC to Host Public Meeting re Very Low-Level Radioactive Waste Scoping Study and Disposal of Greater-than-Class C Waste: Agency Headquarters in Rockville, Maryland on February 22, 2018," dated February 12, 2018.) The meeting will be held from 9:00 a.m. to 3:00 p.m. in the auditorium at the agency's headquarters in Rockville, Maryland. Interested stakeholders may participate via webinar or teleconference.

Discussion

On December 22, 2015, in Staff Requirements Memorandum (SRM)–SECY–15–0094, "Historical and Current Issues Related to Disposal of GTCC Low Level Radioactive

Waste (LLRW),” the Commission directed the NRC staff to develop a regulatory basis for disposal of GTCC and transuranic waste through means other than a deep geologic disposal (including near surface disposal) within six months of the completion of the final rule for Part 61 of title 10 of the *Code of Federal Regulations*, “Low-Level Radioactive Waste Disposal.” (See *LLW Notes*, January/February 2017, p. 26.) The Commission also directed the staff to conduct a public workshop during the development of the regulatory basis to receive input from stakeholders. On September 8, 2017, in SRM–SECY–16–0106, “Final Rule: Low- Level Radioactive Waste Disposal,” the Commission revised its earlier directions regarding the development of the GTCC and transuranic waste regulatory basis. (See *LLW Notes*, September/October 2017, pp. 1, 21-23.) Specifically, the Commission directed the staff to develop the regulatory basis six months after the publication of the supplemental proposed rule for the 10 CFR Part 61 rulemaking.

The NRC staff is in the initial phase of implementing the Commission’s directions in SRM–SECY–15–0094 and SRM–SECY–16–0106. According to the NRC, “[t]he process of potentially amending the NRC’s regulations is very thoughtful and deliberative because it can have significant impacts on members of the public, [s]tates, licensees and other stakeholders.” The regulatory basis describes the various scientific, technical and legal issues associated with a potential rulemaking. Therefore, as a part of the initial steps in implementing the Commission’s directions, the staff has planned a public meeting with stakeholders to identify the various technical issues that should be considered in the development of a regulatory basis for the disposal of GTCC and transuranic waste. The staff is also requesting that stakeholders respond to specific listed questions contained in the *Federal Register* notice that was issued on February 14, 2018. When this initial phase is completed, staff plans to develop a regulatory basis, which will be provided for public review. Staff plans to hold public meetings on the draft regulatory basis as well. Once all of the foregoing is completed, the staff will develop a final regulatory basis.

Specific Request for Comment

The NRC is seeking stakeholder participation and involvement in identifying the various technical issues that should be considered in the development of a draft regulatory basis for the disposal of GTCC and transuranic radioactive waste through means other than a deep geologic disposal, including near surface disposal. To assist in this process, the NRC staff is requesting that interested stakeholders respond to the questions below. In addition, the NRC staff has conducted some initial technical analyses to assist its understanding of potential hazards with near surface disposal of GTCC and transuranic wastes, which are contained in draft “*NRC Staff Analyses Identifying Potential Issues Associated with the Disposal of Greater-Than-Class C Low- Level Radioactive Waste.*” The draft analyses should assist in providing responses to the following questions:

1. What are the important radionuclides that need to be considered for the disposal of the GTCC and transuranic wastes?

The U.S. Department of Energy (DOE) has described three broad categories of GTCC wastes, including a range of transuranic radionuclides, in its “Final Environmental Impact Statement for the Disposal of Greater-than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste.” (See *LLW Notes*, November/December 2017, pp. 1, 23-28.) The three categories are entitled activated metals, sealed sources and other wastes. The attributes (i.e., radionuclide concentrations, heat generation, and waste form) vary significantly between the three categories. Certain waste streams represent a very specific waste form (i.e., stainless steel for most activated metals; very concentrated amounts in sealed sources) that may require specific treatment to mitigate potential safety, security and criticality concerns. Some waste streams may contain sufficient quantities of specific radionuclides that will present a significant thermal output and/or gas generation through radiolysis. Still other waste streams may contain a significant quantity of fissile radionuclides (i.e., some isotopes of uranium and plutonium). The NRC is interested in identifying those radionuclides that could be important for evaluating the safety and security of storage associated with the operational period at a disposal facility and the post-closure period (including inadvertent intruder protection). Additionally, the NRC is interested in obtaining available data and information to support the characteristics of GTCC and transuranic wastes.

2. How might GTCC and transuranic wastes affect the safety and security of a disposal facility during operations (i.e., pre-closure period)?

The presence of sufficient quantities of high activity radionuclides and/or fissile radionuclides in GTCC and transuranic wastes may impact the design and operational activities associated with a disposal facility prior to disposal. The NRC is interested in identifying those design and operational activities at a disposal facility that may be impacted by GTCC and transuranic wastes. For example, the requirements in 10 CFR Part 73 would require licensees to develop safeguards systems to protect against acts of radiological sabotage and to prevent the theft or diversion of Special Nuclear Material (i.e., transuranic waste such as plutonium, uranium-233 or uranium enriched in the isotopes uranium-233 or uranium-235) if a sufficient amount of Special Nuclear Material were present above ground at the disposal facility.

3. How might GTCC and transuranic wastes affect disposal facility design for post-closure safety including protection of an inadvertent intruder?

The NRC is considering disposal units (i.e., a single trench, borehole, and vault) that would contain a single category of waste (i.e., sealed sources) as well as disposal units that contain a mixture of all three waste types. However, the NRC believes the best approach for understanding the issues would be to assume that waste within a disposal unit would be separated by the waste category and not be co-mingled. Such an approach could provide a clear understanding of the issues associated with how a specific waste category might affect disposal facility design. Certain waste streams associated with GTCC and transuranic wastes have larger inventories and concentrations of radionuclides than was typically considered at low-level radioactive

waste disposal facilities. For example, certain GTCC and transuranic wastes in sufficient quantities have the potential for significant thermal output that could affect degradation processes within a disposal unit and hydrogen gas generation through radiolysis that could also affect degradation processes of the waste package and waste form. Additionally, waste streams associated with GTCC and transuranic wastes may have fissile materials that require facilities to be designed to limit the potential for a criticality event or limit the amount of fissile material that can be disposed. There is a potential balance between security/safety and economic feasibility of design, construction and operation. The NRC would like to hear from the stakeholders on these aspects as well. The information provided on economic feasibility would be in concert with the NRC's strategies on examining the cumulative effects of potential regulatory actions. The NRC is interested in identifying the various scenarios that should be considered in evaluating the post-closure safety for the disposal of GTCC and transuranic waste—especially scenarios associated with specific issues and concerns that may not have been previously considered for commercial disposal facilities (i.e., synergistic effects of the thermal output on geochemical processes affecting release of radionuclides).

Public Meeting

To facilitate the understanding of the public and other stakeholders of the issues and the submission of comments, the NRC staff has scheduled a public meeting for February 22, 2018. The meeting will be held from 1:00 p.m. to 3:00 p.m. EST in the NRC's Two White Flint Auditorium at 11545 Rockville Pike, Rockville, Maryland.

Interested stakeholders participating via webinar will be able to view the presentation slides prepared by the NRC staff and electronically submit comments over the internet. Participants must register to participate in the webinar. The registration information to participate in the public meeting via the webinar may be found in the meeting notice at <https://www.nrc.gov/pmns/mtg?do=details&Code=20180033>. The meeting notice can also be accessed through the NRC's public website under the headings Public Meetings & Involvement at <https://www.nrc.gov/public-involve/publicmeetings/index.cfm>.

The final agenda for the public meeting will be posted no fewer than 10 days prior to the meeting date. Interested stakeholders that are unable to participate in person or via webinar may choose to participate via teleconference by dialing the bridge number (800) 857-9840 and entering the pass code 4975456.

Submitting Comments

Interested stakeholders may submit comments by any of the following methods:

- Federal Rulemaking website: Go to <http://www.regulations.gov> and search for Docket ID NRC-2017-0081. Address questions about NRC dockets to Carol Gallagher at (301) 415-3463 or at Carol.Gallagher@nrc.gov.

- Email Comments to: Email comments to Rulemaking.Comments@nrc.gov. If you do not receive an automatic email reply confirming receipt, then contact the NRC at (301) 415-1677.
- Fax comments to: Fax comments to Secretary, U.S. Nuclear Regulatory Commission, at (301) 415-1101.
- Mail comments to: Mail comments to Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555– 0001, ATTN: Rulemakings and Adjudications Staff.
- Hand deliver comments to: Comments may be hand delivered to the NRC at 11555 Rockville Pike, Rockville, Maryland 20852 between 7:30 a.m. to 4:15 p.m.

Interested stakeholders are reminded to please include Docket ID NRC 2017-0081 in the subject line of any comment submission.

Obtaining Information

Interested stakeholders should refer to Docket ID NRC–2017–0081 when contacting the NRC about the availability of information for this action. Stakeholders may obtain publicly-available information related to this action by any of the following methods:

- Federal Rulemaking website: Go to <http://www.regulations.gov> and search for Docket ID NRC–2017–0081.
- NRC’s Agencywide Documents Access and Management System (ADAMS): Publicly-available documents may be obtained online in the ADAMS Public Documents collection at <http://www.nrc.gov/reading-rm/adams.html>. To begin the search, select “ADAMS Public Documents” and then select “Begin Web-based ADAMS Search.” For problems with ADAMS, please contact the NRC’s Public Document Room (PDR) reference staff at (800) 397–4209, (301) 415–4737, or by email to pdr.resource@nrc.gov.
- NRC’s PDR: Copies of public documents may be examined and purchased at the NRC’s PDR, Room O1–F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

Background

The NRC’s “Licensing Requirements for Land Disposal of Radioactive Waste” are provided in 10 CFR Part 61. Section 10 CFR 61.2, “*Definitions*,” provides that waste as used in Part 61 means those low-level radioactive wastes containing source, special nuclear or byproduct material that are acceptable for disposal in a land disposal facility. The definition also indicates that low- level radioactive waste means radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel or

byproduct material as defined in paragraphs (2), (3), and (4) of the definition of byproduct material in § 20.1003.

The Statements of Consideration (SOC) for the 10 CFR Part 61 proposed rule explained that not all waste may be suitable for disposal in the near surface. Specifically, Section IV, “*Purpose and Scope*,” of the SOC indicates that, while 10 CFR Part 61 was intended to deal with the disposal of most low-level radioactive waste defined by the Low-Level Radioactive Waste Policy Act, the 10 CFR Part 61 waste classification system identified some low-level radioactive wastes that are not suitable for disposal under its regulatory framework, and alternative methods would have to be used.

In § 61.55, “*Waste classification*,” the NRC developed a classification system for waste for near surface disposal, which categorizes waste as Class A, B or C. This provision also describes waste that is not generally acceptable for near-surface disposal, whose disposal methods must be more stringent than those specified for Class C waste. This waste is referred to as GTCC waste.

Nuclear power reactors, facilities supporting the nuclear fuel cycle and other facilities and licensees outside of the nuclear fuel cycle generate the GTCC waste. This class of wastes include:

- plutonium- contaminated nuclear fuel cycle wastes;
- activated metals;
- sealed sources; and,
- radioisotope product manufacturing wastes – i.e., wastes “occasionally generated as part of manufacture of sealed sources, radiopharmaceutical products and other materials used for industrial, education, and medical applications.”

Transuranic waste is not included in the § 61.2 definition of low-level radioactive waste. In a 1988 amendment to the Atomic Energy Act of 1954, as amended, a definition for transuranic was added. Transuranic waste is defined as “material contaminated with elements that have an atomic number greater than 92, including neptunium, plutonium, americium, and curium, and that are in concentrations greater than 10 nanocuries per gram [(nCi/g)], or in such other concentrations as the [U.S.] Nuclear Regulatory Commission may prescribe to protect the public health and safety.” Transuranic waste is a byproduct of nuclear research and power production and is primarily produced from spent fuel recycling, medical isotope production or nuclear weapons fabrication. The waste may consist of rags, tools and laboratory equipment contaminated with organic and inorganic residues.

The identification and evaluation of regulatory concerns associated with land disposal of GTCC and transuranic waste will largely depend on the characteristics of the wastes – i.e., isotopes; concentrations and volumes of waste; and, physical and chemical

properties. The variable characteristics of the waste can influence the decision regarding the appropriate regulatory approach to use for management and disposal of these wastes. Overly conservative assumptions for the inventory and characteristics could significantly limit disposal options, whereas, overly optimistic assumptions with respect to characteristics could lead to a disposal facility that may not provide adequate protection of public health and safety and security.

For additional information, please contact Cardelia Maupin of the NRC's Office of Nuclear Material Safety and Safeguards (NMSS) at (301) 415-4127 or at Cardelia.Maupin@nrc.gov.

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