U.S. Nuclear Regulatory Commission Public Meeting Summary
And Answers to Questions

Title: Regulatory Concepts for Integrated Low-Level Radioactive Waste Disposal Rulemaking

Meeting Identifier: 20231325

Date of Meeting: January 23, 2024

Location: Webinar

Type of Meeting: Informational meeting with a Question-and-Answer session

Purpose of the Meeting: The purpose of this public meeting was to describe the draft regulatory concepts being addressed in the Integrated Low-Level Radioactive Waste Disposal rulemaking and to provide a forum for members of the public to make presentations and ask questions on this rulemaking.

Note: All NRC staff positions expressed at this meeting and in this document are preliminary. Proposed and final requirements may continue to develop based on public input and internal considerations.

General Details: The U.S. Nuclear Regulatory Commission (NRC) staff conducted a public webinar on January 23, 2024, to discuss the NRC's Integrated Low-Level Radioactive Waste Disposal rulemaking. This was the second public meeting on this rulemaking; the first public meeting was held on May 17, 2023. This meeting was intended for the NRC staff to briefly present the regulatory concepts addressed in this rulemaking and to provide a forum for members of the public to make presentations on this rulemaking. The meeting started at 2:00 p.m. ET and concluded at approximately 4:15 p.m. ET. There were approximately 150 participants, including NRC staff and management, other Federal government agencies, State representatives, industry, non-governmental organizations, trade press, and other members of the public.

George Tartal from the Office of Nuclear Material Safety and Safeguards (NMSS) started the meeting by welcoming all attendees and describing the purpose, agenda, and meeting logistics. Mr. Tartal noted that the meeting was being recorded and that the NRC was not accepting formal public comments at the meeting, rather that would happen at a later point in the rulemaking process. All of the Microsoft Teams chat questions asked during the meeting have been answered and included in this summary. Jane Marshall from NMSS provided opening remarks for the meeting, welcomed attendees, and provided some insights on the public request for the meeting.

NRC Presentation: David Esh from NMSS made a presentation with slides. He started with a quick overview of the history of the rulemaking and how two separate rulemakings have been integrated into the current rulemaking. He presented on the safety case, which is a high-level summary of the information and analyses that support the demonstration that the land disposal facility will be constructed and operated safely, and that disposed material will not endanger

public health and safety. He then discussed the technical assessments, including intruder, performance, site stability, and operational safety. He then discussed timeframes and compliance period, describing the staff's proposal to require a compliance period of 1,000 years without significant quantities of long-lived radionuclides, and otherwise 10,000 years and a performance period. Mr. Esh then discussed the draft requirements for Greater-Than-Class C (GTCC) waste criticality and physical protection, whereby near-surface disposal would require a minimum of 5 m depth and an intruder barrier, up to a 10,000 nCi/g threshold. He then discussed waste acceptance, whereby a licensee could use the site-specific results of technical analyses to determine the waste acceptance criteria. Finally, he discussed exception criteria that would apply to existing licensees who don't plan to accept GTCC waste or a significant quantity of long-lived radionuclides. Following Mr. Esh's presentation, the NRC invited participants to ask questions.

Wyatt Padgett from Urenco USA asked if the revised regulatory analysis will be made available before the proposed rule goes to the Commission. The NRC staff responded that the revised regulatory analysis will not be made publicly available before the rulemaking package goes to the Commission, though there have been significant changes made to it since it was last made available for comment, and that it considers the previous comments submitted. The NRC staff also added that the rulemaking process allows for public comments to be submitted and that prior rulemaking efforts resulted in significant changes between the proposed and final rules.

Karen Hadden expressed concern for ever-hotter materials being disposed and that criticality is a concern where explosive, corrosive chemicals of many kinds are present.

Mike Woodward from Hance & Scarborough law firm asked if there will be an easy way to determine what the term significant quantities of long-lived radionuclides means. The NRC staff answered that, although there is no quick way to make this determination, Appendix H to the draft guidance will help a licensee determine what a significant quantity is.

Connie Kline read a short quote from an unreferenced NRC document that there is no way to guarantee that any disposal facility for any waste will not release some amount of radioactivity. The NRC staff generally agreed with this and made an analogy to the institutional control period for waste facilities. The NRC staff added that small amounts of radioactivity will get out of those facilities over time, and that the NRC's regulations ensure that what does get out will not pose a safety concern.

Connie Kline then asked if any of this is being proposed for on site at reactor low-level radioactive waste containment. The NRC staff responded that this is for removal of material to a disposal facility.

Low-Level Radioactive Waste Forum Presentation: Daniel Shrum from the Low-Level Radioactive Waste Forum made a presentation with slides. His presentation focused on questions on how the rulemaking will address GTCC waste, questions on the compliance period and recommending the compliance period be no longer than 1,000 years, questions on why a performance assessment is needed for the intruder analysis as the approach should be reasonable and flexible and not a barrier for the next facility to be built, questions on why the NRC needs to include an exception clause and that the existing rule is sufficient in this area, and how his concerns with regards to the regulatory analysis from the 2016 version of the

rulemaking would be addressed in the new rulemaking. Following Mr. Shrum's presentation, the NRC invited participants to ask questions.

NRC staff clarified that for the performance period it's an As Low As Reasonably Achievable-like criteria, so that impacts are reduced to the extent practical.

Steven Sondheim had three concerns: 1) that radioactive waste being dumped in Memphis garbage dumps about 10 years ago with no monitoring or checking of the trucks that brought the waste in, 2) that radioactive waste could be left at the site where it's produced, and 3) a lot of foreign waste has been sent to Memphis and other local places. NRC staff responded that regulatory control and oversight is necessary in the management of radioactive materials and radioactive waste, and that the generators and disposal facility operators are being relied upon to do the right thing. The regulator ensures that in the circumstances where things don't go right they get corrected. As for leaving waste where it's generated, staff mentioned that it found that such a process would not provide public health and safety at certain sites.

Department of Energy (DOE) Presentation: Amie Robinson from the U.S. Department of Energy's Office of Waste Disposal in Environmental Management made a presentation without slides. Her office is responsible for cleanup of sites all over the country. Waste from these sites can be stored on-site or at other facilities. DOE has a vested interest in and continues to support the NRC's effort to update regulatory requirements for disposal of GTCC and low-level wastes. DOE agrees with NRC that near-surface disposal is a suitable option for GTCC waste disposal when the waste acceptance criteria are developed based on site specific performance analysis that considers the actual site conditions and the characteristics of the waste to be disposed. Another suggestion is that NRC should provide analysis for sites based on their climate or demographics, such as the more arid sites, which are typical of radioactive disposal locations. Another suggestion is that the NRC should include accompanying guidance for sites on individual waste stream analysis and inventory tracking to add regulatory flexibility based on site-specific information. She reiterated that DOE agrees with the NRC that near surface disposal is a suitable option for GTCC waste disposal when the waste acceptance criteria are fully developed based on a site-specific performance analysis that considers the actual individual site conditions and characteristics of the waste to be disposed. Following Ms. Robinson's presentation, the NRC invited participants to ask questions.

The NRC staff added that the NRC's criteria do not apply to DOE disposal facilities. The DOE has its own criteria that applies to their facilities, whereas the NRC's criteria apply to commercial low-level waste disposal facilities.

Urenco USA Presentation: Wyatt Padgett from Urenco USA made a presentation with slides. Mr. Padgett described Urenco's uranium enrichment business line, including a pilot project to dispose of a limited quantity of tails and a contract in place for disposal at one of the US disposal sites, which is expected to be completed early this year. Urenco USA is committed to endorsing and actively supporting well-researched and thought-out regulation that contributes to the overall welfare of the industry, fosters fair competition, and ensures the highest standards of ethical business practices. Urenco USA stated they had provided comments on earlier versions of the regulatory analysis supporting previous rulemaking efforts. During that analysis, assumptions were made on the direct impact to four licensees and Agreement States. Urenco USA believes that pass-through costs were not included, and their perspective is that the cost

estimate falls significantly short of the total impact to the industry. Input from Urenco USA and industry members is needed for the regulatory analysis to be properly completed, as Urenco USA's estimates were more than 10 times the NRC's analysis alone. Urenco USA stated that the NRC has never publicly addressed these comments and that the NRC should ensure previous comments are addressed in this rulemaking. Following Mr. Padgett's presentation, the NRC invited participants to ask questions.

Connie Kline stated that the NRC's mission is to regulate nuclear power and to protect public health and safety. She was concerned with the discussion of the burdens on the industry or the negative impact on the industry, and that the NRC should not consider those kinds of costs. [This comment was responded to by Perry Robinson, and that question and answer are addressed later in this summary.]

The NRC staff then clarified that there are differences between Class C waste and GTCC waste, as described in 10 CFR 61.55(a)(4) that talks about waste that's not generally acceptable for near surface disposal and is reserved to the NRC at the moment, and it's also carved out in the Low Level Waste Policy Amendments Act of 1985. There are additional considerations for disposing of GTCC waste.

Energy Solutions Presentation: Tom Magette from Energy Solutions made a presentation with slides. Mr. Magette said Energy Solutions operates two of the four low-level radioactive waste disposal sites in the U.S. He encourages the NRC staff to maintain the current schedule for the rulemaking, as they have seen the schedule slip in the past. He said the NRC needs to employ an independent review, including all four of the sited states and a compact representative, to minimize unintended consequences. He believes that 1,000 years should be a time limit for a compliance period for ensuring stability and longer time frames are more appropriately addressed qualitatively since uncertainties increase over time. Mr. Magette stated he does not like the term "exceptions" since it infers that something is not being addressed that maybe should be, and the rule should instead refer to "criteria" in 10 CFR 61.1(b). Following Mr. Magette's presentation, the NRC invited participants to ask questions.

Larry Camper asked if the NRC is considering revising the tables in 10 CFR 61.55 given that the cutoff for transuranic waste today is 100 nanocuries per gram, and if not, how will it be addressed. He also asked how the NRC staff is addressing security issues associated with the near-surface disposal of transuranic waste. The NRC staff responded that the approach of using a site-specific technical analysis alleviates the burden of the fixed limits in the table. The table was based on the radionuclides of waste analyzed in the 1980s, and fusion and advanced reactors could have different radionuclides. The NRC staff added that some of the GTCC waste are of concern from a physical protection standpoint in the proposed rule because of the concentrations of certain materials. The rulemaking includes discussion of what has been considered in the different types of waste and what would need special physical protection requirements or less physical protection requirements depending on the type and concentrations of the waste. There are some limitations in terms of special nuclear material that Agreement States can regulate under section 274 of the Atomic Energy Act and also incorporated into 10 CFR Part 150.

Nuclear Information and Resource Service (NIRS) Presentation: Diane D'Arrigo from NIRS made a presentation without slides. Ms. D'Arrigo is a radioactive waste project director at NIRS.

She questioned whether burying long lasting, concentrated radioactive material in trenches 30 to 100 feet deep provided adequate isolation from the environment. She stated that although there have been improvements, she believes there is a constant pressure to weaken public protection and environmental protection. Ms. D'Arrigo noted that the current proposal would allow much higher radioactive concentrations that are long-lived and that people do not want cancer-causing, immune-compromising radioactive materials leaking into their water, soil, or air, even if it is at a legal level of exposure.

Ms. D'Arrigo stated that the proposed rule would allow more than 33 times higher radioactive releases and exposures from low-level waste sites than from the high-level waste facility formerly proposed at Yucca Mountain. She added that Federal regulations for the high-level repository allow a release of radioactivity of 15 millirem per year for the first 10,000 years, while this proposal is for 25 millirem during operation, but up to and beyond 500 millirem per year from the radioactive waste disposal sites. Ms. D'Arrigo stated this 500 millirem release is a risk of 1 in 25 adults exposed getting cancer according to the EPA's rules and the National Academy of Sciences risk assessments assuming a lifetime dose.

Ms. D'Arrigo noted that an NRC differing opinion paper outlines the legal, technical, security, and policy violations of permitting GTCC waste and depleted uranium into these facilities, but rather should go to federally licensed high level waste radioactive facilities. Government regulators and members of the public pay hundreds or thousands of dollars to gain access to and learn to use computer codes that claim to be able to predict the doses to members of the public in years, decades and centuries to come. She believes the probabilistic performance assessments are black boxes that are being used to justify longer-lasting and more-intensely radioactive waste going to sites that are not capable of isolating the waste for as long as it's dangerous.

Ms. D'Arrigo commented that over the various iterations of this rulemaking there have been efforts to deregulate nuclear waste, calling it below regulatory concern. She noted that while the below regulatory concern provision or very low-level waste is not within the scope of this rulemaking, she opposes the deregulation of waste. She opposes the movement of higher concentration and longer lasting waste into these facilities. The technical concerns on this have been repeatedly presented to the NRC by the state of Utah, by the Institute for Energy and Environmental Research, and others.

Ms. D'Arrigo stated she believes the regulations in 10 CFR 61.41 to 44 [from Subpart C, "Performance Objectives"], protection of the general public from releases of radioactivity, in this proposal expressly allow doses of 500 millirem effective dose equivalent per year to members of the public, although the existing concentration tables that distinguish the classes A, B, C, and GTCC are based on allowing 500 millirem per year. The current limit is 25 millirem per year and the risk at that level is 1 in 500 people getting cancer for exposed men getting cancer. For females, children and babies, it's a much higher risk, 7 times more for baby girls at the same level as compared to a standard man. At 500 millirem one in 25 people exposed over their lifetime will get cancer. Ms. D'Arrigo finds the existing rule unacceptable, but the new rule would be even worse, as it would allow higher concentrations, 33 times higher than would be allowed under the rules for the high-level waste facility. The 500 millirem limit is 20 times higher than releases allowed from operating nuclear power reactors by the EPA and its 40 CFR 190 limits.

This amount of exposures would come from a facility that would be closed for decades, centuries or millennia. Ms. D'Arrigo opposes the proposed rule changes that would do this.

Ms. D'Arrigo is concerned about the creation of compliance, performance and protective assurance periods that cannot be guaranteed. Changing the 100 years of institutional control to other longer periods doesn't do anything to isolate the waste during that time. The radioactive waste concentrations are plugged into computer models that have never been fully verified or validated. The computer models are allowing GTCC waste, depleted uranium, and other long-lasting and intense materials into the 10 CFR Part 61 sites. In the history of existing sites, the first six of them have leaked, and some are continuing to leak. Dr. Arjun Makijani and Bryce Smith of the Institute for Energy and Environmental Research provided numerous technical challenges to the allowance of GTCC waste and depleted uranium into these facilities, specifically into the Waste Control Specialists facility. Ms. D'Arrigo called on the NRC staff to review those papers, the differing opinion, and the 2015 comments from NIRS.

The uranium health risks are higher than assumed. Ms. D'Arrigo believes this is a major federal action that requires an environmental impact statement. There's been pressure to keep the rulemaking on schedule, however, she believes the 90 days for public comments needs to be extended. She is concerned about the shift in the Department of Energy saying it agrees with the NRC that GTCC waste can go to low-level waste burial sites. Following Ms. D'Arrigo's presentation, the NRC invited participants to ask questions.

An NRC staff member added to the discussion of the differing opinion that was mentioned by Ms. D'Arrigo, stating that it addresses some of the concerns raised by Ms. D'Arrigo about dual regulation, the issue of disruption of the compact system, and the issues that were raised on security.

Pat Marida stated that waste continues to be generated when there really isn't a good solution for its disposal. A specific radioactive particle will disintegrate, but it forms isotopes of other radioactive elements, and those all have their own decay period half-lives, and then they also give out neutrons and alpha particles that hit other normal regular elements and make them radioactive, so they continue to generate new radioactivity. He stated that we're creating compounds and dangerous materials that threaten life on Earth, and we cannot be too careful with them. In fact, we cannot really be generating any more of them.

Larry Camper asked about the relationship with 10 CFR Part 150 in addressing GTCC waste and whether that would be dealt with primarily through statements of consideration language or changes to 10 CFR Part 150. The NRC staff responded that there are some limited changes being proposed to 10 CFR Parts 150 and 73.

NRC Presentation (continued): Mr. Tartal then presented on next steps for the rulemaking, whereby the project schedule would have the NRC staff deliver a proposed rule to the Commission for vote in May 2024. He emphasized that, if the Commission approves, a proposed rule will be published in the Federal Register, and that notice will describe how members of the public can comment on the proposed rule. Mr. Tartal then adjourned the meeting. All of the meeting presentations given with slides are available in ADAMS (see References below).

The participants asked numerous questions in the Microsoft Teams chat during the presentations, and those questions and answers are summarized here. The NRC staff answered some of the questions during the meeting, while others were answered after the meeting had concluded. Both sets of questions and answers are included in this summary.

Summary of Questions and Answers from the Meeting Chat that were Answered During the Meeting:

In addition to the topics discussed in the meeting, the NRC staff received several questions electronically via the Teams chat. The Teams chat in NRC public meetings is usually reserved for logistics issues, but in this case the NRC staff offered the chat as another means for asking questions. The following are questions that were asked and answered during the course of the meeting in the Microsoft Teams chat.

Q: Tim Gannaway – Is the GAO correct in determining that GTCC domestic sealed sources currently have a viable pathway for disposal while GTCC sealed source material of foreign origin does not?
A: NRC staff – The licensee can analyze the disposal of GTCC and submit that to the regulator under the current regulations.

Q: Tim Gannaway – Waste Control Specialists (WCS) and the Texas Commission on Environmental Quality (TCEQ) representatives have claimed that there is no difference in Class C or Greater Than Class C criteria. Is that accurate and, if so, why isn't GTCC just classified as Class C waste?
A: NRC staff – The proposed criteria are not yet issued. However, what TCEQ said is mostly accurate. The fundamental technical analyses would be the same. GTCC waste would be required to have a 500-year intruder barrier **AND** be buried 5 m deep, whereas Class C waste is required to have a 500-year intruder barrier **OR** be buried 5 m deep. There are other technical considerations for certain types of GTCC, such as heat generation and radiolysis. But those would not apply to all types of GTCC.

Q: Tim Gannaway – Have any sites aside from the WCS facility in Texas expressed interest in GTCC disposal? How many commercial low-level radioactive waste sites currently operate in agreement states? How many of those are licensed for disposal of Class A, B, and C waste?
A: NRC staff – No sites besides Texas have expressed interest in GTCC waste disposal. There are currently 4 operating sites. Three of the four are licensed for A, B, C. [To be clear - the typed answer NRC staff provided during the meeting stated that the Texas site expressed interested in GTCC, not the State of Texas. WCS is the licensee, and the State of Texas is the regulator.]

Q: Connie Kline – How many Agreement States are there?
A: NRC staff – Most US states are NRC Agreement States – there are currently 39 Agreement states and 3 letters of intent to become Agreement States. See https://www.nrc.gov/agreement-states.html .

Q: Monica Perales – Will you avoid critical infrastructure and major resources such as oil and gas development when determining disposal sites?

A: NRC staff – There are siting characteristic requirements provided in 10 CFR 61.50. These have been revised in the proposed rule but are mostly the same as in the existing rule. The requirement at 10 CFR 61.50(a)(3) talks about consideration of future developments.

Q: Roger Seitz – The United Kingdom uses a strict dose constraint for a compliance period of several hundred years and continues calculations beyond that for risk guidance levels (not strict dose limits). The longer-term calculations are quantitative in the UK but are compared to a risk guidance level and are not interpreted as strict compliance with a dose constraint.
A: NRC staff – UK regulators were present when the NRC staff presented this information at DISPONET (October 2023). They stated that they rely on long-term technical analyses to make licensing decisions. For instance, the low-level radioactive waste site (Drigg) is expected to be fully eroded in 2,000 to 5,000 years. The UK regulators stated that they would expect the analyses to be longer if this erosion were not to occur.

Q: Monica Perales – Cardelia, but you know that it was TCEQ and WCS that started this entire process. The industry has made that very clear. They were the impetus. And, you are aware that the NRC and WCS have challenged other actions of Texas. For example, despite the State of Texas saying NO to spent nuclear fuel, the NRC is pushing on in court. Therefore, I am not sure I have faith in your statements, Cardelia.
A: NRC staff – Yes, the NRC staff is aware that it started with questions from WCS through TCEQ. However, neither WCS nor TCEQ can speak on behalf of the State of Texas. This was made clear to the NRC by meetings with the Texas Office of the Governor and letters from the Governor to the NRC and DOE. Please check out the Texas equivalent of 10 CFR 61.44(a)(4). As required by all Agreement States, the State of Texas acknowledged NRC's authority for GTCC waste disposal in its regulatory program by adopting regulations compatible with those of the NRC in 10 CFR 61.55(a)(iv). The Texas Administrative Code 336.362(a)(2)(D), states: "Waste that is not generally acceptable for near-surface disposal is waste for which form, and disposal methods must be different, and in general more stringent, than those specified for Class C waste. Disposal of this waste is regulated by the United States Nuclear Regulatory Commission." The adoption of this regulatory language by the State of Texas was required by the NRC as a matter of compatibility in an October 2, 2003, letter from Mr. Paul H. Lohaus, Director of the Office of State and Tribal Programs, to Ms. Susan Jablonski, Technical Advisor, TCEQ (ADAMS Accession No. ML032760041).

Summary of Questions and Answers from the Meeting Chat that are being Answered After the Meeting:

In addition to the topics discussed in the meeting, the NRC staff received several questions electronically via the Teams chat that were not addressed due to time limitations. The Teams chat in NRC public meetings is usually reserved for logistics issues, but in this case the NRC offered the chat as another means for asking questions. The following questions were asked in the Microsoft Teams chat but not discussed or answered and, the NRC staff is providing them here with the meeting summary.

Q: Tim Gannaway – What are differences in the two GTCC sealed source streams identified by the NRC and why is one included in the rulemaking proposal for near-surface disposal while the other is not?

A: NRC staff – The proposed rule is applicable to all GTCC waste being considered for near-surface disposal. Whether or not a certain GTCC waste is acceptable at a specific site (i.e., meets the regulatory requirements) will depend on a number of factors such as site characteristics, waste form stability, and the quantity and type of GTCC waste to be disposed.

The U.S. Department of Energy's Final Environmental Impact Statement for the Disposal of GTCC Waste grouped sealed sources into two broad categories: small, sealed sources and large Cs-137 irradiators. The large Cs-137 irradiators are encased in large devices with a volume of 0.71 m^3 (25 ft^3), whereas multiple small, sealed sources could fit inside a 208-liter drum (55-gallon drum). DOE estimated that the total volume of GTCC waste from the large Cs-137 irradiators was 1,000 m^3 and 1,800 m^3 for the small, sealed sources. The total volume of GTCC was divided into two groupings, based on information in DOE's FEIS, to better understand the potential hazards of sealed sources. The more significant difference between these two groups is the concentration of alpha emitting transuranic nuclides with half-life greater than 5 years in the sealed source. NRC has estimated (based on information in DOE's FEIS) that the small, sealed sources have a concentration on the order of 85,000 nCi/g compared to the Class C limit in Part 61 of 100 nCi/g. The NRC is considering that a concentration of 10,000 nCi/g for alpha emitting transuranic nuclides with half-life greater than 5 years as an upper limit for near-surface disposal of GTCC waste, beyond which would need to be evaluated by the Commission on a case-by-case basis, and thus has indicated the potential difficulty for near-surface disposal of the small sealed sources; however, with special technology or designs, a licensee may be able to justify that performance criteria could be met even with quantities in excess of this limit.

Q: Tim Gannaway – Why was a study completed on suitability of the Waste Control Specialists site in Texas for GTCC disposal in 2018 when it is prohibited by existing rules? Would a new study be completed if NRC finalize the proposed rule changes?
A: NRC staff – WCS as a licensee can complete technical studies as desired. The completion of a technical study by a licensee does not obligate the regulator to review or approve. At that time, it wasn't clear to the State of Texas (regulator) if based on existing language in 10 CFR Part 61 that they could approve GTCC waste disposal or if the NRC would need to approve. That was the subject of analysis and eventually resulted in the rulemaking discussed at the meeting.

Q: Tim Gannaway – TCEQ Commissioner Bobby Janecka stated at a recent hearing in our community (Andrews, Texas) that the NRC has disposed of GTCC waste on a case-by-case basis. When, where, and what specific materials comprised those case-by-case disposals?
A: NRC staff – The NRC regulates waste disposal and does not dispose of waste. The NRC is not aware of waste being disposed such that the package prepared for disposal was GTCC waste, though individual components may have had concentrations above the Class C limit. Waste classification is not determined until a package is ready to be shipped for disposal. Licensees can use concentration averaging, consistent with 10 CFR 61.55(a)(8) and its associated guidance in the 2015 Branch Technical Position on Concentration Averaging and Encapsulation. Within the constraints of that guidance, a few individual pieces within a package may contain concentrations within the GTCC range, but the overall package's average concentrations will still meet Class C limits. For example, the Washington State Department of Health concluded in their 1998 Technical Evaluation Report that the Portland General Electric Trojan reactor vessel with its highly activated internals in place (but without the fuel) met stability

and performance requirements and could be disposed of at the US Ecology Richland low-level radioactive waste disposal site as Class C waste.

Q: Tim Gannaway – The NRC issued a Consolidated Interim Storage Facility license to WCS which was overturned by the courts as bureaucratic overreach in violation of existing law. The proposed rule change contradicts the existing Low-Level Radioactive Waste Policy Amendments Act of 1985. How does the NRC justify licensing of activities clearly prohibited by Congress?
A: NRC staff – The NRC performs its regulatory activities consistent with statutes and Congressional direction. The NRC will abide by final court decisions and disagrees with the comment that NRC is in violation of existing law.

Q: Tim Gannaway – WCS and TCEQ representatives have indicated that much of the GTCC waste comes from medical or oilfield sources. What percentage of GTCC waste comes from the medical or industrial uses as opposed to the amount from the generation of nuclear energy, research, and defense related activities?
A: NRC staff – The U.S. Department of Energy's "Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste" (FEIS) estimated a total volume of GTCC waste of 8,800 m^3. This total volume is comprised from GTCC waste that has been or will be generated by current activities and facilities (termed Group 1 in DOE's FEIS) and GTCC waste that may be generated by future activities and facilities (termed Group 2 in DOE's FEIS). The Group 1 GTCC waste has an overall volume of approximately 3,680 m^3 based on approximately 880 m^3 of activated metal GTCC waste (from the generation of nuclear energy at commercial nuclear reactors) and 2,800 m^3 of sealed source GTCC waste (sealed sources used in medical and industrial activities). The Group 2 GTCC waste has an overall volume of approximately 6,120 m^3 and does not contain any sealed sources. Thus, sealed sources from medical and industrial applications make up approximately 75% by volume of the Group 1 GTCC waste and 30% by volume of all GTCC waste (both Group 1 and Group 2).

Q: Tim Gannaway – WCS holds a contractual agreement with the DOE to transfer ownership of the Federal Waste Facility to the federal government once they cease operations and complete closure of the facility. Would an expansion to include disposal of GTCC waste in the facility affect the current agreement for DOE to eventually take ownership? Would it impact the amount required for financial assurance and decommissioning of the site?
A: NRC staff – The GTCC waste disposed in the Federal cell would likely be included in the ownership assumed by DOE since they will take ownership of the facility and not particular waste types. Financial assurance and decommissioning should be minimally impacted by the receipt of GTCC waste since site closure. Those aspects are determined primarily by surface closure design and overall facility design and are mostly independent from waste type (assuming all waste disposed is stable).

Q: Tim Gannaway – Does the proposed rule change on GTCC also encompass waste defined as GTCC-like?
A: NRC staff – The proposed rule statements of consideration in the *Federal Register* notice will describe the distinction between GTCC and GTCC-like waste. The NRC's regulations under 10 CFR Part 61 apply to domestic, commercial facilities who may decide to dispose of GTCC

waste (assuming the rule becomes effective), whereas the DOE is responsible for managing GTCC-like waste in Federal facilities under the DOE's rules.

Q: Steven Sondheim – In Memphis the public and the local admin was appalled that up to [Class] C waste was dumped in local garbage dumps with no liners, leakage, and no monitoring of radioactive input. TDEC DID NOT INFORM PUBLIC. We want local input and control! How? And is there an evacuation plan?
A: NRC staff – The scope of this rulemaking only includes low-level radioactive waste disposal facilities.

Q: Connie Kline – Is this rule based on multiple state compacts? That failed for LLRW in the past.
A: NRC staff – This rule is not dependent on the state compact system. It should work similarly to how the current regulation works in terms of state compacts.

Q: Pat Marida – How does NRC hope to act responsibly when talking about 1000 or even 100 years from now? Makes for a lot of guessing and propaganda. What is the real need to get waste off certain people's hands now? Not to mention the dangers of shipment. Radioactivity will last essentially forever. That's a billion years for uranium. This new low-level proposal must be changed to a proposal to stop generating waste when there is no real solution for dealing with it.
A: NRC staff – This rule covers the safe disposal of low-level waste including long-lived radionuclides. The multiple different requirements work together to ensure safety of people today and into the distant future.

Q: Pat Marida – We have been through this many times before. Add increasingly higher levels of radioactive waste to landfills. Designate it as below regulatory concern. Make compacts between states to dump all the waste into one state. My state of Ohio was once designated to take the waste from several other states. Whatever state is weakest or has leadership willing to take it.
A: NRC staff – All States have to meet certain safety criteria associated with low-level radioactive waste disposal.

Q: Roger Seitz – The 500 mrem/yr limit for intrusion for Part 61 was based on 500 mrem/yr cleanup standards in 10 CFR Part 20 at that time rather than considering probabilities.
A: NRC staff – There is no technical basis outside of the consideration of the lower likelihood of occurrence to apply a dose standard of 25 mrem/yr to a person on one side of the hypothetical buffer zone boundary and apply a standard of 500 mrem/yr to a person on the other side of the boundary. Regardless of past discussion and consideration, the dose standards proposed today reflect the likelihood of occurrence.

Q: Monica Perales – DOE should also include seismicity when conducting their analysis.
A: NRC staff – The NRC's regulations do not apply to the DOE. The DOE develops their own regulations. In the NRC's requirements seismicity is to be considered in site selection.

Q: Pat Marida – Why is NRC's time limited so they cannot answer all the public's questions? This seems to be NRC standard policy. And why is NRC in charge of making a summary, which usually sums up good reasons for the NRC proposal? Why aren't these meetings scheduled to

allow the public to speak for as many hours as we have questions? We are not paid for being here. Our questions are rarely answered accurately. Often answers refer to a paragraph somewhere that provides no real answer. Or questions are "misinterpreted" and an answer is given that does not relate to the question.
A: NRC staff – The NRC uses its best judgement in scheduling public meetings to anticipate presentations, discussions, and questions. The NRC normally issues meeting summaries within 30 days after each public meeting. The NRC is answering all of the questions asked during the meeting within this summary regardless of whether they were asked verbally or within the meeting chat.

Q: Pat Marida – Will the chat be published online for the public to view? For how long?
A: NRC staff – The NRC is answering all of the meeting chat questions within this meeting summary. The meeting summary is a permanent agency record, whereas a Microsoft Teams meeting chat is not.

Q: Perry Robinson – [In response to Connie Kline's comment after the Urenco USA presentation] Consideration of burden on the industry is explicitly required pursuant to Presidential Executive Orders.
A: NRC staff – The Federal government is required to consider all sources of public burden in a regulatory analysis. Under Executive Order 12866 "each agency shall consider incentives for innovation, consistency, predictability, the costs of enforcement and compliance (to the government, regulated entities, and the public) … Expanding on this Executive Order, the NRC's draft NUREG/BR-0058, Rev. 5, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," instructs the staff to consider attributes such as industry implementation, the projected net economic impact on the affected licensees to implement mandated changes, and industry operation, the projected net economic effect due to routine and recurring activities required by the proposed action on all affected licensees.

Q: Lexi Tuddenham – At the same time, a qualitative approach should only complement a quantitative benchmark, which if needs to be longer than 1,000 years, then should be.
A: NRC staff – The discussed approach is to require 1,000 years if the disposal facility will not contain significant quantities of long-lived radionuclides. If the facility would contain significant quantities of long-lived radionuclides, then the compliance period would be 10,000 years followed by a performance period covering longer timeframes. A site-specific intruder assessment would also be required for these timeframes. The approach would assure that quantitative information (benchmarks) are used to make safety decisions.

Q: Lexi Tuddenham – Here in Utah, with facilities continuing to try to take in this ever-hotter waste, citizens like me are very concerned about the prospect of more of the material being taken into a state that already been victimized by being a downwind state of nuclear testing.
A: NRC staff – The NRC's regulations under 10 CFR Part 61 provide adequate assurance of public health and safety for land disposal of radioactive waste. The NRC or its Agreement State, as applicable, regulates the licensees responsible for disposing of radioactive waste to ensure they remain in compliance with these regulations.

Q: Pat Marida – Depleted uranium from the Portsmouth Nuclear site has transuranics because high-level radioactive waste was run through the gaseous diffusion enrichment process for decades. There is a lot of Technetium-99 in the cylinders as well. This is highly dangerous. It

would be expected that all significant radioactivity present in a waste stream would be evaluated, so if the DU isn't pure that would be included in the technical analysis.
A: NRC staff – Licensees or applicants are required under 10 CFR 61.58(b) to provide methods for characterizing waste for acceptance. The methods must identify the parameters to be characterized and the uncertainty in the characterization data that is considered acceptable. The regulations specify that radionuclide identities, activities, and concentrations in the waste be adequately characterized. The NRC's technical analyses would then be used to ensure that any remaining uncertainties are identified and managed to protect public health and safety. In addition, and if required, appropriate design-specific license conditions may be used to mitigate uncertainties associated with the technical analyses.

Next Steps:

The NRC staff is developing a proposed rule that is currently scheduled to be delivered to the Commission in May 2024. If the Commission approves, the NRC staff will publish the proposed rule in the *Federal Register* for public comment. After considering the public comments, the NRC staff plans to deliver a final rule to the Commission (date TBD, placeholder at November 2025).

References:

- 1/23/2024 Public Meeting Notice - Public Meeting on the Integrated Low-Level Radioactive Waste Disposal Rulemaking, January 22, 2024 (ADAMS Accession No. ML24022A312)
- 1/23/2024 - NRC Staff Presentation on the Integrated Low-Level Radioactive Waste Disposal Rulemaking, January 23, 2024 (ADAMS Accession No. ML24022A141)
- 1/23/2024 - LLW Forum Presentation - Integrated Low-Level Radioactive Waste Disposal Rulemaking, January 23, 2024 (ADAMS Accession No. ML24022A139)
- 1/23/2024 - Severn Nuclear Services LLC Presentation - Integrated Low-Level Radioactive Waste Disposal Rulemaking, January 23, 2024 (ADAMS Accession No. ML24022A140)
- 1/23/2024 - Urenco USA Presentation - Integrated Low-Level Radioactive Waste Disposal Rulemaking, January 23, 2024 (ADAMS Accession No. ML24022A142)

SUMMARY OF JANUARY 23, 2024, PUBLIC MEETING TO DISCUSS THE INTEGRATED LOW-LEVEL RADIOACTIVE WASTE DISPOSAL RULEMAKING Dated February 26, 2024

DISTRIBUTION:
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RidsOpaMail
GTartal, NMSS
DBearde, NMSS
JShepherd, NMSS
DWhite, NMSS
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ADAMS Accession Nos.: ML24045A173

OFFICE	NMSS/REFS/MRPB/PM	NMSS/REFS/MRPB/RS	NMSS/REFS/RRPB/BC	NMSS/DUWP/LLW PB/BC
NAME	GTartal	DBearde	JShepherd	DWhite
DATE	2/14/2024	2/14/2024	2/14/2024	2/22/2024

OFFICIAL RECORD COPY

MEETING ATTENDANCE

PUBLIC MEETING TO DISCUSS REGULATORY CONCEPTS FOR THE INTEGRATED LOW-LEVEL RADIOACTIVE WASTE DISPOSAL RULEMAKING

WEBINAR

JANUARY 23, 2024, 2:00 P.M. – 4:00 P.M. (Eastern Time)

U.S. Nuclear Regulatory Commission	
Sarah Lopas	Jen Whitman
George Tartal	Derek Widmayer
Priya Yadav	Neil Sheehan
Cardelia Maupin	Marilyn Diaz Maldonado
Boby Abu-Eid	Jill Shepherd
David Esh	Melanie Wong
Diane Bearde	Harry Felsher
Jane Marshall	David Brown
Tim McCartin	Ryan Alexander
Lisa Dimmick	Suzanne Dennis
Lisa London	Jackie Cook
Sheldon Clark	Derek Widmayer
Gary Purdy	Joe Azeizat
Louis Caponi	Helen Chang
Hans Arlt	Keion Henry
Aaron Sanders	Christianne Ridge
Public	
Name	**Affiliation (if provided)**
Daniel Watts	Centrus Energy
Joshua Adams	Centrus Energy
Josie Piccone	
Jessalynne Wells	Andrews County, Texas government
Stephen Raines	
Chris Schwarz	Urenco USA
Roger Seitz	
Diane D'Arrigo	Nuclear Information Resource Service
Ashley Morris	BWXT
Brian Christian	
Darcy Campbell	EPRI
Mason Bridwell	Centrus Energy
Adam Summers	INL
Calvin Manning	Framatone
Brooke Olson	State of North Dakota
Keisha Cornelius	Oklahoma Dept. of Environmental Quality
Kaci Studer	State of Indiana
Corey Munz	TLG Services
Wyatt Padgett	Urenco USA

Enclosure

Karen Deibert	State of North Dakota
Dan Shrum	Low Level Waste Forum
Jana Bergman	Curtiss Wright
Larry Camper	
Janet Schlueter	NEI
Mike Woodward	Hance Scarborough, LLP
Lynne Garner	South Carolina DHEC
Michael Martinez	TCEQ
Meghan Lyle	Nevada DHEC
Laila El-Guebaly	
Perry Robinson	
Brian Vamvakias	Texas DSHS
Craig Miller	Orano
Timothy Gannaway	Lamar University
Alisha Stallard	TCEQ
James Kirk	SRS
Israel Chavarria	Washington DOH
Aaron White	U.S. Department of Energy
Amie Robinson	U.S. Department of Energy
Kimberley Noonan	South Carolina DHEC
Mark Senderling	INL
Janell Anderson	State of North Dakota
Bobby Janecka	TCEQ
Kim Kweder	U.S. Department of Energy
Kristen Schwab	Washington DOH
Christopher Kemp	U.S. Department of Energy
M O'Neill	
Tom Magette	Energy Solutions
Cheryl Head	State of Illinois
Ashley Forbes	TCEQ
Leah LaVallee	VNSFS
Alden Brown	Nusano
Paul Underwood	SRS
Coleman Miller	PG&E
Dan Leone	
Jonathan Major	U.S. EPA
Douglas Frenette	Republic Services
Omari Thompson	South Carolina ORS
David Stradinger	State of North Dakota
Rich Janati	State of Pennsylvania
Matt Hendrickson	Oregon DOE
Cheryl Lively	State of Texas
Cathryn Chudy	
Brandon Hurley	
Ed Everett	American Nuclear Insurers
Daniel Schultheisz	U.S. EPA
Marilew Bartling	U.S. Department of Energy

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Hans Weger	TCEQ
Yu Chen Huang	TCEQ
Krista Kyle	TCEQ
Jalynn Knudsen	Utah DEQ
Liam Hines	MIT
Syd Gordon	
Megan Quijano	State of Texas
Mary Meumayr	
Kinsey Boehl	
Lexi Tuddenham	Utah HEAL
Gregorio Rosado	Washington DOH
Steven Sondheim	
Deron Linkenheil	U.S. Department of Energy
Connie Kline	
Justin Marble	U.S. Department of Energy
Earl Fordham	Washington DOH
Monica Perales	FORL
Jzaneen Lalani	Nusano
Audrey Liter	TCEQ
Dan Snow	Lotus LLC
Farrah Court	TCEQ
Pat Marida	
Jeff Burright	Oregon DLCD
Ian Miner	
Raul Valenzuela	Stewart Inc.
Braden Asper	State of Utah
Daryl Davis	
Steven Hommel	SRS
Michael Callaham	
Brad Broussard	TCEQ
John Haygood	TCEQ
Joni Arends	CCNS
Morse Haynes	
John Folette	Nevada Dept. of Health
Michael Keegan	
Karen Hadden	
Ryan Williams	WCS Texas
Jeneane Anderegg	Andrews County, Texas government
Charlyne Smith	University of Florida
Cory Ryncarz	U.S. GAO
Timothy Jenkins	Republic Services
Maatsi Ndingwan	U.S. Department of Energy
Larry Kellum	
Oliver Barrett	

Note: Attendance list based on Microsoft Teams participant list. This list does not include individuals who did not provide their last name either in registering for the meeting or by a follow-up email.