REPORT OF THE PART 61 WORKING GROUP

Comments on a Proposed Rule to Amend Part 61 of Title 10 of the *Code of Federal Regulations (10 CFR)*, "Licensing Requirements for Land Disposal of Radioactive Waste"

LLW FORUM, INC

Low-Level Radioactive Waste Forum, Inc.
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ACKNOWLEDGEMENTS

This report was produced by the Part 61 Working Group (P61WG or working group) on behalf of the Low-Level Radioactive Waste Forum, Inc. (LLW Forum)—an organization established to facilitate state and compact implementation of the Low-Level Radioactive Waste Policy Act of 1980 and its 1985 Amendments (LLRWPAA) and to promote the objectives of low-level radioactive waste regional compacts. The LLW Forum is dedicated to the goals of educating policy makers and the public about the management and disposal of low-level radioactive wastes and fostering information sharing and the exchange of views between state and compact policy makers, federal officials, industry representatives and other interested stakeholders. Directors that serve on the Board of the LLW Forum are appointed by Governors and compact commissions.

Six representatives of members of the LLW Forum participated in the P61WG, including representatives of all four sited states/compacts, as follows:

- **Brad Broussard**, Texas Commission on Environmental Quality
- **Earl Fordham**, Washington Department of Health
- **Richard Janati**, Appalachian States Low-Level Radioactive Waste Compact Commission/Pennsylvania Department of Environmental Protection
- **Susan Jenkins**, South Carolina Department of Health and Environmental Control
- **Michael Klebe**, Central Midwest Interstate Low-Level Radioactive Waste Compact Commission/Illinois Emergency Management Agency
- **Rusty Lundberg**, Utah Division of Radiation Control, Department of Environmental Quality (LLW Forum Chair-Elect)

Four staff members contributed to this project including Todd Lovinger, LLW Forum Executive Director and P61WG Project Director; Gary Robertson, P61WG Technical Consultant; Sebastian Christian, P61WG Outreach Consultant; and Cecilia Snyder, P61WG Communications Consultant.

The P61WG and LLW Forum acknowledge the time and input of many stakeholders that contributed to the development of this report including, but not limited to, state and compact officials; federal agencies including the U.S. Department of Energy (DOE), National Nuclear Security Administration/Global Threat Reduction Initiative (NNSA/GTRI), and U.S. Nuclear Regulatory Commission; organizations; and disposal facility operators.

In particular, the P61WG and the LLW Forum express their sincere appreciation to the NNSA/GTRI for its support and funding of the working group and this report.

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This paper was prepared by the Low-Level Radioactive Waste Forum's (LLW Forum's) Disused Sources Working Group (DSWG) at the behest of the National Nuclear Security Administration's (NNSA)/Global Threat Reduction Initiative (GTRI). The opinions expressed in it are solely those of the DSWG and do not necessarily reflect the official policy or positions of any agency of the U.S. government, including NNSA/GTRI or the U.S. Nuclear Regulatory Commission (NRC), nor any organization with which the members of the DSWG are affiliated. NNSA/GTRI reviewed a draft of this paper for factual accuracy only.

COMMENTS SUBMITTED TO NRC BY P61WG IN JANUARY 2013

The following comments were developed by the Low-Level Radioactive Waste Forum's (LLW Forum's) Part 61 Working Group (P61WG) on the U.S. Nuclear Regulatory Commission's (NRC's) Preliminary Rule Language for Proposed Revisions to Low-Level Radioactive Waste Disposal Requirements (10 CFR Part 61) as found in NRC-2011-0012.

The comments were submitted by letter dated January 7, 2013. (For a copy of the transmittal letter, see Appendix B.)

General Comments and Questions

The P61WG provided the following general comments and questions to NRC:

- What is the NRC's position regarding whether or not there will be a need to remediate existing and previously closed waste disposal facilities due to the proposed revised requirements for long-term site performance standards?

- After the effective date of revisions to Part 61, will states be given three years to adopt the new regulations?

- NRC needs to clarify if the current Part 61 Grandfather clause will still apply to existing sites.

- NRC still needs to address concerns about the difficulty in ensuring compliance objectives after 10,000 years and performance objectives out to peak dose, which could be in the hundreds of thousands of years or even longer.

- Timeframes for evaluating the disposal of large quantities of Depleted Uranium (DU) become purely speculative in nature as the uncertainty with future conditions and modeling parameters increases.

- The proposed rule does not call for a quantitative maximum dose limit for the public beyond 10,000 years, which may be important in light of the significant dose potential that will occur as daughter products in-grow in DU waste beyond 10,000 years.

- The revision should establish a timeframe and dose limit for the performance period.

- The document only contains the additions and is difficult to review without including the strikeouts.

- The Agreement States (specifically the sited states) should be allowed to collaborate with the NRC and determine an appropriate compatibility category for various elements of the revised Part 61. This would alleviate and/or minimize the potential for unintended consequences.

Certification

NRC Proposal: An authorized representative of the waste generator, processor, or collector shall certify by signing and dating the shipment manifest that the transported materials are acceptable for disposal, properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Commission. A collector who signs the certification is certifying that nothing has been done to the collected waste that would invalidate the waste generator's certification.

P61WG Response: The new wording adds clarity and helps address the P61WG's concern about generators, processors, or collectors providing statements certifying approved waste classification procedures. This is an important addition for sited states because much of the waste for disposal comes from generators/processors that the sited states do not regulate or have active control over the waste handling and classification decisions.

Control and Tracking

NRC Proposal: Conduct a quality assurance program to assure compliance with the land disposal facility's criteria for waste acceptance that has been developed in accordance with § 61.58 of this chapter (the program shall include management evaluation of audits);

P61WG Response: This is an important addition for sited states because much of the waste for disposal comes from generators/processors that they do not regulate, nor have active control over the decisions regarding waste handling and classification. The State of Utah also pointed out that the proposed wording has redacted reference to § 61.57 (waste labeling), § 61.55 (waste classification), and § 61.56 (waste form characteristics) which are important for waste label and waste form characteristics and must be kept in the rule.

§ 61.2 Definitions.

NRC Proposal: Compliance period is the time during which compliance with the performance objectives specified in § 61.41, § 61.42, and § 61.44 must be demonstrated. This period ends 10,000 years after closure of the disposal facility.

P61WG Response: This partially addresses the P61WG's comment about 20,000 years by lowering it to 10,000 years. However the 10,000 year compliance is still overly conservative for some waste sites because the waste will have decayed to a fraction of a percent of its original concentration in 1000 years.

NRC Proposal: Performance period is the time after the compliance period for disposal facilities during which the performance objectives specified in §§ 61.41(b) and 61.42(b) must be met.

P61WG Response: This definition does not provide the minimum time required for the performance period. The State of Utah felt it did set a minimum because the timeframe is something > 10,000 yrs. and that the maximum time was not defined – which leaves flexibility to work out to peak dose.

§ 61.7 Concepts.

NRC Proposal: (a) The disposal facility. (1) Part 61 is intended to apply to land disposal of radioactive waste and not to other methods such as sea or extraterrestrial disposal. Part 61 contains procedural requirements and performance objectives applicable to any method of land disposal. It contains specific technical requirements for near-surface disposal of radioactive waste, a subset of land disposal, which involves disposal in the uppermost portion of the earth, approximately 30 meters. Near-surface disposal includes disposal in engineered facilities that may be built totally or partially above-grade provided that such facilities have protective earthen covers. Near-surface disposal does not include disposal facilities that are partially or fully above-grade with no protective earthen cover, which are referred to as "above-ground disposal." Burial deeper than 30 meters may also be satisfactory. Technical requirements for alternative methods may be added in the future. Alternative methods of disposal may be approved on a case-by-case basis as needed under § 61.6.

P61WG Response: Allows states the flexibility to determine if alternative disposal methods are appropriate at their sites.

NRC Proposal: (2) Near-surface disposal of radioactive waste takes place at a near-surface disposal facility, which includes all of the land and buildings necessary to carry out the disposal. The disposal site is that portion of the facility used for disposal of waste and consists of disposal units and a buffer zone. A disposal unit is a discrete portion of the disposal site into which waste is placed for disposal. A buffer zone is a portion of the disposal site that is controlled by the licensee and that lies under the site and between the boundary of the disposal site and any disposal unit. It provides controlled space to establish monitoring locations, which are intended to provide an early warning of radionuclide movement. An early warning allows a licensee to perform any mitigation that might be necessary. In choosing a disposal site, site characteristics should be considered in terms of the indefinite future, take into account the radiological characteristics of the waste, and be evaluated for at least a 500-year timeframe.

P61WG Response: Why has the NRC decided to keep the 500-year timeframe for site selection, when the compliance period is 10,000 years? The State of Utah also pointed out that the proposed wording includes a redaction, in that the "buffer zone" used to mandate that it be large enough to "… take mitigative measures if needed" and the

redaction could potentially jeopardize public health and safety and be incongruent with any approved PA or II analysis.

NRC Proposal: (c) Technical analyses. (1) Demonstrating compliance with the performance objectives requires assessments of the site-specific factors including engineering design, operational practices, site characteristics, and radioactive waste acceptable for disposal. Technical analyses assess the impact of site-specific factors on the performance of the disposal facility and the site environment both during the operational period, as in the analysis for protection of individuals during operations and, importantly for disposal of radioactive waste, over the long term, as in the analyses for protection of the general population from releases of radioactivity, protection of inadvertent intruders, and stability of the disposal site after closure.

P61WG Response: NRC should specifically define what "over the long term" timeframe means.

NRC Proposal: (5) Waste with significant concentrations and quantities of long-lived radionuclides may require special processing, design, or site conditions for disposal. Demonstrating protection of the general population from releases of radioactivity and inadvertent intruders for the disposal of this waste requires an assessment of long-term impacts. Performance period analyses are used to evaluate the suitability of this waste for disposal on a case-by-case basis. In general, for disposal facilities with limited quantities of long-lived waste, performance period analyses are not necessary to demonstrate protection of the general population from releases of radioactivity and protection of inadvertent intruders. However, there may be site-specific conditions that require licensees to assess disposal facilities beyond the compliance period even when long-lived waste is limited. These conditions should be evaluated on a case-by-case basis to determine whether analyses beyond the compliance period would be required.

P61WG Response: Needs further clarity; NRC should specifically state what timeframe is acceptable for the long lived waste. Is it out to peak dose? The State of Utah pointed out that this could be very complicated in that “long-lived waste” in § 61.2 has a 3-part test in the definition including: 1) a minimum half-life (> 3,000 years), 2) long-lived parents with short-lived progeny, and 3) short-lived parents with long lived progeny. The State of Utah recommended that “limited quantities” must be defined somewhere in the rule and Exemption from PA and II analysis should not be guaranteed de facto.

NRC Proposal: (f) The licensing process. (1) During the preoperational phase, the potential applicant goes through a process of disposal site selection by selecting a region of interest, examining a number of possible disposal sites within the area of interest, and narrowing the choice to the proposed site. Through a detailed investigation of the disposal site characteristics the potential applicant obtains data on which to base an analysis of the disposal site's suitability. Along with these data and analyses, the applicant submits other more general information to the Commission in the form of an application for a license for land disposal. The Commission's review of the application is in accordance with administrative procedures established by rule and may involve

participation by affected State governments or Indian tribes. While the proposed disposal site must be owned by a State or the Federal government before the Commission will issue a license, it may be privately owned during the preoperational phase if suitable arrangements have been made with a State or the Federal government to take ownership in fee of the land before the license is issued.
(2) During the operational phase, the licensee carries out disposal activities in accordance with the requirements of these regulations and any conditions on the license. Periodically, the authority to conduct the above ground operations and dispose of waste will be subject to a license renewal, at which time the operating history will be reviewed and a decision made to permit or deny continued operation. When disposal operations are to cease, the licensee applies for an amendment to the site license to permit site closure. After final review of the licensee's site closure and stabilization plan, the Commission may approve the final activities necessary to prepare the disposal site so that ongoing active maintenance of the site is not required during the period of institutional control.
(3) During the period when the final site closure and stabilization activities are being carried out, the licensee is in a disposal site closure phase. Following that, for a period of five years, the licensee must remain at the disposal site for a period of post-closure observation and maintenance to assure that the disposal site is stable and ready for institutional control. The Commission may approve shorter or require longer periods if conditions warrant. At the end of this period, the licensee applies for a license transfer to the disposal site owner.

P61WG Response: This provides more clarity for the specified time period of post-closure observation and maintenance, but it still maintains/allows for a shorter or longer periods depending on conditions. It would be prudent to eliminate the shorter time period and require at least a five year or more observation period for LLRW site operators.

NRC Proposal: (g) Implementation of dose methodology. The dose methodology used to demonstrate compliance with the performance objectives of this part shall be consistent with the dose methodology specified in the standards for radiation protection set forth in Part 20 of this chapter. After the effective date of these regulations, applicants and licenses may use updated factors, which have been issued by consensus scientific organizations and incorporated by the U.S. Environmental Protection Agency into Federal radiation guidance. Additionally, applicants and licensees may use the most current scientific models and methodologies (e.g., those accepted by the International Commission on Radiological Protection) appropriate for site-specific circumstances to calculate the dose. The weighting factors used in the calculation of the dose must be consistent with the methodology used to perform the calculation.

P61WG Response: This supports the P61WG's recommendation to allow dose methodologies to be based on the best available science. The State of Utah suggested that the new dose methodology must receive prior Commission approval, on a case-by-case basis. That way, each license will clearly specify the alternate dose methodology authorized, thus making the way clear for later enforcement of dose and activity limits at specific monitoring points around a disposal site (Points of Compliance).

§ 61.12 Specific technical information.

NRC Proposal: (i) A description of the kind, amount, and specifications of the radioactive material proposed to be received, possessed, and disposed of at the land disposal facility, including the criteria for acceptance of waste for disposal.

P61WG Response: This is an important addition for sited states because much of the waste for disposal comes from generators/processors that they do not regulate, nor have active control over the decisions regarding waste handling and classification.

§ 61.13 Technical analyses

NRC Proposal: (a) A performance assessment that demonstrates that there is reasonable assurance that the exposure to humans from the release of radioactivity will meet the performance objective set forth in § 61.41(a). A performance assessment shall:
(1) Consider only features, events, and processes that might affect demonstrating compliance with § 61.41(a). The features, events, and processes considered must represent a range of phenomena with both beneficial and adverse effects on performance, and must consider the specific technical information required in § 61.12(a) through (i). A technical basis for either inclusion or exclusion of specific features, events, and processes must be provided. Specific features, events, and processes must be evaluated in detail if their omission would significantly affect meeting the performance objective specified in § 61.41(a).
(2) Consider the likelihood of disruptive or other unlikely features, events, or processes for comparison with the limits set forth in § 61.41(a).
(3) Provide a technical basis for either inclusion or exclusion of degradation, deterioration, or alteration processes (e.g., of the engineered barriers, waste form, site characteristics) and interactions between the disposal facility and site characteristics that might affect the facility's ability to meet the performance objective in § 61.41(a).
(4) Provide a technical basis for models used in the performance assessment such as comparisons made with outputs of detailed process-level models or empirical observations (e.g., laboratory testing, filed investigations, and natural analogs).
(5) Evaluate pathways including air, soil, groundwater, surface water, plant uptake, and exhumation by burrowing animals.
(6) Account for uncertainties and variabilities in the projected behavior of the disposal system (e.g., disposal facility, natural system, and environment).
(7) Consider alternative conceptual models of features and processes that are consistent with available data and current scientific understanding, and evaluate the effects that alternative conceptual models have on the understanding of the performance of the disposal facility.
(8) Identify and differentiate between the roles performed by the natural disposal site characteristics and design features of the disposal facility in limiting releases of radioactivity to the general population.

P61WG Response: These requirements may be difficult to comply with when the longer timeframe for the performance period (more than 10,000 years) is evaluated. Timeframes approaching millions of years could be possible for evaluating disposal of DU and would be speculative when considering the uncertainty of future conditions, and the increase of uncertainty with modeling parameters. The State of Utah pointed out that there is a redaction at existing § 61.13(a), where the applicant is to clearly distinguish between the waste isolation roles provided by the engineered embankment and the local site characteristics and believes this information is vital to a licensing decision, and needs to be restored in the proposed rule.

NRC Proposal: (b) Analyses of the protection of inadvertent intruders that demonstrate there is reasonable assurance the waste acceptance criteria developed in accordance with § 61.58 will be met, adequate barriers to inadvertent intrusion will be provided, and any inadvertent intruder will not be exposed to doses that exceed the limits set forth in § 61.42(a) as demonstrated in an intruder assessment. An intruder assessment shall:

P61WG Response: § 61.42 does not establish a dose limit for the inadvertent intruder during the performance period.

NRC Proposal: (1) Assume that an inadvertent intruder occupies the disposal site at any time during the compliance period after the period of institutional controls ends, and engages in normal activities including agriculture, dwelling construction, resource exploration or exploration (e.g., well drilling), or other reasonably foreseeable pursuits that unknowingly expose the intruder to radiation from the waste.
(2) Identify adequate barriers to inadvertent intrusion that inhibit contact with the waste or limit exposure to radiation from the waste, and provide a basis for the time period over which barriers are effective.
(3) Account for uncertainties and variabilities.
(e) Analyses that assess how the disposal facility and site characteristics limit the potential long-term radiological impacts, consistent with available data and current scientific understanding. The analyses shall only be required for land disposal facilities with long-lived waste that contains alpha-emitting radionuclides with average concentrations exceeding 10 nCi/g or radionuclides with average concentrations exceeding one tenth of the values listed in Table 1 of § 61.55, or if necessitated by site-specific factors including engineering design, operational practices, and site characteristics. The analyses must identify and describe the features of the design and site characteristics that will demonstrate that the performance objectives set forth in §§ 61.41(b) and 61.42(b) will be met.

P61WG Response: This answers several concerns of the P61WG related to the need to make a distinction between unique waste streams such as depleted uranium and routine commercial waste streams in order to account for the differences in toxicity of the two (physical and chemical form and radiological properties). The P61WG concerns included:

- The long period of performance assessment is only appropriate for large quantities of depleted uranium but not for routine LLRW streams which contain mostly short-lived radionuclides.
- It burdens the entire LLRW waste classification system and resulting disposal facility performance assessment requirements with a long period of compliance and performance when most facilities will not receive significant quantities of waste.
- For non-DU LLRW, this extended period of compliance is unnecessary since the waste will have decayed to a fraction of a percent of its original concentration and no longer presents an unacceptable hazard. Only facilities that receive significant quantities of DU should have a long period of compliance and performance.

§ 61.42 Protection of inadvertent intruders.

NRC Proposal: (a) Design, operation, and closure of the land disposal facility must ensure protection of any inadvertent intruder into the disposal site who occupies the site or contacts the waste at any time after active institutional controls over the disposal site are removed. The annual dose must not exceed 5 milliSieverts (500 millirems) to any inadvertent intruder within the compliance period. Compliance with this paragraph must be demonstrated through analyses that meet the requirements specified in § 61.13(b).

P61WG Response: This clarifies the long-standing question to the NRC by stating that the annual dose must not exceed 5 milliSieverts (500 millirems) to any inadvertent intruder within the compliance period. However, it does not specify an exposure limit to the inadvertent intruder within the performance period. The State of Utah pointed out that it does not specify an exposure limit to the inadvertent intruder within the performance period, in that the dose is to conform to ALARA principles, which are highly subjective.

§ 61.58 Waste acceptance.

NRC Proposal: (a) Waste acceptance criteria. Each applicant shall provide, for approval by the Commission, criteria for the acceptance of waste for disposal that provide reasonable assurance of compliance with the performance objectives of Subpart C of this part. Waste acceptance criteria shall specify, at a minimum, the following:
(1) Allowable activities and concentrations of specific radionuclides. Allowable activities and concentrations shall be developed from the technical analyses required by either § 61.13 for any land disposal facility or the waste classification requirements set forth in § 61.55 for a near-surface disposal facility.
(2) Acceptable waste form characteristics and container specifications. The characteristics and specifications shall meet the minimum requirements for waste characteristics set forth in § 61.56(a) for all waste, and the requirements in § 61.56(b) for waste that requires stability to demonstrate compliance with the performance objectives of Subpart C of this part.
(3) Restrictions or prohibitions on waste, materials, or containers that might affect the facility's ability to meet the performance objectives in Subpart C of this part.

(b) Waste characterization. Each applicant shall provide, for Commission approval, acceptable methods for characterizing the waste for acceptance. The methods shall identify the characterization parameters and acceptable uncertainty in the characterization data. The following information, at a minimum, shall be required to characterize waste:
(1) Physical and chemical characteristics;
(2) Volume, including the waste and any stabilization or absorbent media;
(3) Weight of the container and contents;
(4) Identities, activities, and concentrations;
(5) Characterization date;
(6) Generating source; and
(7) Any other information needed to support the technical analyses set forth in § 61.13.
(c) Waste certification. Each applicant shall provide, for Commission approval, a program to certify that waste meets the acceptance criteria prior to receipt at the disposal facility. The certification program shall:
(1) Designate authority to certify and receive waste for disposal at the disposal facility.
(2) Specify documentation required for waste characterization, shipment (including the requirements set forth in Appendix G of 10 CFR part 20), and certification.
(3) Identify records, reports, tests, and inspections that are necessary to maintain to demonstrate compliance with the requirements in § 61.80.
(4) Provide approaches for managing waste that has been certified as meeting the waste acceptance criteria in a manner that maintains its certification status.

P61WG Response: This is an important addition for sited states because much of the waste for disposal comes from generators/processors that they do not regulate, nor have active control over the decisions regarding waste handling and classification. It will help sited states verify the waste classification and homogeneity and place more of the burden on generators. The State of Utah expressed concerns with:

1. At proposed § 61.58(a)(3) – NRC makes reference to Subpart C, which includes 4 important rule citations: §§ 61.40 thru 61.44. At § 61.43, are found the requirements for protecting disposal site workers during operations. However, no changes are proposed there by NRC. Instead, the existing citation will continue to require disposal licensees to protect workers in accordance with current 10 CFR 20. Consequently, disposal site workers will not be afforded the improved dose methodologies and modern conversion factors, that are now to be provided to waste generators in packaging their LLRW. Hence, only waste generators will benefit from this improved technology, and protection of disposal site workers appears to be a lower priority for the Commission.
2. At proposed § 61.58(c) – the lead sentence should be modified to require **prior** Commission and/or disposal site regulatory agency approval, **before shipment for land disposal**. To wait to determine compliance until after arrival at the disposal site is a waste of generator time and resources. Such postponement or delay, also creates a crisis for both the disposal site operator, and his/her regulator that is avoidable.

COMMENTS SUBMITTED TO NRC BY P61WG AND INDIVIDUAL STATES IN JULY 2012

The following comments were developed by the P61WG and individual states on NRC's Part 61 rulemaking initiative.

The comments were submitted by letter dated July 30, 2012. (For a copy of the transmittal letter, see Appendix C.)

General Comments and Questions

The P61WG and individual states provided the following general comments and questions to NRC:

> **Pennsylvania:** Where practical, NRC should avoid "one size fits all" approach in the development of new regulations or requirements for disposal of low-level radioactive waste (LLRW). For example, the design of the Pennsylvania (PA) regional facility requires an above-grade construction with multiple barriers (engineered cover, overpacks and disposal modules). Shallow land burial is prohibited and PA regulations establishes a concentration limit for disposal of Ra-226 (100 nCi/gm) for the regional facility. The facility design and other State specific requirements would not allow disposal of large quantities of certain types of waste (low activity - high volume waste and depleted uranium) at a future PA facility.
>
> **Pennsylvania:** NRC should consider potential impacts of proposed changes [to Part 61] on sited states as well as the impact on the existing LLRW disposal facilities.
>
> **South Carolina:** The new definition of long-lived waste seems to apply to the characterization of a disposal site and not to individual waste. Guidance should be provided, concurrently with the new definition, for how a facility should plan to meet the new requirements when receiving waste containing long-lived radionuclides (such as DU) for disposal. For example, the ASTSWMO document dated April 2011 and entitled "Incidental TENORM – A Guidance for State Solid Waste Managers" recommends that for disposal of TENORM, "no more than 1-10% of the volume of the cell should contain these subject materials."[1]
>
> **South Carolina:** It is stated that the revised Part 61 would have to be effective after one year for NRC licensees and applicants and would have to be adopted by states within one year after becoming effective. It would likely take longer than one year for a licensee to conduct a site-specific analysis under the new requirements and have it reviewed and

[1] http://www.astswmo.org/Files/Policies_and_Publications/Federal_Facilities/2011.04_FINAL_ASTSWMO_TENORM_Paper.pdf

approved by regulatory authorities. Typically States are given three years to adopt new regulations that are not as complex as this proposed revision. What is the rationale for giving states one year to adopt?

Texas: In developing site-specific waste acceptance criteria it is important to seek input from all stakeholders. Licensee waste acceptance plans may not provide the specificity needed by generators to ensure their waste will be accepted without additional processing or re-packaging. A site-specific waste acceptance criteria approach maintains doses As Low As is Reasonably Achievable (ALARA) and provides some certainty to generators that if their waste is packaged in a certain manner and meets all the criteria it will be transported and received ready for disposal.

P61WG: Agrees that NRC should allow, as an option, disposal facilities to establish site-specific waste acceptance criteria based on the results of the performance assessment and intruder assessment, in addition to the use and application of current waste classification tables in 10 CFR 61.55.

P61WG: Part 61.1.a. states that "Applicability of the requirements in this part to Commission licenses for waste disposal facilities in effect on the effective date of this rule will be determined on a case-by-case basis and implemented through terms and conditions of the license or by orders issued by the Commission." Since this paragraph is not proposed for revision, does the NRC intend for the new regulations to apply to new disposal facilities (i.e., facilities that become operational after the revision of Part 61) only, or is NRC expecting that sited states with existing facilities will choose to incorporate the new requirements through license conditions?

P61WG: If a sited state has adopted the language in Part 61.1.a into State regulation and has previously incorporated license conditions requiring compliance with all Part 61 equivalent regulations, new revisions to Part 61 would automatically apply to existing sites in those states. The regulation should contain language that explicitly states that requirements pertaining to performance assessments for long-lived waste do not apply to existing facilities unless future waste acceptance can be characterized as "long-lived waste" (license conditions could be used to prohibit acceptance of large quantities of DU). Otherwise, NRC should gain a complete understanding of how revisions pertaining to performance assessments will affect existing sites, to avoid unintended consequences.

P61WG: The NRC should sponsor performance assessment training classes for sited state personnel and states with proposed disposal sites. Financial support for travel to this training would be extremely helpful to host states.

P61WG: NRC should consider extending the comment period in order to allow the public and the states adequate time to provide response comments.

P61WG: Will NRC offer a grandfather provision to low-level waste disposal facilities in operation on the effective date of the new rule?

Performance Assessment

Illinois: A graph presented by the NRC at the May 18, 2011 public meeting indicated that commercial LLRW decays to 1% of its original activity within a 500-year period while the decay curve for DU remains constant until 50,000 years before it appears to begin to increase. It doesn't make sense to burden the entire LLRW waste classification system and resulting disposal facility performance assessment requirements with a 20,000-year period of compliance when most facilities will not receive significant quantities of DU and will not experience the in-growth of daughter products from DU.

Illinois: It also appears that the 20,000-year period of compliance is intended to include the extreme climate variations; i.e., glaciation. If the intent is to preserve the disposal facility and waste forms in a post-glacial environment, then that can only be accomplished using geologic disposal since any surface facility would be ground up by ice sheets (along with the rest of civilization in its path). For non-DU LLRW, this extended period of compliance is unnecessary since the waste will have decayed to a fraction of a percent of its original concentration and no longer presents an unacceptable hazard. Only facilities that receive significant quantities of DU should have a long period of compliance.

Illinois: It is unclear as to how the proposed 20,000-year period of compliance will work in the revised sections 61.13, 61.41 and 61.42. Section 61.13 states that the analysis of long-lived waste must calculate the peak dose that would occur 20,000 years or more after site closure. It then states that no dose limit applies to the results of this analysis. What is the point of performing the analysis if there are no criteria to determine whether the results are acceptable?

Illinois: Sections 61.41 and 61.42 pertain to the protection of the general public and inadvertent intruders. Both of these sections have dose limits (25 and 500 mrem/y TEDE) and a requirement that compliance with these standards be demonstrated through a performance assessment that evaluates peak annual dose up to 20,000 years following closure of the facility. A slide presented at the May 18, 2011 public meeting indicates that there is no dose limit for these peak annual dose calculations. What period of time do the dose limits (25 and 500 mrem/y TEDE) apply to? If they don't apply to the 20,000-year period, then what standard is used to demonstrate compliance with these two sections?

Pennsylvania: There is a need to make a distinction between unique waste streams such as depleted uranium and routine commercial waste streams to account for the differences in toxicity of the two (physical and chemical form and radiological properties). The long period of performance assessment (i.e., 20,000 years) might be appropriate for large quantities of depleted uranium but not for routine LLRW streams which contain mostly short-lived radionuclides.

Pennsylvania: The uncertainties associated with the long period of performance assessment are large enough that it would be very challenging to make a credible

prediction about the long-term performance of the disposal facility. This could also complicate the licensing process for future commercial LLRW disposal facilities (such as the one in PA) that would not be disposing of large quantities of depleted uranium. Therefore, NRC should consider allowing Agreement States to select a period of performance assessment consistent with State policies, site specific physical and design feature, projected waste streams, and the waste acceptance criteria for the proposed facility.

Pennsylvania: A two-tiered approach for conducting performance assessment is appropriate for disposal of large quantities of depleted uranium. The terms "performance period" and "compliance period" should be defined clearly. If NRC decides to impose a two-tiered approach, additional clarification and guidance is needed regarding the use of peak annual dose for continuous assessment of the long-term performance of the disposal facility. The initial proposal by NRC did not require a dose limit or other method to account for peak dose beyond the performance period (i.e., 20,000 years).

Pennsylvania: The performance assessment requirements should include a periodic review and updating of the performance assessment to reflect changes in the source term, conditions of the site, new methodology, etc. and to ensure compliance with the performance objectives.

Pennsylvania: Allow licensees the flexibility to apply ICRP dose methodologies "consistently" in a site-specific performance assessment.

Texas: Dose methodologies should be based on the best available science. Effects, if any, on the methodology for calculation of organ doses should be specified in the existing limits in 61.41.

Texas: The term "reasonably foreseeable" is too subjective. Suggest use of different terminology to better define future timeframes. This does not necessarily mean specifying period(s) of performance. The use of a two-tiered or multi-tiered approach may be acceptable as long as the states have flexibility in evaluating varying period(s) of performance. This may be driven by the generation origin of depleted uranium (i.e., spent fuel reprocessing or DU waste from enrichment). For compliance with Part 61 requirements, Texas currently requires a period of performance for a minimum of 1,000 years or the time at which peak dose occurs. This provides the flexibility to evaluate various timeframes and maintain compatibility even if the NRC chooses to retain the proposed 20,000-year tier.

Texas: Longer timeframes of performance must be evaluated carefully with the understanding that regulatory decisions will be made with a greater emphasis on current policy rather than strict dose limits. Timeframes approaching millions of years for evaluating disposal of DU become purely speculative in nature as the uncertainty with future conditions and uncertainty with modeling parameters increases. In this regard, some might consider shallow land burial of DU unacceptable due to the uncertainties associated with major climatic changes, societal changes, and changes in geologic

features caused by erosion. This may prompt consideration of a different type of land disposal for DU, possibly greater depth of burial. There is no geology, no climate, and no engineering design that can be expected to remain static for timeframes approaching a million years or more.

Texas: Based on comments previously submitted by the State of Utah on the initial Part 61 rulemaking, the ingrowth of DU progeny occurred at much shorter timeframes than what the NRC had originally determined in their DU disposal analysis. These shorter timeframes may be instructive in reducing speculation and uncertainty, at least to some degree. Texas has not evaluated disposal of DU yet.

Texas: The current NRC rules and guidance on evaluating long-term performance do not recommend taking credit for waste form or any engineered features beyond 300-500 years. The site-specific characteristics, geology, hydrogeology, and arid versus humid are presently considered when evaluating long-term performance of a disposal site. Due to the long timeframes for evaluating DU and the uncertainty with how waste form, disposal technologies, and cover technologies will perform over the long term, only studied, tested, and best available technology should be considered. Disposal unit characteristics and, to a large degree, waste form characteristics cannot be relied upon for longer timeframes. Furthermore, performance periods based on other factors such as geochemistry within the disposal unit must be approached with caution. Taking credit for geochemical interactions, such as pH that retards transport, between the waste and the surrounding environment without sufficient study can make dramatic differences in when the peak dose occurs or if any dose occurs at all. Obviously, the performance period is also driven by the radionuclide inventory.

Texas: Although not explicitly stated in Part 61, flexibility for establishing site-specific waste acceptance criteria has been understood by the current operational disposal sites. The performance assessment (PA) guidance document, NUREG-1573, suggests that if performance objectives cannot be met, that limits on inventory be imposed. Texas has taken this approach and will continue to refine the PA to reflect changes in inventory and additional site-specific data over the operational life of the disposal site. Texas has a unique arrangement as compared to the other sited states in that Texas will take ownership of the site and the waste upon closure and license termination. The State of Texas has a vested interest in the waste types, waste forms, and specific criteria for waste disposal to ensure that performance objectives will be met now and in the future. Additionally, the Texas Radiation Control Act statutorily requires the State of Texas to develop waste acceptance criteria.

Utah: Most recently, the NRC estimated 17 Ci of U-238 and 3 Ci of U-235 were assumed to be disposed in the generic LLRW disposal site over a 20-year life. These activity values are actually low by 1-2 orders of magnitude. See the 1981 NRC Draft

Environmental Impact Statement (DEIS), NUREG-0782, Volume 2, Tables 3.3 and 3.4,[2] where a much larger activity was previously predicted: 3,407 Ci for U-238 and 479 Ci for U-235.

Utah: We appreciate how the tiered approach is an attempt to provide flexibility in estimating assumed waste concentrations that a future inadvertent intruder may be exposed to. As proposed, the inadvertent intruder analysis (IIA) in NRC Tier 2 considers protection of the intruder from 95% of the waste volume they might be exposed to. Since the IIA will need to assume an activity concentration in the waste form (e.g., Ci/m3), Tier 2 would require the licensee and/or the regulator to know:

a. *Waste Concentration Range and Physical Distribution* – meaning both the range of concentrations in a disposal cell and their three-dimensional distribution, as actually placed. While the licensee may have this information, Utah DRC does not, nor are State inspections used to verify any distribution claim the licensee may make. In addition, the uncertainties discussed below undermine any confidence a regulator may have during review of licensee's distribution claim.

b. *Dilution by Mixing of Bulk Waste Forms As Placed* – common Class A disposal practice at the Clive site often calls for mixing of various bulk waste shipments on the same disposal lift area, as a means to exploit complimentary engineering properties of different wastes, and maximize facility ultimate disposal capacity.

c. *Dilution by Use of Backfill Materials* – many waste shipments disposed at Clive are placed with native soil, flowable sand backfill or concrete low-strength material (CLSM) to reduce void ratio, improve strength properties of the waste form, and to minimize potential for future differential settlement.

Given these uncertainties, we recommend the NRC apply a simpler approach to IIA. An acceptable method would be the use of either the average waste concentration or the maximum waste concentration, for key isotopes in a disposal cell.

Utah: The proposed rule does not call for a quantitative maximum dose limit for the public beyond 20,000 years, which may be important in light of the significant dose potential that will occur as daughter products in-grow in the waste beyond 20,000 years. A possible approach would be to establish a maximum dose limit at a point of compliance for the lengthy POP in the PA model. We fully recognize the multiple uncertainties in long-term PA predictions, and we appreciate the NRC statement that (p. 24): "*The proposed approach is based on the position that there are a large number of uncertainties of the risks imposed on future generations, especially from processes or events other than radioactive waste disposal. In addition, there is uncertainty in the*

[2] NUREG-0782, Volume 2, Table 3.3 provides 20-year projected activity (Ci/m3) for 30 considered LLRW waste streams. Table 3.4 provides the volume (m3) projected for each. After accounting for 11 waste streams predicted without U-238 or U-235 concentrations, one can multiply the two factors to arrive at a total estimated activity for each isotope.

projected risk to future populations from waste disposal, which may be based on a number of assumptions about the behavior and characteristics of future society."

Considering these uncertainties, and in light of the paleoclimate, geologic, and half-life issues that exist, we believe it to be more protective of public health and the environment if NRC determines quantitative maximum dose limits in the rule for long-term PA model predictions (>20,000 years).

Utah: With regard to the new wording proposed in 10 CFR 61.7(c)(6), the term "compliance period" is undefined. The same is true for the term "performance period", as described in the Draft Federal Register Notice (DFRN), see page 34. We suggest that a formal definition of both terms be added to 10 CFR 61.2. This might also help prevent confusion, in that the DFRN also refers to a "period of performance" in its discussion of the new IIA requirements proposed in 10 CFR 61.42 (see DFRN, p. 48). Also a NRC compatibility category should be assigned in Section VI of the DFRN (pp. 50-53).

Washington: NRC staff proposed a two-tiered approach for evaluating compliance with 10 CFR Part 61's site compliance to 20,000 years, and long-term assessment that extends beyond 20,000 years to the time of peak dose. Washington does not support this regulatory period of compliance. With uranium mills using 1000 years (or at least 200 years) for an evaluation period, to impose a substantially higher number for LLRW disposal sites appears arbitrary. In comparison, with a shorter timeframe, uranium in-growth and decay to Ra-226 is apparently less hazardous than radioactive waste decay. During the development of Washington's LLRW PA circa 2000, several discussions with the NRC took place on how far out to go. Little if any guidance was available. The NRC thought 10,000 years was conservative. Washington used this value for compliance, and a much longer period for peak dose. Washington supports flexibility in the two-tiered regulatory scheme to allow longer-lived waste streams such as DU.

Washington: Washington does support a tiered approach for the period of performance; a regulatory period using a reasonably foreseeable future date (e.g., 1000 – 10,000 years) for compliance with the dose standard, and a longer period extending to peak dose for informational (non-regulatory) use only. Under the policy of risk-informed performance based, a non-standard regulatory compliance period should be encouraged. Once controlling radionuclides are identified, site-specific modeling will yield the appropriate performance period.

Washington: Washington supports a site-specific analysis for not only large quantities of DU, but to cover the entire inventory disposed at a facility. By having the complete inventory site analysis, the site operator and regulator are better informed about potential public doses. And new, previously unanalyzed, waste streams (e.g., DU) can be evaluated much faster and cheaper. If the analysis is periodically updated, a safety margin (e.g., sum of fractions for controlling radionuclides) can be determined and risk-informed decisions made.

Washington: Performance assessments can be done in many different forms (e.g., deterministic, probabilistic). NRC's methodology may be different than an Agreement State's. Understanding NRC's technical requirements for modeling would be beneficial as long as the requirements are guidance and not rule.

Washington: Washington fully supports the use of the most current ICRP dose methodologies during the development of the PA. Once the PA is incorporated into the "final" product (whatever that may be, or be it a stand-alone document), states do not need to update the document unless they revise the "final" product.

South Carolina: Given the Commission's expanded direction in January 2012 regarding the 20,000 years, will the proposed definition of long-lived waste be revised?

Working Group: Given the new proposed definition of long-lived waste and the staff's 2008 analysis showing that shallow-land disposal of large quantities of DU at humid sites may not meet the performance objectives in Subpart C, it seems reasonable that some disposal facilities may choose to prohibit or limit the acceptance of waste that would cause the disposal facility to be characterized as disposing of "long-lived waste". Determinations for waste acceptance are typically considered for each container of waste proposed for disposal. The current definition may be misinterpreted and used to characterize individual containers of waste sent for disposal. The definition of long-lived waste should be revised to clarify that the definition applies to the overall characterization of a disposal site and is a factor in determining the performance assessment approach to be used for a particular site. Instead of defining the term "long-lived waste", consider defining the concept of a facility that is subject to a more robust performance assessment based on the types of waste disposed.

Working Group: Supports the flexibility to use ICRP dose methodologies.

Performance Objectives

Pennsylvania: PA supports the use of TEDE in Section 61.41, and the annual dose limit of 25 millirems.

Texas: If the NRC chooses to base the period of performance on waste packaging, waste form, disposal technologies, etc., then demonstrating meeting performance objectives may be burdensome or almost impossible for site development because this will add additional uncertainty in the analysis. Limited credit for engineered features may be appropriate on a case-by-case basis.

Washington: New Part 61 needs to define "performance period" and/or "compliance period."

Institutional Control Period

Pennsylvania: PA regulations in Chapter 236 (section 236.416) require an "active" institutional control period and a "passive" institutional control period. During the active institutional control period (minimum of 100 years), the program will include active methods for access control, surveillance, monitoring, custodial care and administration of funds to cover the costs for these activities. During the passive institutional control period (at least as long as the hazardous life of the waste), the program will include passive access control, monitoring and administration of funds to cover the costs for these activities. The hazardous life is defined as, "the time required for radioactive materials to decay to safe levels of radioactivity, as defined by the time period for the concentration of radioactive materials within a given container or package to decay to a maximum permissible concentrations as defined by federal law or by standards to be set by the host state, whichever is more restrictive." The hazardous life of the PA disposal facility is projected to be about 500 years, which is consistent with the design goal of the PA disposal facility to provide containment for Class C waste for a minimum of 500 years.

South Carolina: Currently, Part 61.59 states the period of institutional controls will be determined by the Commission but institutional controls may not be relied upon for more than 100 years following transfer of control of the disposal site to the owner. Part 61.7.b.4 states "Institutional control of access to the site is required for up to 100 years." The wording suggests that 100 years is a maximum amount of time. Increasing the time (to 300 years for example) seems to be less conservative given the current wording. Before considering revising to a greater number, NRC should review the basis for limiting this period to 100 years in the original rule and determine whether it is still valid.

South Carolina: Part 61.29 states that "A shorter or longer time period for post-closure observation and maintenance may be established and approved as part of the site closure plan, based on site-specific conditions." Therefore, the timeframe for institutional control period could be done similarly.

South Carolina: The uncertainty associated with estimating future costs, site conditions, and normal O&M activities is a challenge when evaluating the sufficiency of funds set aside by the licensee for long-term care. Increasing the amount of time allowed for depending on institutional controls would make the evaluation more challenging by increasing the amount required in the fund at closure and increasing the uncertainty of the amount required.

Compatibility Category

Pennsylvania: NRC and the Agreement States (specifically the sited states) should collaborate to determine an appropriate compatibility category for various elements of the revised Part 61. This would alleviate and/or minimize the potential for unintended consequences.

Texas: It's not clear by this directive what "ensure alignment between the States and Federal government on safety fundamentals" means. The State of Texas is currently in alignment with the federal government as is demonstrated through Agreement State status and IMPEP reviews. Part 61 already allows for site-specific performance assessments. If a new compatibility category is being considered for site-specific waste acceptance criteria, the NRC should allow flexibility through either the "D" or "H&S" compatibility category.

Washington: Washington recommends Compatibility Category C for site specific aspects. Part 61 has four standards currently listed. These fundamental requirements ensure worker safety, public safety, protection from inadvertent intrusion, and site stability after closure. Higher compatibility category assignment is not required as a site-specific PA and site-specific WAC do not constitute program definitions nor present trans-boundary issues.

Working Group: The sited states request that a representative be added to NRC's Standing Committee on Compatibility for the Part 61 revisions.

Waste Classification

Illinois: The waste classification tables in Part 61.55 were developed during the original promulgation of Part 61 and are appropriate for the majority of commercial low-level radioactive waste generated in the nation. While there is the "new" commercial waste stream of depleted uranium resulting from the enrichment process, this waste stream will not be disposed at all LLRW disposal facilities. The closed sites of West Valley, NY; Maxey Flats, KY; Sheffield, IL; and Beatty, NV did not receive these wastes. The currently operating LLRW disposal facilities at Barnwell, SC and Richland, WA are not accepting these waste streams. This waste stream is only proposed for disposal at the Clive, UT LLRW disposal facility owned and operated by EnergySolutions and is under consideration by the state of Texas.

Texas: The waste classification tables, even if modified with this rulemaking, should be retained. Allowing waste acceptance based solely on a PA is problematic. Too much uncertainty and subjectivity in a PA could allow disposal of wastes that fall outside the definition of low-level radioactive waste.

Utah: The NRC has no LLRW waste concentration limits for Ra-226 in 10 CFR 61.55. However, Utah does have a Class C limit for Ra-226,100 nCi/gm (100,000 pCi/gm).[3] Class A concentrations are reached when a waste has less than 10% of this value, or 10 nCi/gm (10,000 pCi/gm) [ibid.]. Utah is not the only Agreement State with such limits; all four of the host States for LLRW disposal have these same Ra-226 waste concentration limits (see below).

[3] See Utah Radiation Control Rules at UAC R313-15-1009, Table I. Rule available online at: http://www.rules.utah.gov/publicat/code/r313/r313-015.htm#T47.

Comparison of Agreement State LLRW Concentration Limits for Ra-226; Including State Limits for Class A, Class C, and Greater than Class C Waste:

	Class A	Class C	GTCC
• South Carolina	< 10 nCi/gm	< 100 nCi/gm[4]	> 100 nCi/gm
• Texas	< 10 nCi/gm	< 100 nCi/gm[5]	> 100 nCi/gm
• Utah	< 10 nCi/gm	< 100 nCi/gm	> 100 nCi/gm
• Washington	< 10 nCi/gm	< 100 nCi/gm[6]	> 100 nCi/gm

We recognize the NRC staff's May 3, 2011 DFRN calculation of Ra-226 in-growth for a LLRW waste form containing a large quantity of DU, as found in the attending NRC regulatory basis document (ML111030586), Figure 2. DRC review of this graph indicates the Utah Ra-226 Class A waste limit would be reached after about 20,000 years of in-growth (see NRC ML111030586, Figure 2), whereafter the DU waste would become Class C material under Utah rule. The same NRC graph also indicates that the DU waste would become a Greater than Class C (GTCC) waste at about 400,000 years post-disposal, per the NRC Ra-226 in-growth graph. It appears that the NRC Figure 2 Ra-226 in-growth calculations may have failed to consider the sensitivity of several factors, including: 1) initial U-234 concentration in the waste form, and 2) DU chemical form (zero valent [ZV] metal, U3O8, or UO3). These factors came to DRC attention when staff was asked to examine Ra-226 in-growth for 5,300 drums of DU waste shipped to Clive in early 2010 from the DOE Savannah River site (SRS).[7]

Utah:

Time to Become Class C Waste

The URS calculations[8] indicate that time needed for DU waste (post-disposal) to exceed the Utah's Ra-226 Class A concentration limit (Ra-226 ≥ 10 nCi/gm or 10,000 pCi/gm), and thus become Class C waste,[9] would range from 5,400 years[10] to 61,200 years.[11] The

[4] See South Carolina LLRW disposal regulations at RHA 3.56.1.3 and Table I. Rule available online at: http://www.scdhec.gov/health/radhlth/61-63-PART-III-D-E.pdf

[5] See Texas Administrative Code at T30S336.362(a)(3) and Table I. Rule available online at: http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=30&pt=1&ch=336&rl=362.

[6] See Washington Administrative Code at WAC 246-249-040, Table I. Rule available online at: http://apps.leg.wa.gov/WAC/default.aspx?cite=246-249-040.

[7] See Westinghouse Savannah River Company, November 4, 2002, "Depleted Uranium Oxide Sampling Results", interoffice memorandum from K.S. Parkinson to S.A. Williams and D.L. McWharter, NMM-ETS-2002-00184, Revision 0, 5pp. 2 attachments.

[8] See URS Corporation Inc., November 18, 2010, "Ingrowth of Ra-226 from Depleted Uranium", technical memorandum by Messrs. Robert Baird and Gary Merrell (URS) to Loren Morton (Utah DRC), 3 pp., and attached calculations / spreadsheets (24 pp.).

[9] For Utah Class C waste threshold, see DRC rule at UAC R313-15-1009(1)(c)(ii).

[10] Where initial DU in waste is in zero valent metal form and initial U-234 at secular equilibrium, see 11/18/10 URS Memorandum, Table 1.

[11] Where initial DU in waste is in UO_3 form, and no U-234 is present, see 11/18/10 URS Memorandum, Table 1.

lower end of this time range is where DU waste (irrespective of chemical form) starts with U-234 concentrations in natural or secular equilibrium with U-238. In this scenario, the Ra-226 in the DU material would in-grow to become a Class C waste sometime between 5,400 and 6,200 years. This time interval is significantly shorter than predicted by the NRC in its May 3, 2011 DFRN.

For DU from typical spent fuel reprocessing, this Ra-226 in-growth time would be between about 20,700 and 24,200 years.[12] For the DOE SRS DU waste, now held in a temporary storage building at Clive, the Class C threshold would be exceeded somewhere between 25,500 and 29,800 years post-disposal,[13] assuming DU waste remains in a closed system and is not leached from the disposal cell. In contrast, the NRC proposed 20,000-year POP would allow DU from spent fuel reprocessing to continue to be designated as Class A waste.

Utah: GTCC Implications for DU – as seen in the table above, all four Agreement States have a Ra-226 waste concentration standard for LLRW, where a waste becomes GTCC at concentrations above 100 nCi/gm (100,000 pCi/gm). Again, there is no NRC corollary for this State requirement.

Time to Become GTCC Waste

URS calculations also indicate that the Ra-226 in-growth time needed for DU waste to exceed the Utah's Ra-226 Class C concentration limit, and thus become "… generally unacceptable for land disposal," or Greater than Class C (GTCC) waste, ranges from 40,800 years and 269,000 years post-disposal.[14] Again, the most rapid transformation is found in DU waste where the initial U-234 concentration is in secular equilibrium with U-238, and could occur between 40,800 and 50,400 years post-disposal (irrespective of chemical form).[15] Again, this estimate is about ten times earlier than calculated by the NRC in their May 2011 DFRN documents.

For DU from typical spent fuel reprocessing, the material could become GTCC at about 171,000 to 223,000 years post-disposal.[16] As for the DOE SRS DU waste currently stored at Clive, the GTCC threshold would be exceeded at sometime between 187,000 and 223,000 years post-disposal.[17] Both of these estimates are about half of the time predicted in the May 2011 NRC DFRN documents.

Washington: Washington supports the flexibility this action allows a site operator and state regulator. The flexibility exercised by a state must be limited to areas supported by the site's PA. In areas not supported by a site's PA, Part 61's WAC should be used. The new table values still need to protect the inadvertent intruder. Isotopic table values need

[12] Where initial U-234 activity is about 17% of initial U-238 activity, and DU in zero valent metal form, see 11/18/10 URS Memorandum, Table 1. The larger value (24,200 yrs) is where DU is in UO_3 form instead.
[13] See 11/18/10 URS Memorandum, Table 1.
[14] See 11/18/10 URS Memorandum, Table 2.
[15] *Ibid.*
[16] *Ibid.*
[17] *Ibid.*

to be based upon site-specific waste form and packaging allowed, site characteristics, disposal practices, technologies employed, site appropriate scenarios and the probability of intrusion (currently assumed to = 1). Many of these factors are well established at the operating sites. Scenarios using probability of intrusion less than one should be permitted when obvious factors (e.g., USDOE burial grounds in close proximity) are present that would preclude abandonment.

Inadvertent Intruder

Pennsylvania: 10 CFR Part 61, section 61.42(a) should be amended to include a dose limit for inadvertent intruders. For example, PA regulations in Chapter 236 (section 236.320) states that, "the disposal facility design shall, to the extent practicable, limit radiation exposures to the inadvertent intruder to annual whole body dose equivalent of 25 millirem." This dose limit is consistent with the annual whole body dose limit of 25 millirems in section 236.13 (Part 61.42 equivalent), "Protection of the General Population and Environment from Release of Radioactivity."

Utah: To a degree we agree with the statement where the NRC explains "… *the safety of the inadvertent intruder is ensured by the waste classification system and the disposal requirements imposed for each class of waste.*" We also recognize that the existing requirements at 10 CFR 61.7(b)(4) and (5) only require an inadvertent intruder protection (and therefore analysis) for Class C waste. We see how NRC is proposing a new section in 10 CFR 61.7(c)(6) to provide an overriding requirement for an inadvertent intruder analysis (IIA), irrespective of the waste class;[18] this over-riding mandate should apply to all classes of LLRW, in order to provide uniformity of LLRW regulation nationally. As a result, we recommend the following change in the proposed wording at new section 10 CFR 61.7(c)(6) [changes in redline text]:

> "(6) Regardless of the waste classification, and requirements found at 10 CFR61.7(c)(4) and (5), all waste will require an inadvertent intruder assessment, and some waste may require enhanced controls or limitations at a particular land disposal facility to provide reasonable assurance that the waste will not present an unacceptable hazard over the compliance period…."

Utah: We appreciate the point of view that use of cultural information in determining a time period for the IIA be limited to a few hundred years.[19] We also note the much longer 20,000-year period proposed as a new IIA requirement in draft 10 CFR 61.42. However, possible consideration may be appropriate for a longer time period for IIA, given:

a. Long half life of DU.

b. Significant in-growth of radium-226 that NRC did not recognize in its May 3, 2011 DFRN and attending regulatory basis document (ML111030586).

[18] See NRC draft rule language found in October 3, 2011 email, Enclosure 1, p. 67.
[19] See NRC DFRN from October 3, 2011 email, Enclosure 1, p. 23.

Utah: In addition to the changes suggested by the NRC, we suggest the following improvement (NRC proposed changes in yellow highlight, State changes in red text): *"(b) Analyses of the protection of individuals from inadvertent intrusion must demonstrate that there is reasonable assurance that the waste classification and segregation requirements will be met, that adequate barriers to inadvertent intrusion will be provided for Class C wastes pursuant to § 61.7(b)(5), and that the exposure to any inadvertent intruder will not exceed the limits set forth in § 61.42 as demonstrated in an intruder assessment*."

P61WG: The "reasonably foreseeable" exposure scenarios should be specified for the intruder assessment in guidance.

APPENDIX A: LLW FORUM RESOLUTION RE ENHANCED CONSIDERATION OF SITED STATES' COMMENTS ON PROPOSED REVISIONS TO 10 CFR PART 61

Park City, Utah

October 23, 2013

As the U.S. Nuclear Regulatory Commission (NRC) is considering proposed revisions that would amend Part 61 of Title 10 of the *Code of Federal Regulations* (10 CFR), "Licensing Requirements for Land Disposal of Radioactive Waste;"

As, on January 19, 2012, the Commission directed NRC staff to expand the current limited-scope revision to Part 61 regarding site-specific analysis to bring a clearer risk-informed approach to Part 61 through extensive interactions with stakeholders to determine whether certain risk-informed approaches should be incorporated into the current rulemaking;

As, on July 18, 2013, NRC staff requested Commission approval to publish a proposed rule to amend 10 CFR Part 61 in the *Federal Register* that, among other things:

- requires low-level radioactive waste disposal licensees and license applicants to conduct updated and new site-specific analyses and to permit the development of criteria for future low-level radioactive waste acceptance based on the results of these analyses;
- updates the existing technical analysis requirements for protection of the general population (i.e., performance assessment) to include a 10,000-year compliance period; adds a new site-specific technical analysis for the protection of inadvertent intruders (i.e., intruder assessment) that would include a 10,000-year compliance period and a dose limit; adds a new analysis for certain long-lived low-level radioactive waste (i.e., performance period analysis) that would include a post-10,000 year performance period; and, revises the technical analyses required at closure;
- adds a new requirement to develop criteria for the acceptance of low-level radioactive waste for disposal based on either the results of these technical analyses or on the existing low-level radioactive waste classification requirements in order to facilitate consideration of whether a particular disposal site is suitable for future disposal of depleted uranium (DU), blended low-level radioactive waste, or any other previously unanalyzed low-level radioactive waste stream; and
- proposes amendments to facilitate implementation and better align the requirements with current health and safety standards;

As, upon publication of a proposed rule to amend 10 CFR Part 61, NRC's Office of Federal and State Materials and Environmental Management Program plans to continue engaging stakeholders and

members of the public on possible changes to Part 61;

As states and compacts have primary responsibility for issues related to the management and disposal of low-level radioactive waste under the Low-Level Radioactive Waste Policy Act of 1980 and its 1985 amendments;

As all current operating low-level radioactive waste disposal facilities are located in and regulated by Agreement States;

As states and compacts have a primary and vested interest in and will be directly impacted by any proposed revisions to Part 61;

Now Wherefore Be it Resolved that the LLW Forum encourages NRC to directly communicate with and seek feedback specifically from representatives of the sited states on the proposed revisions to 10 CFR Part 61, and

Now Wherefore Be it Further Resolved that the LLW Forum encourages NRC to give enhanced consideration to feedback from representatives of the sited states on the proposed revisions to 10 CFR Part 61.

APPENDIX B: TRANSMITTAL LETTER TO NRC DATED JANUARY 7, 2013

LOW-LEVEL RADIOACTIVE WASTE FORUM, INC.

1619 12TH Street, N.W. – Washington, D.C. 20009
(202) 265-7990 * (202) 265-7995 FAX

January 7, 2013

Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ATTN: Rulemakings and Adjudications Staff

Re: Docket ID NRC–2011–0012

Dear NRC Secretary:

On behalf of the Low-Level Radioactive Waste Forum's (LLW Forum) Part 61Working Group (P61WG), please accept the attached comments on the U.S. Nuclear Regulatory Commission's (NRC's) November 2012 Preliminary Rule Language for Proposed Revisions to Low-Level Waste Disposal Requirements (10 CFR Part 61).

The LLW Forum's P61WG was formed in the summer of 2012. The purpose of the working group is to assist the states and compacts in providing comment and feedback to the NRC on the Part 61 rulemaking initiative. The working group is composed of six (6) members representing South Carolina, Texas, Utah, Washington, Illinois and Pennsylvania.

By letter dated July 30, 2012, the P61WG submitted initial comments to the NRC in advance of submittal of the technical basis document to the Commission in September 2012. Given the role of the sited states in regulating low-level radioactive waste disposal facilities, P61WG members relied heavily upon input from representatives of the four sited states of South Carolina, Texas, Utah and Washington in conducting its review of all elements of the Part 61 rulemaking initiative.

As a follow-up to our July 30 communication, the P61WG developed and submits the attached comments on the November 2012 preliminary rule language. In addition, please note that the sited states will be submitting additional comprehensive and technical comments individually.

On behalf of the P61WG, I want to thank the NRC staff for their continued assistance during our review of the rulemaking initiative and for the agency's consideration of the working groups' comments. We believe this is an important document that has potentially significant impacts on the disposal and management of low-level radioactive wastes and we sincerely appreciate the opportunity to provide the attached feedback and comments.

If you have questions or require additional information, please feel free to contact me at (202) 265-7990 or at LLWForumInc@aol.com.

Regards,

Todd D. Lovinger, Esq.
Executive Director of the LLW Forum
Project Manager of the DSWG and P61WG

Enclosure

cc Larry Camper, Division of Waste Management & Environmental Protection,
Office of Federal & State Materials & Environmental Management Programs,
U.S. Nuclear Regulatory Commission

James Kennedy, Division of Waste Management & Environmental Protection,
Office of Federal & State Materials & Environmental Management Programs,
U.S. Nuclear Regulatory Commission

Aby Mohseni, Division of Waste Management & Environmental Protection,
Office of Federal & State Materials & Environmental Management Programs,
U.S. Nuclear Regulatory Commission

Gregory Suber, Division of Waste Management & Environmental Protection,
Office of Federal & State Materials & Environmental Management Programs,
U.S. Nuclear Regulatory Commission

APPENDIX C: TRANSMITTAL LETTER TO NRC DATED JULY 30, 2012

LOW-LEVEL RADIOACTIVE WASTE FORUM, INC.

1619 12TH Street, N.W. – Washington, D.C. 20009
(202) 265-7990 * (202) 265-7995 FAX

July 30, 2012

Andrew Persinko
Deputy Director
Environmental & Performance Assessment Directorate
Division of Waste Management and Environmental Protection
Office of Federal & State Materials & Environmental Management Programs
U.S. Nuclear Regulatory Commission
Mail Stop T-8-F-5
Washington, DC 20555

Dear Andrew Persinko:

On behalf of the Low-Level Radioactive Waste Forum's (LLW Forum) Disused Sources Working Group (DSWG), please accept the attached comments on the U.S. Nuclear Regulatory Commission's (NRC) Part 61 rulemaking initiative.

The LLW Forum formed the DSWG in September 2011 at the request of and with financial support from the National Nuclear Security Administration (NNSA). The purpose of the working group is to study issues related to the management and disposition of sealed sources, using a holistic approach that considers both the front-end and back-end, and to develop a list of potential action items and recommendations to address the issues. The working group is composed of eight (8) members representing New York, Texas, Utah, Washington, Atlantic Compact, Midwest Compact, Rocky Mountain Compact, and Southeast Compact.

Due to the potential impact of the Part 61 rulemaking initiative to impact options for the disposal of sealed sources, the DSWG members formed a subgroup named the Part 61 Working Group (P61WG) to review and provide comments on the rulemaking initiative for consideration by the NRC in advance of submittal of the technical basis document to the Commission in September 2012. The P61WG is composed of six (6) members representing Texas, Utah, Washington, South Carolina, Pennsylvania and Illinois.

Given the role of the sited states in regulating low-level radioactive waste disposal facilities, P61WG members relied heavily upon input from representatives of the four sited states of South Carolina, Texas, Utah and Washington in conducting its review of all elements of the Part 61 rulemaking initiative.

On July 19, 2012, the P61WG members attended the NRC's stakeholder meeting in Rockville, Maryland. The next day, on July 20, 2012, P61WG members met in Washington, District of Columbia to review and edit the attached document for consideration by the NRC.

On behalf of the DSWG and P61WG, I want to thank the NRC staff for their assistance during our review of the rulemaking initiative and for the agency's consideration of the working groups' comments. We believe this is an important document that has potentially significant impacts on the disposal of sealed sources and other low-level radioactive wastes and we sincerely appreciate the opportunity to provide the attached feedback and comments.

If you have questions or require additional information, please feel free to contact me at (202) 265-7990 or at LLWForumInc@aol.com.

Regards,

Todd D. Lovinger, Esq.
Executive Director of the LLW Forum
Project Manager of the DSWG and P61WG

Enclosure

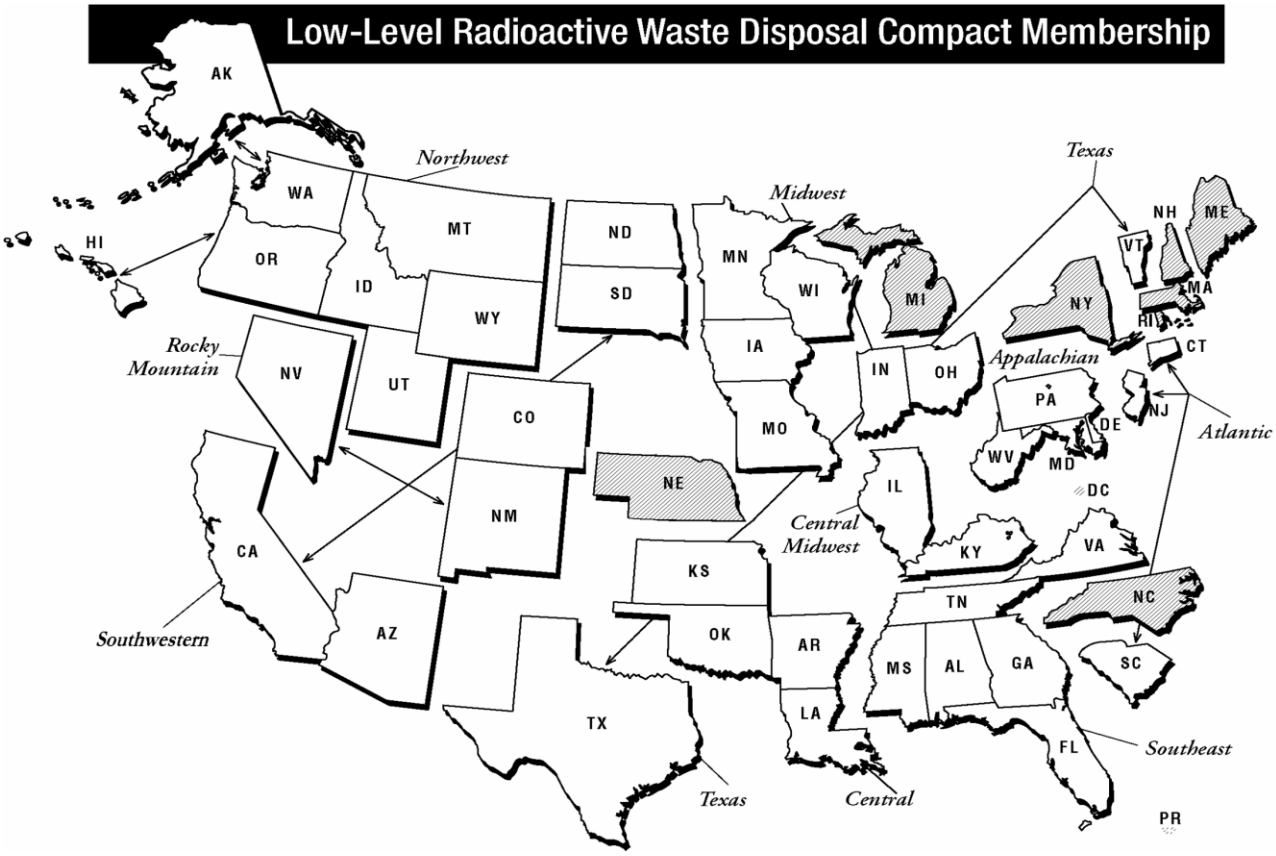
cc Larry Camper, Division of Waste Management & Environmental Protection,
Office of Federal & State Materials & Environmental Management Programs,
U.S. Nuclear Regulatory Commission

James Kennedy, Division of Waste Management & Environmental Protection,
Office of Federal & State Materials & Environmental Management Programs,
U.S. Nuclear Regulatory Commission

Donald Lowman, Division of Waste Management & Environmental Protection,
Office of Federal & State Materials & Environmental Management Programs,
U.S. Nuclear Regulatory Commission

Gregory Suber, Division of Waste Management & Environmental Protection,
Office of Federal & State Materials & Environmental Management Programs,
U.S. Nuclear Regulatory Commission

This paper was prepared by the Low-Level Radioactive Waste Forum's (LLW Forum's) Part 61 Working Group (P61WG) with funding from the National Nuclear Security Administration (NNSA)/Global Threat Reduction Initiative (GTRI). The opinions expressed in it are solely those of the P61WG and do not necessarily reflect the official policy or positions of any agency of the U.S. government, including NNSA/GTRI or the U.S. Department of Energy (DOE) or the U.S. Nuclear Regulatory Commission (NRC), nor any organization with which the members of the P61WG are affiliated.



Appalachian Compact
Delaware
Maryland
Pennsylvania
West Virginia

Atlantic Compact
Connecticut
New Jersey
South Carolina

Central Compact
Arkansas
Kansas
Louisiana
Oklahoma

Central Midwest Compact
Illinois
Kentucky

Northwest Compact
Alaska
Hawaii
Idaho
Montana
Oregon
Utah
Washington
Wyoming

Midwest Compact
Indiana
Iowa
Minnesota
Missouri
Ohio
Wisconsin

Rocky Mountain Compact
Colorado
Nevada
New Mexico

Northwest accepts Rocky Mountain waste as agreed between compacts

Southeast Compact
Alabama
Florida
Georgia
Mississippi
Tennessee
Virginia

Southwestern Compact
Arizona
California
North Dakota
South Dakota

Texas Compact
Texas
Vermont

Unaffiliated States
District of Columbia
Maine
Massachusetts
Michigan
Nebraska
New Hampshire
New York
North Carolina
Puerto Rico
Rhode Island