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June 17, 2011

CD11-0173

Annette Vietti-Cook
Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
Rulemakings and Adjudications Staff

Subject: Preliminary Proposed Rule Language for Demonstrating Compliance with 10 CFR 61 Subpart C – 76 FR 24831; Docket ID NRC–2011–0012

Dear Ms. Vietti-Cook:

Energy*Solutions* is submitting the comments contained in the attachment in response to the subject notice. We appreciate the opportunity to comment on the preliminary language before it is promulgated as a proposed rule.

Our comments are summarized in the attached documents. The first provides our detailed comments and the rationale for each. The second provides a mark-up to the preliminary language to show how each could be implemented.

Thank you again for this opportunity to comment. Questions regarding these comments may be directed to me at (240) 565-6148 or temagette@energysolutions.com.

Sincerely,

Thomas E. Magette, P.E.
Senior Vice President
Nuclear Regulatory Strategy

Attachments

COMMENTS ON PRELIMINARY PROPOSED RULE LANGUAGE

In the document, *Part 61: Site Specific Analyses for Demonstrating Compliance with Subpart C Performance Objectives, Preliminary Proposed Rule Language* ("preliminary language"), the NRC Staff has set forth its proposed approach for implementing Commission direction contained in two Staff Requirements Memorandums[1,2] to conduct a limited scope rulemaking. This limited scope originally was to "...specify a requirement for a site-specific analysis for the disposal of large quantities of depleted uranium..." This scope was broadened to include blended waste, specifically to "...explicitly require a site-specific analysis for an inadvertent intruder." While the objective of this approach is conceptually sound and has been supported by Energy*Solutions*, the outcome as contained in the preliminary language goes beyond the nature of a limited scope rulemaking. The preliminary language imposes significant new requirements on the disposal of all low-level radioactive waste (LLW), in essence imposing the analytical standard Staff has proposed for unique wastes to all waste streams.

Energy*Solutions* submits that it was not the intention of the Commission, nor has Staff prepared additional analyses that would support the notion that such sweeping new requirements are necessary for the protection of human health and safety. Furthermore, we believe that many of the specific requirements contained in the preliminary language go beyond what is necessary to properly regulate the disposal of what has alternately been termed unique or previously unanalyzed waste streams. In particular, we believe that Staff has failed to justify the selection of a 20,000-year period of performance for compliance ("compliance period") and the requirement that an inadvertent intruder be assumed to occupy a disposal site. Our detailed comments on these and other aspects of the preliminary language are set forth below.

Given that the Staff has proposed a more far-reaching approach to risk informing Part 61 than was anticipated, we believe that an additional change to the preliminary language would leverage the new requirement for a performance assessment and an intruder assessment to provide significant improvement to the overall effectiveness of Part 61. This change is to allow for the creation of site-specific Waste Acceptance Criteria that would serve as the regulatory standard for the waste streams that could be safely disposed in any given facility. If, as is presumed in this rulemaking, there are instances where additional requirements (beyond those contained in the tables in 10 CFR 61.55) are necessary because of the limitations of the generic analyses in Part 61, then it is equally true that there may be instances where fewer requirements are necessary for the same reason. Accommodating the proposed change we describe below would not only improve the effectiveness of this rulemaking, it could eliminate the need for a future rulemaking currently under consideration.[3]

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[1] Staff Requirements – SECY-08-0147 – Response to Commission Order CLI-05-20 Regarding Depleted Uranium, March 18, 2009.

[2] Staff Requirements – SECY-10-0043 – Blending of Low-Level Radioactive Waste, October 13, 2010.

[3] Staff's Approach to Comprehensive Revision to 10 CFR Part 61, SECY-10-0165, December 27, 2010.

1. Period of Performance – The NRC evaluated five options in its *Technical Analysis Supporting Definition of Period of Performance for Low-Level waste Disposal* ("Technical Analysis") and selected Option 3, Regulatory Precedent. It adopted a two-tiered approach with a 20,000-year compliance period over which the risks from disposal of radioactive waste in the near surface are quantitatively evaluated, combined with a performance period for which peak dose is estimated to provide an indication of long-term disposal facility performance.

The two-tier approach has precedent and provides a reasonable approach for dealing with the uncertainties over the long term for some radionuclides. Energy*Solutions* agrees with the staff recommended two-tiered approach with a compliance period over which the risks from disposal of radioactive waste in the near surface are quantitatively evaluated and a performance period to determine the relative performance of the disposal facility over time as is now provided for in NRC guidance.[4]

However, the compliance period of 20,000 years is without precedent; 20,000 years has never been adopted in any radioactive waste regulation. As explained below, it is not an appropriate time period for the compliance calculation and it is not needed to provide protection for the public health and safety. A 1,000 year compliance period is a more reasonable and defendable time period.

A 20,000-year compliance period is not analytically feasible – Although the 20,000-year period may capture the affects of a large scale ice age, requiring the analysis for the disposal of LLW to experience catastrophic climate changes is not only inconsistent with past NRC guidance and decision making, it is not feasible. Requiring an analysis leading up to, including, and after an ice age is a longer time frame than that "...over which scientific extrapolations can be convincingly made."[5] Future licensees would be obligated to evaluate scenarios for a compliance period that are not "reasonably foreseeable," and for which the consequences would be entirely speculative.

The capacity for human beings to predict the future is not very impressive. We look at past events and use them to make assumptions as to the number, size, frequency, and duration of future events. The proposed compliance period overwhelms any basis we have for extrapolating the past to project either environmental change or human activities. We are unable to develop the assumptions needed for quantitative analyses to predict dose to any human receptor, including potential inadvertent intruders.

NRC agreed during the May 18, 2011 meeting that it is hard to predict what local practices will be and the probability of human behaviors at a site in 20,000 years. Simply put, we are not able to construct a rational basis for analyzing events or circumstances 20,000 years in the future. A requirement to do so would be an unreasonable regulatory burden on an applicant and would be virtually impossible to implement in a licensing process. In the past, the

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[4] A Performance Assessment Methodology for Low-Level Radioactive Waste Disposal Facilities, NUREG-1573, October 2000.

[5] Technical Analysis Supporting Definition of Period of Performance for Low-Level Waste Disposal, U.S. NRC, May 2011, p. 2.

Commission has rejected scenarios that have been unduly speculative even in the NEPA context. In the 2006 LES decision[6], the Commission did not take issue with the Board's decision that rejected "unduly speculative" impacts noting that the Board had concluded that "...technological and socio-economic changes are not predictable with any confidence, any projections about the likelihood of an intruder scenario would be exceedingly speculative." It is not clear how this speculation would be bounded for compliance determinations that are more rigorous than NEPA evaluations.

A compliance period requires the production of a number. Numbers suggest precision. As NRC Staff itself stated in the Technical Analysis:

> Just because a calculation can be performed or computer model parameters can be set to estimate results for longer periods of time does not necessarily mean that the results of the calculations have meaning. If all significant sources of uncertainty are not reflected in the calculations, the results of the calculations can imply a level of precision that is not warranted. For long periods of time, some uncertainties cannot be quantified (e.g., those associated with landform evolution).[7]

Staff further cautioned against reading too much into the compliance period, saying:

> Uncertainties associated with the performance of natural and engineered systems may increase, and uncertainties associated with human behavior definitively increase, over extended periods of time. Uncertainty, in this context, can render the result of the calculation meaningless as input to regulatory decision making.[8]

Unfortunately, the uncertainties associated with a calculation for a 20,000-year compliance period would result in a number that is not only imprecise, but meaningless. Such a result is not useful, and conflicts with what Staff observed as a key factor, data quality:

> Arguably the biggest determinant of the safety of future generations is the quality of data developed and the quality of the assessment that is performed.[9]

Frankly, a quantitative assessment over a 20,000-year compliance period will not generate the desired quality. It would not be of sufficiently high quality to be acceptable for NRC purposes. That is the main reason why a 20,000-year compliance period is not appropriate. A shorter compliance period taken together with a longer performance period as provided for in NUREG -1573 would properly account for uncertainty and provide a significantly more robust and defensible result.

NRC itself has made a compelling argument as to why 20,000 years is an unreasonable compliance period. Importantly, selecting a shorter compliance period does not undermine

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[6] Memorandum and Order, In the Matter of Louisiana Enrichment Service, L.P. (National Enrichment Facility), U.S. Nuclear Regulatory Commission, CLI-06-15, June 2, 2006.

[7] Technical Analysis, p. 11.

[8] Technical Analysis, p. 4.

[9] Technical Analysis, p. 25.

the objective of this rulemaking. Rather it enhances it. Adopting the two-tiered approach described in the preliminary language, combined with a shorter compliance period, would provide a robust regulatory scheme. The result would be a compliance analysis that is more reliable and defensible, combined with a performance analysis that not only accounts as best possible for the period of time leading to peak dose, but provides decision makers with appropriate flexibility to account for uncertainty.

NRC Staff provides a compelling summary defense of this approach in the Technical Analysis:

> Shortening the compliance period would ensure the impacts from natural climate cycling (e.g. glacier formation) are evaluated in the assessment period. If ice ages were to occur, the impacts to society (e.g. risks) from the natural processes associated with the ice ages would be severe. The release of radioactivity from waste disposal facilities would likely not have high priority if the basic necessities such as food and shelter are not being met. Providing the evaluation of climate cycling in the assessment period would ensure the evaluation, which is expected to be semi-quantitative, is consistent with the increased level of uncertainty. In addition, changes in technology over 5,000 years would be expected to be quite large. The longer the compliance time, the greater the likelihood that the calculations performed using current assumptions may be misleading to decision makers.[10]

A 20,000-year compliance period is not based on regulatory precedent – NRC's Technical Analysis presents various precedents for selecting a variety of numbers, including:

- Draft Environmental Impact Statement for Part 61, which used 10,000 years as a basis
- SECY-96-103, which recommended 10,000 years
- NUREG-1573, which recommended 10,000 years for consistency with previous work
- 40 CFR 191 and 10 CFR 60, which both specify 10,000 years for High Level Waste
- 10 CFR 20, Subpart E which requires 1,000 years for decommissioned sites
- 10 CFR 40, Appendix A which recommends 1,000 years for uranium mill tailings

Notably, none of these precedential sources uses 20,000 years, either in a strict quantitative compliance context or for a long-term assessment.

Furthermore, completely missing from the NRC's regulatory precedent discussion is any consideration of the decision-making process conducted by the U.S. Department of Energy (DOE). The DOE manages and disposes of approximately 88 percent of the LLW generated in the United States and is responsible for the vast majority of depleted uranium awaiting disposal. The DOE uses a 1,000 year time frame for compliance, and then conducts additional long term analyses to inform stakeholders. Should the preliminary language be approved, the regulatory dichotomy between commercial and DOE facilities would be striking. At Hanford, there are federal and commercial disposal operations that are separated only by a fence. It makes no sense to have two federal standards for LLW, particularly at

[10] Technical Analysis, p.16.

what amounts to the same site. At the Hanford commercial LLW disposal site, DOE leases the property to the State of Washington. At the end of the lease period, the site will return to DOE control and be subject to DOE requirements.

Another applicable regulatory precedent is the recent State of Utah rulemaking that provides for a compliance period of a minimum of 10,000 years for a performance assessment to evaluate the disposal of DU, with a qualitative analysis for the period to peak dose.

Thus, while staff has given regulatory precedent as the rationale for selecting their approach, including the 20,000-year compliance period, there is in fact no precedent for a 20,000-year compliance period. NRC Staff, the Advisory Committee on Reactor Safety, DOE, and others within the nuclear industry have struggled for decades with how best to analyze the impact of disposing of long-lived waste, without any regulatory or advisory body ever advocating a 20,000-year time period.

We acknowledge that Staff has raised important technical issues – natural cycling of climate, in-growth of daughter products, transport characteristics of various radionuclides – but they do not form a suitable basis to override precedents that are included in multiple NRC rule and guidance documents used by the Commission for decades. We believe the staff failed to adequately support 20,000 years as a regulatory precedent. Such a significant departure from past approaches warrants a more detailed justification, particularly in light of the large uncertainties associated with a 20,000-year compliance period.

A 20,000-year compliance period is inconsistent with the NRC goals to reduce ambiguity and facilitate implementation as stated in the May 3, 2011 *Federal Register* notice – A purpose of revising Part 61 is to reduce ambiguity and facilitate implementation. As noted above, there is much uncertainty about the future when focusing on a 20,000-year period. Requiring a 20,000-year compliance period achieves neither of these goals because of speculation that is inherent in making the assumptions and developing the scenarios needed for a quantitative analysis for this time period. One could anticipate endless argument as to what is reasonable in resolving these difficult issues. It would be hard enough if the NRC was the only decisionmaker. But in the area of LLW, this is compounded by the fact that this rule will be implemented by regulators in Agreement States. Establishing a 20,000-year compliance period will not reduce ambiguity or ease implementation.

A 20,000-year compliance period results in additional overconservatism in the preliminary language – The selection of a 20,000-year compliance period has the effect of imposing additional requirements that are not reasonable. Examples include:

- **Barrier Performance** – Barriers must be shown to "inhibit contact with the disposed waste...over the compliance period." It is impossible to demonstrate the effectiveness of an engineered feature for this time period and equally unlikely that NRC ever would accept such an analysis. In the past the NRC has not allowed credit for barriers past 500 years.[11]

[11] NUREG-1573, section 3.2.

- **Inadvertent Intruder** – The preliminary language requires that the intruder "occupy" the site.

The flaws with these specific aspects of the preliminary language are discussed in more detail below, but it is clear that their derivation arises from the contemplated compliance period. Over such a long time period, it is difficult if not impossible to apply traditional reasonableness standards or engineering evaluations. The end result is standards that are unnecessary even for satisfying the performance objectives for long-lived waste, but worse, they are now applied to the disposal of all LLW.

A 20,000-year compliance period imposes a higher standard than does Part 60 for High Level Waste – The preliminary language sets a compliance standard for the public dose of 25 mrem/yr over a 20,000 year period. This is clearly more restrictive than the 10,000 year compliance period in 10 CFR Part 60 for HLW. Also the dose standard for Yucca Mountain under Part 63 after 10,000 years is 100 mrem/yr. Thus, the preliminary language contemplates a standard more restrictive for LLW than are regulations for HLW.

A 1,000 year compliance period is more appropriate – There is no dispute that judgment is required in selecting a compliance period. There is no "perfect" number for a compliance time frame, only a reasonable number. It is also clear that whatever the number selected, various stakeholders will have concerns with the number. Nevertheless, Energy*Solutions* believes that the NRC should reject the 20,000 year period for the reasons discussed above. There is precedent for time periods of 1,000 and 10,000 years. However, the selection of a compliance time period longer than 1,000 years would result in analyses becoming less and less meaningful, simply because of the increase in uncertainty.

Energy*Solutions* is of the view that while a compliance period of 10,000 years may be workable, a compliance period of 1,000 years is preferable. This period is consistent with the time period in 10 CFR Part 20, Appendix E (LTR) and 10 CFR Part 40. Importantly it will be consistent with the time period used by DOE at its disposal sites under DOE Order 435.1, Radioactive Waste Management. In our view, harmonization of federal standards is particularly important in this case because of DOE's responsibility for DU.

The Commission in its West Valley Policy Statement addressed an objection to using the 1,000-year LTR standard for evaluating the potential of leaving onsite waste incidental to reprocessing that contains some long lived isotopes. The Commission did not provide an exception to the 1,000-year compliance period. It did, however, conclude given the significant quantities of mobile, long-lived radionuclides present onsite that an analysis of impacts beyond 1,000 years should be provided in the DOE/NYSERDA EIS. The Commission stated that:

> This information will need to be evaluated to determine if peak doses might occur after 1000 years and to define dose consequences and impacts on potential long-term management of residual radioactivity at the site.

> Depending upon the outcome of the EIS review, the Commission may need to consider the need for environmental mitigation. [12]

The two tier system described in the preliminary language provides precisely the additional information sought by the Commission.

Consistent with the West Valley approach and the guidance in NUREG-1573, the second tier would be used to extend the performance assessment calculations to estimate peak annual dose to provide an indication of long-term disposal facility performance. A two-tiered approach would ensure that short and long term risks are assessed within an appropriate uncertainty framework. This is consistent with recommendations of the ACNW, Staff guidance, and the approach adopted for high-level waste disposal at Yucca Mountain. The performance period assessment would test the impact of long-lived waste and provide the applicant, licensee, decision makers, and the public information on whether the disposal facility poses a realistic threat of irreversible harm or catastrophic consequences. In light of its qualitative approach, it would allow more room for judgment and discretion, which is appropriate in light of the uncertainties.

A 1,000 year compliance period permits quantitative analyses with a manageable level of uncertainty and without the need for undue speculation. It is a reasonable standard to provide the rigor warranted for compliance. Thus, the public health and safety will be protected by the safety envelope of the two-tier approach.

Proposed Changes to Preliminary Rule Language – To implement a 1,000 year compliance period, changes in language are proposed in the attachment, Proposed Changes to Preliminary Rule Language. Changes are proposed for the following sections:

61.7(c)(7)	To address barrier degradation during the compliance period
61.13(e)(2)	To clarify that the performance period begins after 1,000 years rather than 20,000 years, and that analyses are qualitative in nature
61.13(e)(2)	To clarify that the purpose of the performance period analysis is to test the impact of long-lived waste and whether the disposal facility poses a realistic threat of irreversible harm or catastrophic consequences.
61.41&42	To modify compliance period to 1,000 years

2. Intruder Assessment – The proposed new requirement for an intruder assessment in §61.7(c)(7) states that "...the intruder assessment must assume that an inadvertent intruder occupies the disposal site after closure and engages in activities that unknowingly expose the intruder to radiation from the waste." The proposed language is unnecessarily restrictive, imposes significant new regulatory requirements, and conflicts with established Commission policy. It is also inconsistent with the stated reason for a site-specific analysis, which is to consider the specific site, waste streams, and receptors in designing and operating a disposal facility.

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[12] *Decommissioning Criteria for the West Valley Demonstration Project (M–32) at the West Valley Site*; Final Policy Statement, 67 FR 5003, 5006, February 1, 2002.

The intruder concepts are unnecessarily restrictive – The preliminary language includes a new concept in §61.7(c)(7) that addresses the intruder assessment and requires, among other things, that the intruder assessment identify intruder barriers. This section requires that "The barriers must inhibit contact with the disposed waste or limit the radiological exposure of an inadvertent intruder over the duration of the compliance period." A requirement to demonstrate that a barrier can be shown to be effective for 20,000 years, the compliance period included in the preliminary language, is an unnecessarily restrictive requirement.

Setting aside for the moment the question of whether such an assessment is even technically feasible, it is completely unnecessary for at least some waste streams specifically targeted in this rulemaking. There is no evidence that blended waste, although having been determined by the NRC to – in large quantities – constitute a unique waste, poses a hazard that merits containment for thousands of years. Their safe disposal does, however, rely on the presence and function of barriers; but it is impossible to demonstrate their effectiveness "...over the duration of the compliance period."

The intruder concepts impose significant new regulatory requirements – The current rules require protection of an inadvertent intruder because of the prospect that this individual may encounter waste and be exposed to radiation at some time in the future. The definition of an inadvertent intruder in 10 CFR 61.2 (unchanged by the preliminary language) describes an intruder as "... a person who might occupy the disposal site after closure..." 10 CFR 61.7, Concepts, states in §61.7(b)(3) that "It is possible but unlikely that persons might occupy the site in the future..." (also unchanged by the preliminary language).

10 CFR 61.23(c), Standards for issuance of a license, addresses the intruder as follows:

> The applicant's proposed disposal site, disposal site design, land disposal facility operations (including equipment, facilities, and procedures), disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide **reasonable assurance** that individual inadvertent intruders are protected in accordance with the performance objective in § 61.42, Protection of individuals from inadvertent intrusion. [Emphasis added]

In each of these instances, it is clear that under the existing rules the intruder must be protected. It is not required that demonstrating protection must be based on the assumption that the intruder "occupies" the site, as is the case in the preliminary language. This change imposes significant new requirements on the licensee. Under the preliminary language, this standard would apply to all waste disposed, which is an unreasonable regulatory standard. Even waste that decays to levels that pose no threat to an intruder within hundreds of years (or less) must be treated as if it would remain hazardous for tens of thousands of years.

The intruder concepts conflicts with established Commission policy – The concept of an intruder as someone who *might*, but would not necessarily be guaranteed to encounter the waste is not only clearly established in the current rules, it has been affirmed by the Commission in licensing actions as well. In licensing proceedings for Louisiana Energy Services enrichment facility, experts for both the applicant and NRC Staff testified that significant intruder exposures at Energy*Solutions*' Clive site were unrealistic. The Atomic

Safety and Licensing Board found that intruder scenarios at Clive were so unreasonable "...as to fall outside of what can reasonably be called anticipated or not unduly speculative impacts." They further found that changes necessary to reverse this conclusion were "not predictable with any confidence" and that "...any projections about the likelihood of an intruder scenario would be exceedingly speculative." In considering a petition to review the Board's decision, the Commission agreed, noting: "The Board's reluctance to assume or speculate about far-reaching and large-scale changes was not unreasonable."[13]

Energy*Solutions* proposes that the NRC apply a standard of "reasonably foreseeable scenarios" for the intruder assessment. This would require that a licensee demonstrate compliance with the performance objective in §61.42 without imposing the unreasonable assumption that an intruder must occupy a site. The concept of reasonably foreseeable is already widely applied in NRC rules and guidance. Even the guidance issued by the staff for performance assessments done prior to the completion of *this* rulemaking states that intruder analyses "...should consider reasonably foreseeable activities by an intruder that may result in inadvertent disruption of the disposal facility..."[14] Similarly, NRC uses reasonably foreseeable scenarios for purposes of decommissioning and license termination.[15] As noted in the Regulatory Issue Summary:

> The staff recommended allowing justification of scenarios based on reasonably foreseeable future land use, as opposed to defaulting to very conservative scenarios such as the resident farmer.[16]

Proposed Changes to Preliminary Rule Language – To address these comments on the inadvertent intruder, changes in language are proposed in the attachment, Proposed Changes to Preliminary Rule Language. Changes are proposed for the following sections:

61.2	To clarify that the intruder scenario requires reasonably foreseeable assumptions
61.7(c)(7)	To clarify that the intruder scenario requires reasonably foreseeable assumptions
61.13(b)	To clarify that the intruder scenario requires reasonably foreseeable assumptions and that the performance standard is whether the performance objectives are met regardless of the classification and segregation
61.13(e)(2)	To clarify that the intruder scenario requires reasonably foreseeable assumptions
61.55(a)(6)	To clarify that this paragraph is not establishing a new intruder assessment requirement

[13] CLI-06-15, June 2, 2006.

[14] *Summary of Existing Guidance that may be Relevant for Reviewing Performance Assessments Supporting Disposal of Unique Waste Streams*, FSME-10-030, April 13, 2010.

[15] Consolidated Decommissioning Guidance, NUREG-1757, September 2006.

[16] *Results of the License Termination Rule Analysis*, RIS-2004-08, May 28, 2004.

3. Definition of Long-Lived Waste – The preliminary language imposes significant new requirements on the disposal of "long-lived waste," a newly defined term. These new requirements, e.g., imposing a maximum site disposal inventory for long-lived wastes, go beyond what is necessary to address unique waste streams. Under this definition, the waste streams that would be subject to the significant new requirements articulated in the preliminary language go well beyond what was originally contemplated by the Commission, i.e., significant quantities of depleted uranium.

The preliminary language defines long-lived waste as "waste for which more than ten percent of the initial radioactivity remains after 20,000 years, or waste for which the peak activity from progeny occurs after 20,000 years." This definition captures a significant percentage of the waste currently being disposed of as Class A waste. For example, Energy*Solutions* routinely receives waste at its Clive and Barnwell disposal sites that contain 63 nuclides that would satisfy this definition. Since the year 2000, we have disposed of over 250,000 packages of waste with a total volume of >89,000,000 ft^3 at the Barnwell and Clive sites that contain these isotopes.

The potential consequences of disposal of wastes containing these nuclides were fully analyzed in the Draft Environmental Impact Statement[17] and the Final Environmental Impact Statement[18] for the preparation of Part 61. Literally hundreds of radioactive isotopes were identified from 37 LLW waste streams that were analyzed. The most important radioisotopes were selected. The nuclides not included – including the 63 referred to above – were not accidentally omitted. Nor were they removed to resolve a jurisdictional conflict, as was the case with U-238. Staff has presented no analysis to justify increasing the regulatory scrutiny provided to waste containing these nuclides, nor is there any evidence that there impacts were not properly evaluated during the promulgation of Part 61

It is not clear that there is a need for a definition of long-lived waste. The preliminary language contemplates preparation of a PA and IA that apply to all waste disposed. As such, there is no differentiation among the new requirements contemplated that are not already established by the compliance period and the performance period. For example, there is no need to rely on the term "long-lived waste" in evaluating peak dose. Should the peak fall within the compliance period, then that dose must satisfy the performance objectives. Should that dose fall within the performance period, then no limit applies but the dose must be considered in evaluating the long-term performance of the site.

Energy*Solutions* proposes that NRC eliminate the definition of long-lived waste. If it is determined that the definition is necessary, we propose the following as an alternative definition for long-lived waste:

> Long-lived waste means waste for which the peak activity from either the waste or its progeny occurs after the end of the compliance period.

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[17] Draft Environmental Impact Statement on 10 CFR Part 61 "Licensing Requirements for Land Disposal of Radioactive Waste," NUREG-0782, September 1981.

[18] Final Environmental Impact Statement on 10 CFR Part 61 "Licensing Requirements for Land Disposal of Radioactive Waste," NUREG-0945, November 1982.

4. Stability – The preliminary language appropriately recognizes that stability of long-lived waste may be more uncertain than the 300-year timeframe applicable to Class B and C LLW. However, the preliminary language is not clear on the appropriate timeframe for stability of the disposal unit. Disposal unit stability, in fact, remains addressed no more clearly than in existing regulations. At §61.7(c)(2), Class B and C *waste forms or containers* "...should be designed to be stable (i.e., to maintain gross physical properties and identity) over 300 years." At §61.7(c)(5), *intruder barriers* are addressed as follows: "The effective life of these intruder barriers [to prevent inadvertent intrusion to Class C waste] should be 500 years." Stability of the disposal unit itself is not addressed.

Although not explicitly linked to disposal unit stability, §61.7(c)(7) states "The [intruder] barriers must inhibit contact with the disposed waste or limit the radiological exposure of an inadvertent intruder over the duration of the compliance period." There are three concerns with this language.

1. As written in the preliminary language, §61.7(c)(7) of the preliminary language contradicts §61.7(c)(5) since the compliance period for the intruder barrier is set at 20,000 years in §61.42(b); compared with 500 years at §61.7(c)(5).

2. The concepts of inhibiting contact and radiological exposure are distinct, but phrased as options due to the choice of the word "...or..." as drafted in the preliminary language. As long as performance objectives are met, there is no safety benefit to inhibiting contact with waste materials.

3. Reference to the "compliance period" could be interpreted to intend that the disposal unit itself must demonstrate stability for 20,000 years. As this timeframe approaches geologic time, it is not likely that any near surface disposal unit could conclusively be demonstrated to meet these criteria.

Energy*Solutions* recommends that the timeframe for stability of the disposal unit be made explicit – namely, that §61.7(c)(2) set a stability timeframe for the *disposal unit* (including disposal units containing long-lived waste) to be 300 years; but include discussion that long-lived waste may still be appropriately disposed via near-surface disposal regardless of disposal unit stability if the performance assessment shows acceptable radiological consequences in accordance with §61.41 and §61.42.

Proposed Changes to Preliminary Rule Language – To clarify that the relative importance of site stability and satisfying the performance objectives, a change to § 61.7(c)(2) is proposed in the attachment, Proposed Changes to Preliminary Rule Language.

5. Maintenance and Update of Performance and Intruder Assessments – Over time the waste streams to be disposed likely will change, new information about the site and its performance may become available, disposal practices may evolve, and new analytical methods may be developed. Therefore, §61.13 should specify a minimum frequency for updating the performance and intruder assessments. A 5-year cycle is proposed, since each update is expected to require significant time and resources to produce, review, and approve. This expectation should be included in the rule, as opposed to guidance, so that consistent standards are applied to disposal facilities in all states.

It also should be recognized that only minor modifications to performance and intruder assessments may be necessary as part of the 5-year maintenance review. In addition, updates may be required to address the disposal of unanalyzed waste streams during the period between the updates. In either case, the scope of the changes to the performance and intruder assessments should be whatever is necessary to demonstrate that the performance objectives will still be met.

Proposed Changes to Preliminary Rule Language – To provide for maintenance and updating, a new section §61.52(a)(13) is proposed in the attachment, Proposed Changes to Preliminary Rule Language.

6. Implementation – The rule should be a forward-looking (prospective) rule as the NRC has stated that the existing regulations are adequate to protect the public health and safety.[19] The rule should apply to new waste being disposed after the effective date of the rule. Nonetheless, although existing waste need not be disturbed, the performance assessment and intruder assessment would need to consider the waste already buried at the site as well as additional waste planned for disposal.

Existing licensees would need an appropriate time period to prepare performance and intruder assessments. We propose that the effective date be 24 months after publication of the final rule in the *Federal Register*. Recognizing it is difficult to predict how long it may take for a regulator to review and approve the performance and intruder assessments, the rule should provide that disposals of currently authorized waste streams may continue during the review period.

Proposed Changes to Preliminary Rule Language – To address ongoing disposal, a new section §61.52(a)(15) is proposed in the attachment, Proposed Changes to Preliminary Rule Language. Energy*Solutions* proposes that the timeframe for PA/IA requirements and the applicability to existing licenses also be explicitly specified in the statements of consideration.

7. Rule vs. Guidance – The question of how much detail should be in a regulation versus in guidance documents is raised in most rulemakings. Regulations provide for certainty, consistency, and enforceability. On the other hand, it is recognized that changing regulations entail significant effort and time. Guidance, while not directly enforceable, is easier to change over time and this flexibility is often beneficial. Nonetheless, it is important that the basic objectives and principles be clearly established in the regulations. This is particularly important for revisions to Part 61 given that all current disposal sites are regulated by Agreement States, which are not obligated to comply with NRC guidance.

During the May 18, 2011 meeting, it was implied that portions of the preliminary language would apply only to some, presumably long-lived, waste streams. However, as written, there seems to be no such differentiation. The suggestion was offered by Staff that the applicability of certain requirements could be clarified in guidance. We do not see how guidance could be used in this way. As the NRC Office of General Counsel pointed out during the meeting,[20] guidance cannot supersede a rule. Thus it is important that the NRC be

[19] *Notice of availability of preliminary proposed rule language and public meeting*, 76 FR 24831, May 3, 2011.

[20] Transcript, p. 184.

clear in the rule as to what it means and expects. If different assessments are acceptable for different nuclides, then that must be specified in the rule, not guidance, since guidance cannot reinterpret the plain language of a regulation.

8. Compatibility Categories – Energy*Solutions* proposes that the NRC assign Compatibility Categories for all newly proposed changes to 10 CFR 61 that will require Agreement States to adopt rules that are essentially identical to those promulgated by the NRC, generally Category B. While the compatibility categories for the various new sections are not established in the preliminary language, it was clear from the discussions at the May 18, 2011 public meeting that the agency is considering allowing the states a degree of flexibility that would be inappropriate given the potential transboundary and health and safety implications.

NRC Management Directive and Handbook 5.9, *Adequacy and Compatibility of Agreement State Programs*, "...describes the specific criteria and process that will be used to identify the compatibility categories of those NRC program elements that should be adopted by an Agreement State for purposes of compatibility..." The Handbook specifies that "NRC program elements in Category B are those that apply to activities that have direct and significant transboundary implications." Part II of the Handbook identifies Categorization Criteria and states: "To be included in Category B, an NRC program element is to be one that applies to activities that have direct and significant effects in multiple jurisdictions." Given that generators, shippers, and/or processors of LLW operate in all 50 states, it is impossible to conclude that the elements intended for the proposed rule do not have significant effects in multiple jurisdictions.

Furthermore, by the time any regulation from this rulemaking takes effect, there will be two operating licensed LLW disposal sites accepting waste from outside their host regions. Any debate about the existence of transboundary impacts will have been resolved. Given that the current and foreseeable disposal sites all operate in Agreement States, it is important that the standards be consistent among the affected states and that there be uniformity on the need and approaches for meeting the performance objectives.

Some of the changes in the preliminary language are to sections of the regulations that currently are Compatibility Category H&S. Handbook 5.9 describes the applicability of this category as follows:

> ...the State should adopt program elements in this category, based on those of NRC, that embody the essential objectives of the NRC program elements because of particular health and safety considerations.

As described below, Energy*Solutions* has proposed the adoption of a WAC approach to provide reasonable assurance that regardless of the waste stream, the site design or characteristics, the waste classification, and the site's disposal practices, the performance objectives would be met. This assurance would be provided on the basis of a site-specific analysis, a more robust approach than is currently embodied in the regulations. Given the health and safety significance of this approach, Agreement State adoption of the affected portions of the regulations should be a matter of "adequacy," i.e., H&S. This would be consistent with other provisions in Part 61 such as those in §61.42-61.54. There should not

be inconsistent standards among Agreement States in this area as there should be uniformity on the need and approaches for meeting the performance objectives.

9. Site-Specific Waste Acceptance Criteria – The preliminary language requires LLW disposal facilities to conduct site-specific analyses to demonstrate compliance with the performance objectives in Part 61. As part of that effort, NRC intends to require that each site demonstrate through both a performance assessment and intruder assessment that the performance objectives are met. While these changes are positive additions to the low-level waste regulatory framework and contribute to making Part 61 a more risk-informed and performance-based regulation, the changes do not go far enough to address the dichotomy between the generic classification system and the site-specific performance objectives.

The preliminary language for §61.7(c)(6) states that performance and intruder assessments will be utilized "...to provide reasonable assurance that the waste will not present an unacceptable hazard over the compliance period." The thrust of this section is to identify "...enhanced controls and limitations which are site- and waste-specific." While acknowledging that it may be necessary in some cases to impose additional controls because of the shortcomings of the generic approach in Part 61, it is equally true that there may be cases when these same shortcomings result in unnecessarily restrictive limitations. The same performance and intruder assessments that can be used to identify additional controls when necessary should be relied upon to relax unnecessarily restrictive controls when appropriate.

Such an approach would be consistent with the existing §61.54 that allows for alternative requirements for site design and operations if the performance objectives of Part 61 are met. This would result in a balanced approach firmly grounded on the health and safety standards. Importantly, it would take advantage of the benefits of a performance-based risk-informed approach based on site-specific performance and intruder assessments.

The proposed rule should allow for the development of site-specific Waste Acceptance Criteria – Generally, the regulatory framework of Part 61 has withstood the test of time and is protective of public health and safety. However, it is recognized that the current Part 61 regulation has a number of weaknesses caused by the generic approach to classification based on analyses done three decades ago.

In order to take advantage of the performance-based risk-informed approach based on site-specific performance and intruder assessments, Energy*Solutions* recommends that the NRC modify its preliminary language to allow each applicant for a Part 61 disposal site and Part 61 licensee to establish site-specific waste acceptance criteria (WAC) based on the results of the site's performance assessment and intruder assessment. The basis for this recommendation, which is modeled on the DOE waste disposal approach, is provided below.

Simply stated, establishing a WAC process that takes into consideration the current classification requirements and utilizes site-specific analyses would result in assuring the public health and safety is met regardless of the waste streams involved or classification of the waste. It could eliminate the need for an additional rulemaking to further revise Part 61, conserving resources for use on more pressing health and safety matters. It is a pragmatic approach to modernizing and risk-informing Part 61.

The WAC approach assures public health and safety – The WAC approach assures public health and safety by requiring that the performance objectives are met. As the Commission stated in the Louisiana Energy Services proceeding,[21]

> In the end, the 'bottom line for disposal' of low-level radioactive wastes are the performance objectives of 10 C.F.R. Subpart C, which set forth the ultimate standards and radiation limits for (1) protection of the general population from releases of radioactivity; (2) protection of individuals from inadvertent intrusion; (3) protection of individuals during operations; (4) and stability of the disposal site after closure. Thus, while there may not yet be detailed technical criteria established for all of the kinds of land disposal that might be proposed under Part 61, criteria can be developed 'on a case-by-case basis,' as needed. After all, any technical requirements are 'intended to help ensure that the performance objectives established in Subpart C are met,' but they are 'not the end in themselves... [only] a means of achieving the end,' which are the performance standards. [Citations omitted]

The WAC approach removes unnecessary regulatory burden without compromising public health and safety – The classic Part 61 approach based on the generic classification system is a one-size-fits-all approach that provides varying degrees of safety margin in satisfying the performance objectives. This can result in overconservatism that in some cases is not necessary to meet the performance objectives, thus imposing an unnecessary regulatory burden. Removal of this burden is a worthwhile objective because it places an unjustified cost on disposal services. The ultimate consumer of these services is the general public, members of which benefit to varying degrees from nuclear medicine, nuclear power, and national defense. The WAC approach would compensate for changes to waste streams, disposal practices, and dose methodology that have evolved since the classification system was established decades ago while ensuring that the performance objectives are met. Removing this unnecessary cost would also be consistent with the ALARA concept.

The WAC approach will ensure that all sites clearly meet the performance objectives regardless of waste streams and site characteristics and would result in an integrated safety envelope for the disposal facility. The WAC approach also provides for regulatory oversight since the site-specific analyses and the WAC would require approval before it could be applied. The WAC would provide a clear basis, based on site- and waste-specific analyses, to override the current requirements, which are based on the generic analyses that do not account for actual site characteristics and disposal practices.

Proposed Changes to Preliminary Rule Language – To implement the WAC approach, changes in language are proposed in the attachment, Proposed Changes to Preliminary Rule language. Changes are proposed for the following sections:

61.2	To define the term "waste acceptance criteria"
61.7(c)(6)	To explain the WAC concept

[21] Memorandum and Order, In the Matter of Louisiana Enrichment Service, L.P. (National Enrichment Facility), U.S. Nuclear Regulatory Commission, CLI-05-05, p. 11, January 18, 2005.

61.12 (a)(i)	To provide for including the WAC in the application
61.52(a)(14)	To limit disposal to only waste authorized by a WAC and to require updating of the WAC periodically and for special WACs

PROPOSED CHANGES TO
PART 61: SITE SPECIFIC ANALYSES FOR DEMONSTRATING COMPLIANCE WITH SUBPART C PERFORMANCE OBJECTIVES
PRELIMINARY PROPOSED RULE LANGUAGE

§ 61.2 Definitions.

Intruder assessment is an analysis that:
(1) Assumes that an inadvertent intruder ~~occupies~~ has access to the site at any time during the compliance period after institutional controls are removed and engages in reasonably foreseeable activities ~~(e.g., agriculture, dwelling construction, and resource exploration)~~ that might unknowingly expose the inadvertent intruder to radiation from the waste;
(2) Examines the capabilities of intruder barriers to inhibit contact with the waste by an inadvertent intruder or to limit the inadvertent intruder's exposure to radiation; and
(3) Estimates the potential annual total effective dose equivalent, considering associated uncertainties, to an inadvertent intruder engaging in reasonably foreseeable activities that might unknowingly expose the inadvertent intruder to radiation from the waste.

[Delete definition of Long-lived waste.] Alternatively:

Long-lived waste means waste for which ~~more than ten percent of the initial radioactivity remains after 20,000 years, or waste for which~~ the peak activity from either the waste or its progeny occurs after the end of the compliance period ~~20,000 years~~.

Performance assessment is an analysis that:
(1) Identifies the features, events, and processes that might affect the disposal system;
(2) Examines the effects of these features, events, and processes on the performance of the disposal system; and
(3) Estimates the annual total effective dose equivalent to any member of the public. This estimate must consider the associated uncertainties, caused by all significant features, events, and processes.

Waste Acceptance Criteria (WAC) are the waste concentrations and total activity of waste a specific site can accept. The WAC is based on site-specific performance and intruder assessments that demonstrate that the performance objectives of Subpart C are met regardless of the waste classification.

§ 61.7 Concepts.

(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 which may be built totally or partially above-grade provided that such facilities have protective earthen covers. Near-surface disposal does not include disposal facilities which 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. While there may not yet be detailed technical

criteria established for all kinds of land disposal that might be proposed, alternative methods of disposal can be approved on a case-by-case basis as needed.

(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. For near-surface disposal, the disposal unit is usually a trench. 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.

(b) Performance assessment. (1) Many features, events, and processes can influence the ability of a waste disposal facility to limit releases of radioactivity to the environment. Disposal system behavior is characterized by the disposal facility design, the characteristics of the waste, and the geologic and environmental characteristics of the disposal site. A performance assessment evaluates the behavior of a radioactive waste disposal system and the uncertainties in the system.

(2) The performance assessment identifies the specific characteristics of the disposal site (e.g., hydrology, meteorology, geochemical, biotic, geomorphology, etc.); degradation, deterioration, or alteration processes of the engineered barriers (including the waste form and container); and interactions between the site characteristics and engineered barriers that might affect the performance of the disposal facility. The performance assessment examines the effects of these processes and interactions on the ability of the disposal facility to limit waste releases and calculates the annual dose to a member of the public for comparison with the appropriate performance objective of subpart C of this part.
(c) * * *
(1) Disposal of radioactive waste in near-surface disposal facilities has the following safety objectives: protection of the general population from releases of radioactivity, protection of inadvertent intruders, protection of individuals during operations, and ensuring stability of the site after closure.

(2) A cornerstone of the system is stability—stability of the waste and the disposal site— which minimizes the access of water to waste that has been emplaced and covered. Limiting the access of water to the waste minimizes the migration of radionuclides, which avoids the need for long-term active maintenance and reduces the potential for inadvertent intruders to be exposed to the waste. While stability is desirable; it isn't necessary from a health and safety standpoint for most low-level waste because the waste doesn't contain sufficient radionuclides to be of concern. This low-activity waste (e.g., ordinary trash-type waste) tends to be unstable, which can become a problem if it is mixed with higher activity waste. If lower activity waste is mixed with the higher activity waste, the deterioration of the unstable waste could lead to the failure of the system and could permit water to penetrate the disposal unit, which could cause problems with the higher activity waste. Therefore, to avoid placing requirements for a stable waste form on relatively innocuous wastes, these wastes have been classed as Class A waste, which will be disposed of in separate disposal units at the disposal site. However, Class A waste that is stable may be disposed of with other classes of waste. Higher activity wastes

that should be stable for proper disposal are classed as Class B and C waste. To the extent that it is practicable, Class B and C waste forms or containers should be designed to be stable (i.e., to maintain gross physical properties and identity) over 300 years. The stability of long lived waste may be more uncertain and require a more robust technical evaluation of the processes that are unlikely to affect the ability of the disposal system to isolate short-lived waste. For long-lived waste and certain radionuclides prone to migration, a maximum disposal site inventory based on the characteristics of the disposal site may be established to limit potential exposure. Consequently, long-lived waste may still be disposed via near-surface disposal regardless of disposal unit stability if the performance assessment shows acceptable radiological consequences in accordance with §61.41 and §61.42.

* * * * *

(5) Waste that will not decay to levels that present an acceptable hazard to an intruder within 100 years is designated as Class C waste. Class C waste must be stable and be disposed of at a greater depth than the other classes of waste so that subsequent surface activities by an inadvertent intruder will not disturb the waste. Where site conditions prevent deeper disposal, intruder barriers such as concrete covers may be used. The effective life of these intruder barriers should be 500 years. A maximum concentration of radionuclides is specified in Tables 1 and 2 of § 61.55 so that at the end of the 500-year period, the remaining radioactivity will be at a level that does not pose an unacceptable hazard to an inadvertent intruder or to public health and safety. Waste with concentrations above these limits is generally unacceptable for near-surface disposal. There may be some instances where waste with concentrations greater than permitted for Class C would be acceptable for near-surface disposal with special processing or design. Disposal of this waste will be evaluated on a case-by-case basis.

(6) ~~Regardless of~~ In addition to the design considerations in subpart D based on the waste classification~~, some waste may require enhanced controls or limitations at a particular land disposal facility~~system, each site shall develop site-specific waste acceptance criteria (WAC) to provide reasonable assurance that the waste will not present an unacceptable hazard over the compliance period. The WAC is to be based on site-specific ~~a~~ performance ~~assessment~~ and ~~an~~ intruder ~~assessment~~assessments that demonstrate that the performance objectives of Subpart C are ~~used to~~ met. In developing the WAC, the assessments will identify ~~these enhanced controls and limitations, which are site and waste-specific. Enhanced~~ controls or limitations ~~could include additional~~ such as limits on waste concentration or total activity, ~~more robust~~ intruder barriers (such as burial ~~below 30 meters~~ depths), and waste-specific stability requirements. These ~~enhanced~~ controls or limitations ~~could~~ are intended to mitigate the uncertainty associated with the evolutionary effects of the natural environment and the disposal facility performance over the compliance period. The WAC are to be updated at the same frequency as the site-specific performance and intruder assessments. WAC are subject to NRC approval prior to their use.

(7) An intruder assessment quantitatively estimates the radiological exposure of an inadvertent intruder at a disposal facility following the loss of institutional controls. The results of the intruder assessment are compared with the appropriate performance objectives. The intruder assessment must identify the intruder barriers and examine the performance of the barriers. The intruder assessment must also address the effects of uncertainty on the performance of the barriers. ~~The barriers must inhibit contact with the disposed waste or limit the radiological exposure of an inadvertent intruder over the duration of the compliance period.~~ An intruder assessment can employ a similar methodology to that used for a performance assessment, but the intruder assessment must assume that an inadvertent intruder ~~occupies~~ has access to the disposal site after closure and engages in reasonably foreseeable activities that could unknowingly expose the intruder to radiation from the waste.

(d) * * *
(4) After a finding of satisfactory disposal site closure, the Commission will transfer the license to the State or Federal government that owns the disposal site. If the Department of Energy is the Federal agency administering the land on behalf of the Federal government the license will be terminated because the Commission lacks regulatory authority over the Department for this activity. Under the conditions of the transferred license, the owner will carry out a program of monitoring to assure continued satisfactory disposal site performance, physical surveillance to restrict access to the site, and carry out minor custodial activities. During this period, productive uses of the land might be permitted if those uses do not affect the stability of the site and its ability to meet the performance objectives. At the end of the prescribed period of institutional control, the license will be terminated by the Commission.

§ 61.12 Specific technical information.
The specific technical information must include the following to demonstrate that the performance objectives of subpart C of this part and the applicable technical requirements of subpart D of this part will be met:

(a) A description of the natural and demographic disposal site characteristics as determined by disposal site selection and characterization activities. The description must include geologic, geotechnical, geochemical, geomorphological, hydrologic, meteorologic, climatologic, and biotic features of the disposal site and vicinity.

* * * * *

(i) A description of the waste acceptance criteria (WAC) that justify the kind, amount, ~~classification,~~ and specifications of the radioactive material proposed to be received, possessed, and disposed of at the land disposal facility.

§ 61.13 Technical analyses.
* * * * *

(a) A performance assessment must represent features, events, and processes that can influence the ability of the waste disposal facility to limit releases of radioactivity to the environment. The features, events, and processes considered in the performance assessment must represent a wide range of both beneficial and potentially adverse effects on performance. The performance assessment must consider the specific technical information provided in § 61.12(a) through (i). The performance assessment must evaluate uncertainties in the projected behavior of the facility. The performance assessment must identify the specific characteristics of the disposal site that are necessary to demonstrate compliance with the performance objectives in subpart C of this part consistent with the specific technical information found in § 61.12. The performance assessment must also identify the degradation, deterioration, or alteration processes of the engineered barriers (including the waste form and container) and interactions between the site characteristics and engineered barriers that might affect the performance of the disposal facility. Pathways analyzed in demonstrating protection of the general population from releases of radioactivity must include air, soil, groundwater, surface water, plant uptake, and exhumation by burrowing animals. The analyses must clearly identify and differentiate between the roles performed by the natural disposal site characteristics and design features in isolating and segregating the wastes. The analyses must demonstrate that there is reasonable assurance that the exposure to humans from the release of radioactivity will not exceed the limits in § 61.41.

(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 and~~that the exposure to any inadvertent intruder who engages in reasonably foreseeable activities will not exceed the limits set forth in § 61.42 as demonstrated in an intruder assessment.

* * * * *

(e) (1) Analyses that discuss how the design of the facility considers the potential long-term radiological impacts, consistent with available data and current scientific understanding. The analyses must identify and describe the features of the design and site characteristics that will reduce long-term impacts.

(2) Qualitative analyses of long-lived waste must ~~calculate~~ evaluate the peak annual dose that would occur ~~20~~1,000 or more years after site closure for the purpose of testing the impact of long-lived waste and provide information on whether the disposal facility poses a realistic threat of irreversible harm or catastrophic consequences. No dose limit applies to the results of these analyses, but the analyses must be included to indicate the long-term performance of the land disposal facility using reasonably foreseeable assumptions and scenarios.

§ 61.28 Contents of application for closure.

(a) * * *

(2) The results of tests, experiments, or any other analyses relating to backfill or excavated areas, closure and sealing, waste migration and interaction with emplacement media, or any other tests, experiments, or analysis pertinent to the long-term containment of emplaced waste within the disposal site, including revised analyses for § 61.13 using the details of the final closure plan and waste inventory.

* * * * *

§ 61.41 Protection of the general population from releases of radioactivity.

(a) Concentrations of radioactive material that may be released to the general environment in ground water, surface water, air, soil, plants, or animals must not result in an annual dose exceeding an equivalent of 25 millirems total effective dose equivalent to any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.

(b) Compliance with paragraph (a) of this section must be demonstrated through a performance assessment that evaluates peak annual dose up to ~~20,000~~ 1,000 years following closure of the disposal facility.

§ 61.42 Protection of inadvertent intruders.

(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 500 millirems total effective dose equivalent.

(b) Compliance with paragraph (a) of this section must be demonstrated through an intruder assessment that evaluates peak annual dose up to ~~20,000~~ 1,000 years following closure of the disposal facility.

§ 61.52 Land disposal facility operation and disposal site closure.

(a) * * *

§ 61.52 Land disposal facility operation and disposal site closure.

(a) * * *

(12) Waste will be disposed of consistent with the description provided in § 61.12(f), and the technical analyses required by § 61.13.

(13) The performance and intruder assessments are to be updated and submitted for NRC approval at a five-year frequency and in the event a licensee intends to dispose of waste that is not in accordance with the current, approved WAC, unless the NRC approves an alternative period.
(14) A licensee may dispose of radioactive waste at the site if it is permitted by an approved WAC notwithstanding its classification. The WAC are subject to NRC approval prior to use by the licensee.
(15) Notwithstanding paragraphs (a)(13) and (a)(14), disposal of currently authorized waste streams may continue during the review period.

* * * * *

§ 61.55 Waste classification.

(a) * * *

(6) Classification of wastes with radionuclides other than those listed in Tables 1 and 2 of this section. If radioactive waste does not contain any nuclides listed in either Table 1 or 2 of this section, it is Class A. As required above, ~~Any~~ waste classified under this subparagraph must be analyzed in the intruder assessment required by § 61.42.

Rulemaking Comments

From: Thomas Magette [TEMAGETTE@energysolutions.com]
Sent: Friday, June 17, 2011 8:12 PM
To: Rulemaking Comments
Cc: Thomas Magette
Subject: Comments in Response to Notice of Availability Docket ID NRC–2011–0012
Attachments: EnergySolutions Comment Letter - Preliminary Proposed Rule Language - FINAL 061711.pdf

Dear Ms. Vietti-Cook:

Energy*Solutions* hereby submits the attached comments on the Preliminary Proposed Rule Language for Site-Specific Analyses for Demonstrating Compliance With Subpart C Performance Objectives. Thank you for the opportunity to provide these comments. We look forward to continuing to participate in this rulemaking.

Sincerely,

Thomas E. Magette, P.E.
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