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

77FR 40817

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**Subject: Request for Comment on Low-Level Radioactive Waste Regulatory Management Issues, 77 FR 40817, July 11, 2012**

**Reference: Docket ID NRC-2011-0012**

Dear Ms. Vietti-Cook:

EnergySolutions is submitting the comments contained in the attachment in response to the subject notice. We appreciate the opportunity to comment on the planned changes to the rules governing the disposal of low-level radioactive waste (LLW). As requested, we have provided comments on the four items included in Commission direction to the NRC staff as described in SRM-COMWDM-11-0002/COMGEA-11-0002. We also provide comments on the emerging issues that have arisen in the public meetings.

In general, we believe that all of the items that the Commission directed the staff to consider should be included in revisions to Part 61. We provide our rationale for this conclusion in the attached comments. In addition, the comments that we submitted on June 17, 2011 including rule text language remain valid and should be incorporated by reference to these comments.

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](mailto:temagette@energysolutions.com).

Sincerely,

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

Attachments

SUNSE Review Complete  
Template = ADM-013

E-REDS = ADM-03  
Add =  
D. Lowman (DBL1)

## COMMENTS ON POTENTIAL CHANGES TO NRC LICENSING REQUIREMENTS FOR LAND DISPOSAL OF RADIOACTIVE WASTE

### ADDITIONAL DIRECTION IN JANUARY 19, 2012 SRM

EnergySolutions believes that all four items listed in SRM-COMWDM-11-0002/COMGEA-11-0002 should be included in revisions to Part 61. A performance assessment (PA) is necessary to assess safe disposal of previously unanalyzed waste streams; any PA should be based on current technology, including the most recent dose methodologies recommended by the International Commission on Radiological Protection; waste acceptance criteria (WAC) generated from the PA would be the most effective way to measure compliance with the performance objectives at a site; and the aspects of these changes all are fundamental to safe disposal thus their adoption by the Agreement States should be required. We address each of these points in more detail below.

In the SRM, the Commission noted that the revisions it directed the staff to consider may "...obviate the need for a second protracted rulemaking." We agree with this notion. In fact, we believe that one rulemaking is sufficient not only to accomplish the initial objective of accounting for previously unanalyzed waste streams, but to accomplish the more far-reaching objective of risk informing Part 61. The use of a PA to generate a WAC (the "PA approach") is the most risk informed way to assess what waste can safely be disposed at a site. Even a comprehensive revision of Part 61 that relies on generic analyses – generic site descriptions, generic intruder assumptions, generic waste streams, generic disposal methods – would be inferior. All of these are not only less representative, but destined to become less precise over time in the same way the current regulations have. A site-specific approach, which would include periodic updates to the PA, is not subject to these shortcomings.

Because the PA approach offers a significant improvement over the current regulations, we believe its use should be provided in Part 61 not just as a supplement to the existing requirements of §61.55, but as an alternative to the existing tables. That is to say, existing and future disposal sites would have the alternative of demonstrating compliance with the performance objectives by using either the tables in §61.55 or the PA approach.

#### **1. Allowing licensees the flexibility to use International Commission on Radiological Protection dose methodologies in a site-specific performance assessment for the disposal of all radioactive waste.**

EnergySolutions supports allowing licensees the flexibility to use International Commission on Radiological Protection (ICRP) dose methodologies in a site-specific performance assessment for the disposal of all radioactive waste.

A significant advantage of the use of a PA (addressed in more detail below) is flexibility. Changes not only in waste streams, but in the state-of-the-art of all aspects of the analysis, can be accommodated in updates to the PA. It only makes sense to allow the use of current science in the preparation of such an analysis. Furthermore, such an approach is consistent with current NRC practice. For example, current dosimetric models, parameters and dose conversion factors as specified in 10 CFR 20 are based on recommendations from ICRP Publications 26 and 30. On a case-by-case basis, the NRC and Agreement States have

authorized licensees to use newer methodologies as referenced in ICRP Publications 60 and 68 (see for example NUREG-1854, section 4.6.1.3, that allowed DOE to use latest dose conversion factors).

The reference should be to most recent dose methodologies adopted by ICRP, not a given publication number. Otherwise, the regulations will be referenced to a standard that also will ultimately be superseded.

**2. A two-tiered approach that establishes a compliance period that covers the reasonably foreseeable future and a longer period of performance that is not a priori and is established to evaluate the performance of the site over longer timeframes. The period of performance is developed based on the candidate site characteristics (waste package, waste form, disposal technology, cover technology and geohydrology) and the peak dose to a designated receptor.**

EnergySolutions supports a two-tiered approach that establishes a compliance period for the reasonably foreseeable future and a performance period to evaluate the performance of the disposal facility over longer timeframes. The two-tiered approach provides a reasonable approach for dealing with the uncertainties over the long term for some radionuclides and is already provided for in NRC guidance.<sup>1</sup> We propose that the compliance period be 1,000 years and that the period of performance extend to the time of peak activity.

**Compliance Period.** In its June 17, 2011 letter to the NRC, EnergySolutions commented in favor of the two-tiered approach. At that time we also supported a compliance period of 1,000 years. In that letter we described in detail the merits of 1,000 years, as well as the disadvantages of longer periods of time, in particular the 20,000 year time-period proposed by NRC staff. We will not repeat those arguments here, other than to highlight the key elements.

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-tiered approach. Specifically, a 1,000-year compliance period:

- Is consistent with the time period in 10 CFR Part 20, Subpart E (License Termination) and 10 CFR Part 40.
- Is consistent with the time period used by the U.S. Department of Energy (DOE) at its disposal sites under DOE Order 435.1, Radioactive Waste Management. Harmonization of federal standards is in the public interest as it avoids two federal agencies with health and safety responsibilities operating under essentially the same statutory provisions having conflicting standards. This is particularly important because both NRC and DOE have responsibility for depleted uranium (DU).
- Is consistent with the recommendations of the National Academy of Public Administration (NAPA) report<sup>2</sup> assessing intergenerational decision making, which

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<sup>1</sup> *A Performance Assessment Methodology for Low-Level Radioactive Waste Disposal Facilities*, NUREG-1573, October 2000.

<sup>2</sup> *Deciding for the Future: Balancing Risks, Costs, and Benefits Fairly Across Generations*, National Academy of Public Administration, June 1997.

DOE relied upon in developing its 1,000-year time period. NAPA suggested that the analysis should be for a few hundred years, which DOE extended to 1,000 years for conservatism.

- Meets the reasonably foreseeable standard set forth by the Commission. Even this time period would require significant deliberation by licensees and regulators regarding assumptions for disposal site performance and human behavior; but this can be done with some rational basis, with a manageable level of uncertainty, and without the need for undue speculation. It is a reasonable standard to provide for the rigor warranted for a compliance review, which is not true for substantially longer time periods. Conversely, a time period of more than 1,000 years would necessitate making assumptions that are unduly speculative; such uncertainty is not appropriate as a basis for compliance decisions.
- Approximates our current understanding of how engineered systems will behave over time, allowing for a rigorous, but not unreasonable, disposal design.
- Is more than sufficient to analyze site performance; over 95% of the activity disposed (other than uranium decay products) will have decayed away after 500 years.<sup>3</sup> The uranium decay products generated by in-growth are accounted for in the second tier, the period of performance, as described below. Thus, there is no discernable advantage served by a compliance period of greater than 1,000 years.

No reasonably foreseeable time period would be sufficient to accurately analyze the specific impacts of uranium progeny. Thus, any effort to identify a compliance period that does address these isotopes is misguided – it unnecessarily complicates the regulation of the short-lived waste stream while failing to appropriately account for the longer-lived waste stream. This potential problem is obviated because the compliance period is only one tier of a two-tiered system.

**Period of Performance.** It is important to note that utilizing a 1,000 year compliance period does not end the safety analysis. With a two-tiered approach, an additional analysis would be conducted to evaluate the site over a longer time period, the period of performance, based on the candidate site's characteristics and the peak activity of the waste disposed. The focus should be on analyzing for catastrophic failure given the nature of modeling and assumptions over long time periods. As ACRS noted in its September 22, 2011 letter, "[t]here is an obligation to avoid the potential for catastrophic consequences from LLW disposal on future generations." ACRS further stated

Avoiding catastrophic consequences for a facility, rather than complying solely with operational dose limits to hypothetical individuals, should be the focus of assessments designed to assess facility performance over a period longer than a few hundred years.

ACRS recommended that beyond the limited compliance period that "...a qualitative evaluation not requiring a specific measure of compliance should be performed to identify

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<sup>3</sup> *Options for Improved Low Level Waste Disposal Using 10 CFR 61.58*, Electric Power Research Institute, Report No. 1021098, 2010.

any significant deficiencies in disposal system overall performance that could lead to catastrophic consequences.”

A two-tiered approach also was adopted by the Commission in its West Valley Policy Statement, wherein the Commission addressed an objection to using the 1,000 year LTR standard for evaluating the potential of leaving onsite waste incidental to reprocessing that contained some long-lived isotopes. The Commission did not provide an exception to the 1,000-year compliance period. It did conclude, however, that given the significant quantities of mobile, long-lived radionuclides present onsite, the impacts beyond 1,000 years should be analyzed. 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.<sup>4</sup>

Consistent with the West Valley approach and the guidance in NUREG-1573, the second tier would be used to extend the PA calculations to estimate peak activity 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 PA 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.

Consequently, the two-tiered approach to analyzing the disposal of LLW is not only consistent with both NRC and DOE precedents, but most importantly is protective of the public health and safety.

### **3. Flexibility for disposal facilities to establish site-specific waste acceptance criteria based on the results of the site’s performance assessment and intruder assessment.**

EnergySolutions supports revising 10 CFR 61 to permit disposal facilities to establish site-specific waste acceptance criteria (WAC) based on the results of the site’s performance assessment and intruder assessment. We further propose that Part 61 be revised to permit the WAC to be used as an alternative to Tables 1 and 2 in 10 CFR 61.55. Such an approach would be consistent with existing regulations that allow for alternative requirements for site design and operations (§61.54) or classification and characteristics of waste (§61.58) if the performance objectives of Part 61 are met.

Providing this flexibility is important for several reasons. The WAC approach would:

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<sup>4</sup> *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.

- Provide the simplest and most effective way to upgrade Part 61 to a risk-informed performance-based approach, a stated objective of the NRC. 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.
- Provide the flexibility to accommodate changing technology, understanding of human health impacts, and site characteristics without the need for future rulemaking. These changes could be incorporated in routine updates of the PA.
- Provide a clear technical improvement over the current approach. The WAC approach would allow consideration of the inventory of waste disposed at a site, which is superior to regulation based on only concentration of LLW per package.
- Address the concern that originally prompted this rulemaking: that certain waste streams now being disposed were not considered in the development of Part 61. The WAC approach would account for *all* waste streams to be disposed at any given site, thus not only capturing those previously unaccounted for, but future waste streams not yet identified. It also provides a significant improvement over the use of a generic waste stream that serves as the basis for §61.55.
- Remove an unnecessary regulatory burden. The generic classification system is a one-size-fits-all approach that provides varying degrees of safety margin in satisfying the performance objectives. The resulting overconservatism is not necessary to meet the performance objectives and results in unjustified costs to all consumers of disposal services, which is to say anyone who reaps the benefits of nuclear medicine, industrial uses of radiation, research and development activities that use radiation, nuclear power, and national defense.
- Reduce the amount of LLW that is stored in lieu of disposal. Nuclear utilities are storing LLW that could be safely disposed, and would be disposed if the WAC approach were adopted. NRC policy specifically favors disposal over storage. Removing artificial constraints that reduce the volume of waste stored would be consistent with this policy.
- Optimize the limited disposal capacity in the United States. There is currently and likely will continue to be for the foreseeable future a limited number of LLW disposal sites. It is a worthwhile objective to maximize the utility of these national assets.
- Align the NRC approach with the DOE approach providing a risk-informed, consistent, and defensible approach for the disposal of LLW nationwide.
- 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.
- Finally, and most importantly, The WAC approach assures public health and safety by requiring that the performance objectives are met.<sup>5</sup>

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<sup>5</sup> See letter from Chairman Meserve to Dr. Piciulo, NYSERDA, noting that at West Valley, the Commission "...adopted a risk-informed performance-based approach to meeting the performance objectives in Part 61 that

**4. A compatibility category for the elements of the revised rule that establish the requirements for site-specific performance assessments and the development of the site-specific waste acceptance criteria that ensures alignment between the States and Federal government on safety fundamentals, while providing the States with the flexibility to determine how to implement these safety requirements.**

EnergySolutions 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. This is consistent with Commission direction to staff in the January 19, 2012 SRM regarding alignment between the States and Federal government on safety fundamentals, as well as following the Commission's own long-standing practice and guidance.

**Safety Fundamentals.** As the Commission stated in the Louisiana Energy Services proceeding,<sup>6</sup>

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.

Clearly the performance objectives of Subpart C are a safety fundamental and their adoption by Agreement States has long been required.

Compliance with the performance objectives is best measured by a preparing a site-specific performance assessment. That has been a key element of this rulemaking since its initiation when NRC staff proposed to the Commission that the best way to account for waste not analyzed in the original Part 61 was to prepare a performance assessment (SECY-08-0147). Thus, preparation of a performance assessment also is a safety fundamental.

It is the performance assessment that generates the WAC, which in turn define the concentrations, volumes, and forms of radionuclides that can be safely disposed at a particular site. The WAC must be known and controlled to assure that a site meets the performance objectives. Thus, the WAC, too are within the envelope of safety fundamentals.

In sum, without knowing the site's source term and how the specific site will perform over time through a site-specific performance assessment, neither the site operator nor the regulator is in a position to determine whether a particular site with that source term will meet the performance objectives of Subpart C. Thus, the safety fundamentals for disposing of radioactive waste must include the three elements of performance objectives, performance assessments, and WAC.

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focuses on the potential health consequences in leaving waste on-site (doses which might occur), rather than considering more indirect measures of measures of health risk, such as meeting specific radionuclide concentration limits," June 17, 2002.

<sup>6</sup> 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.

Consequently, disposal site licensees should have the flexibility to adopt the WAC approach, subject to the review and approval of the Agreement State regulator. For the reasons outlined above, the WAC approach is preferable from the perspective of public health and safety. The review process would provide Agreement States flexibility on implementation.

A reasonable alternative to compatibility category B would be an H&S categorization, which is warranted from the perspective of health and safety. This would be consistent with compatibility category designation of H&S for 10 CFR 61.42-44 and 10 CFR 61.54 and would result in Agreement States being required to adopt the essential elements, i.e., permitting the option of using the WAC approach to demonstrate that the performance objectives are met.

Indeed, adoption of this approach by the Agreement States is *essential* to assure public health and safety given the NRC's own conclusion that 10 CFR 61 as written does not adequately address certain waste streams. It would hardly serve to solve the problem that this rulemaking was initiated to address if in the end, the Agreement States were left with the alternative not to adopt the new rules. They would in effect be left with the alternative not to address the unanalyzed waste streams.

**Commission Guidance.** In addition to the consideration of safety fundamentals, we encourage the Commission to be mindful of its own guidance regarding agreement state compatibility. 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."

There currently are two operating, licensed LLW disposal sites accepting waste from outside their host compact regions, essentially serving as national disposal sites. One sited compact region (the Atlantic) liberally permits disposal at non-compact disposal sites. Generators, shippers, and/or processors of LLW operate in all 50 states. It is clear that disposal of LLW has significant transboundary implications. Given that the current 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.

Finally, it should be recognized that it may be unreasonable to expect individual Agreement States to maintain a highly qualified staff skilled in review of PAs. Doing so would be a significant resource investment that would be exercised only infrequently. Given the importance for high quality reviews of PAs and the skills in that area that the NRC staff has, the NRC should be receptive to requests by Agreement States consistent with the assistance provisions of section 274(i) of the *Atomic Energy Act* of 1954, as amended. The willingness of the NRC to assist States in their reviews of PAs should be clearly stated in the Statements of Consideration for the amended rules.



## **OPTIONS PRESENTED IN SECY-10-0165**

The ongoing site specific assessment rulemaking can and should be sufficient to risk inform Part 61, thus eliminating the need for a future rulemaking. If the NRC adopts the provisions of the January 19, 2012 SRM, in particular the WAC approach, there would be little if anything to be gained by another rulemaking, particularly one that is reliant upon generic analyses. Such analyses would be time-consuming, expensive, and inferior to a site-specific approach.

Continued rulemakings to revise Part 61 would be not only unnecessary, but counterproductive. In addition to producing an outcome that would be inferior to the PA approach, another rulemaking would place LLW disposal in an unacceptably long cycle of ongoing rulemakings. The result would be a set of rules in an unjustifiable state of transition that would conflict with one of the Commission's *Principles of Good Regulation*: Reliability.

Thus, we propose that the Commission end its consideration of all of the options contained in SECY-10-0165 in favor of creating a risk-informed, performance-based system for the disposal of LLW with the current rulemaking.

## **EMERGING ISSUES**

EnergySolutions believes that two of the emerging issues listed in the *Federal Register* notice could reasonably be incorporated in the ongoing rulemaking: updating the §61.55 tables to include the latest dose conversion factors and dose methodologies and expanding the duration of institutional controls from 100 to 300 years. Both of these changes are justified based upon advances in technology that have been well documented during the public meetings on this rulemaking. Updating the tables, while justified on a scientific basis, offers the prospect of significantly complicating this rulemaking. Thus any revisions should be strictly and explicitly limited to revisions to accommodate the most recent ICRP recommendations.

None of the other items listed in the *Federal Register* notice are suitable for inclusion in this rulemaking. While we support addressing the problem of the over reporting of certain isotopes on shipping manifests, we agree with NRC staff that this matter can be addressed with revised guidance and need not be the subject of a rulemaking. The other two issues, licensing criteria for the disposal of greater-than-Class C LLW and screening criteria for low-activity radioactive wastes, are well beyond the scope of the rulemaking. Not only would their inclusion be a diversion from the issues requiring the NRC's attention, they have not been either identified as significant problems or sufficiently well defined to be ripe for consideration.