

**BRIEFING PAPER ON THE NRC STAFF REQUIREMENTS  
MEMORANDUM (SRM) CONCERNING THE  
PART 61 RULEMAKING INITIATIVE  
SEPTEMBER 2014**

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***BACKGROUND***

The U.S. Nuclear Regulatory Commission (NRC) is proposing to amend its regulations that govern low-level radioactive waste disposal facilities to require new and revised site-specific technical analyses, to permit the development of site-specific criteria for low-level radioactive waste acceptance based on the results of these analyses, and to facilitate implementation and better alignment of those requirements with current health and safety standards. This rule would affect low-level radioactive waste disposal licensees or applicants that are regulated by NRC or Agreement States. In a Staff Requirements Memorandum (SRM) dated February 12, 2014, the Commission has approved publication of the proposed Part 61 rule and draft guidance for public comment subject to the comments and changes noted below.

The following comments on the SRM were developed by the Part 61 Working Group (P61WG) of the Low-Level Radioactive Waste Forum (LLW Forum)—an organization that was established to facilitate state and compact implementation of the Low-Level Radioactive Waste Policy Act of 1980 and its 1985 Amendments (LLRWPA) and to promote the objectives of low-level radioactive waste regional compacts. The LLW Forum is dedicated to the goals of educating policy makers and the public about the management and disposal of low-level radioactive wastes and fostering information sharing and the exchange of views between state and compact policy makers, federal officials, industry representatives and other interested stakeholders. LLW Forum board members are appointed by Governors and compact commissions. Representatives of all four sited states participate on the P61WG.

***POTENTIAL ISSUES WITH COMMENTS AND CHANGES***

- 1. The proposed rule should be revised to include a regulatory compliance period of 1,000 years.***

The proposal to set the regulatory compliance period at 1,000 years is a reasonable, practical, and achievable approach for short-lived and most long-lived nuclides and is consistent with *Uranium Mill Tailings Radiation Control Act (UMTRCA)* timeline. The majority of the current disposal sites have done a 1,000-year or more performance assessment for regulatory compliance. Setting the compliance periods at 1,000 years also eliminates the difficult task of having to justify significant uncertainties of longer time periods for short-lived nuclides. Compliance period for sites accepting significant quantities of long-lived or

material with in-growth nuclides should have two components, even if the far future component has significant discussion on uncertainties.

An additional point to consider when setting the compliance period is that all current low-level waste sites base their acceptance criteria on the safety standard that waste received will decay to safe levels within several hundred years, not tens of thousands of years, with the exception of a small number of radionuclides. At least two of the existing facilities will not receive significant quantities of depleted uranium and will not experience the in-growth of daughter products from large amounts of depleted uranium. However, if a waste site were to accept depleted uranium, a much longer compliance period would be required. NRC staff presented an excellent graph during a public meeting showing the decay rate of current commercial low-level radioactive waste at 1% of its original activity within a 500-year period, whereas depleted uranium remains constant for approximately 50,000 years before it begins to decay. Additional analysis indicates that significant ingrowth of the decay products of depleted uranium occurs at approximately 30,000 to 50,000 years.

Because the compliance period defines the time period for a site to meet the established performance objectives, 1,000 years is only adequate for short-lived nuclides.

Therefore there is a need to make a distinction between unique waste streams such as depleted uranium and routine commercial waste streams to account for the differences in physical and chemical form and radiological properties. Longer periods of performance assessment should be required for large quantities of depleted uranium and for the limited number of other radionuclides contributing to dose (i.e., C-14, Tc-99, and I-129), but not for the low-level radioactive waste streams which are currently being accepted and contain mostly short-lived radionuclides. The bottom line is that the NRC needs to make a distinction between unique waste streams (specifically depleted uranium) and routine commercial waste streams to account for the difference in physical and chemical form and radiological properties.

One other point that should be considered is that since many of the sited states have adopted the language in Part 61.1.a into their state regulations and have previously incorporated license conditions requiring compliance with all Part 61 equivalent regulations, new revisions to Part 61 would automatically apply to existing sites in those states. Though it may not help with the issue that sited states likely have adopted the language or incorporated license conditions, NRC should clarify whether the language in 61.13 specifically requiring these analyses to be performed trumps the grandfather language in 61.1.a. It appears to since it refers to the effective date of the subpart. This could potentially be confusing.

The proposed regulation should contain language that explicitly states that requirements pertaining to performance assessments for large volumes of long-

lived waste, such as the depleted uranium proposal, do not apply to existing facilities unless future waste acceptance can be characterized as "long-lived waste."

NRC should clarify whether the language in 10 CFR Part 61.13 specifically requiring these analyses to be performed will trump the current grandfather language in 10 CFR Part 61.1a.

2. ***The proposed rule should be published with a compatibility category "B" applied to the most significant provisions of the revised rule, including the Period of Compliance, the Protective Assurance Analysis Period, and its analytical threshold, which, as it is approached, requires the applicant to propose remedial changes to the disposal site design, or impose inventory limits, or propose alternative methods of disposal; and the Waste Acceptance Criteria.***

NRC needs to clarify if the compatibility category "B" includes only the Period of Compliance, the Protective Assurance Analysis Period, and its analytical threshold or if the wording "most significant provisions of the revised rule" covers much more of the rule. If compatibility category "B" is intended to cover more of the rule, then NRC should clearly identify each section of the rule. NRC and the Agreement States (specifically the sited states) should collaborate to determine an appropriate compatibility category for various elements of the revised Part 61. This would alleviate and/or minimize the potential for unintended consequences.

Under a category B compatibility designation, a site-specific analysis is somewhat compromised by the need to base the analysis on requirements that must be essentially identical to the corresponding federal regulations. Compatibility category C allows states the added flexibility to meet state-specific program needs and unique, critical regulatory situations and site conditions. The possible need for consistency by establishing a prescribed process for all performance assessments will likely come at the expense of the inherent flexibility needed to account for site-specific short-term and long-term circumstances and factors. A compatibility designation of Category "B" would only be reasonable if the more significant proposed changes (e.g., Period of Compliance) have some built-in flexibility. For example, a separate or tiered compliance period could be applied to depleted uranium (or other long-lived nuclides) and the proposed 1,000-year period applied only to short-lived nuclides.

If NRC's rulemaking working group is drafting a table that will clearly assign compatibility categories to each section of the regulation where language is revised or added, it is strongly recommend that the table be released at the same time that the new revised rule language is released.

3. ***The Commission has approved staff's proposal to require a 10,000-year intruder assessment analysis, built upon the same assumptions as the compliance and protective assurance analyses contained in the rule, which should be detailed in guidance documents.***

The proposal for waste sites to provide a qualitative analysis covering a performance period of 10,000 years or more after site closure for evaluation of long-term risks associated with the disposal of long-lived low-level radioactive waste makes sense for sites not yet constructed. How does NRC intend to deal with sites that have been closed, like Maxey Flats in Kentucky, Sheffield in Illinois, and Beatty in Nevada? Additionally, the original provision to allow grandfathering of sites currently in operation from new regulatory requirements should be allowed for sites like EnergySolutions in South Carolina and Utah, US Ecology in Washington, and the Waste Control Specialists facility in Texas, provided their acceptance criteria does not allow for large quantities of long-lived radionuclides and that they can demonstrate compliance with the Federal and State rules. The SRM does not specify a dose limit for an inadvertent intruder and the protective assurance analysis dose limit is only a goal (an ALARA limit); the SRM does not specify if it applies to an inadvertent intruder, a member of the public or both.

There is a need to make a distinction between unique waste streams such as depleted uranium and routine commercial waste streams to account for the differences in physical and chemical form and radiological properties. Longer periods of qualitative performance assessment should be required for large quantities of depleted uranium and for the limited number of other radionuclides contributing to dose (i.e., C-14, Tc-99, and I-129), but not for the routine low-level radioactive waste streams, which contain mostly short-lived radionuclides.

4. ***The site-specific analysis for protection of the general public within the 1,000-year compliance period should set a specific dose limit of 25 mrem/yr.***

The proposal to set the regulatory dose to the general public at 25 mrem/yr during the 1,000-year compliance period is reasonable and is consistent with dose standards currently found in Part 61. All sites' facilities have demonstrated compliance with the 25 mrem/year standard.

5. ***The staff should focus on ensuring a thorough review of the draft guidance by the limited community of disposal operations in the U.S. This includes the licensees, Agreement States, and interested public. The staff should also ensure that the draft guidance is reviewed by the broader scientific and academic community and other government agencies with disposal experience.***

One way NRC staff can ensure review “by the limited community of disposal operations” is to convene a working group that has representatives from each of the sited states.

6. ***The proposed rule should clearly indicate that the intruder assessment should be based on intrusion scenarios that are realistic and consistent with expected activities in and around the disposal site at the time of site closure.***

One way NRC staff can ensure “intruder assessment will be based on intrusion scenarios that are realistic and consistent with expected activities” at each of the operating facilities is to convene a working group made up of representatives from each of the sited states to provide input and recommendations on the intruder assessments previously used at their sites. However, intruder assessments that account for activities or conditions associated with or occurring at the time of closure may over simplify the process or be unreasonable in terms of physical and societal changes that still have some certainty even in the long term (e.g., technological, climatic changes, etc.).

7. ***A further protective assurance analysis should be performed for the period from the end of the compliance period through 10,000 years. Given the significant uncertainties inherent in these long timeframes, and to ensure a reasonable analysis, this performance assessment should reflect changes in features, events, and processes of the natural environment such as climatology, geology, and geomorphology only if scientific information compelling such changes from the compliance period is available. In general, this analysis should strive to minimize radiation dose with the goal of keeping doses below a 500 mrem/yr analytical threshold. The radiation doses should be reduced to a level that is reasonably achievable based on technological and economic considerations.***

This requirement is of particular importance if a sited state decides to expand its acceptance criteria to allow disposal of large volumes of depleted uranium and other long-lived radionuclides in order to account for the differences in toxicity of the two (physical and chemical form and radiological properties). However, intruder assessments that account for activities or conditions associated with or occurring at the time of closure may over simplify the process or be

unreasonable in terms of physical and societal changes that still have some certainty even in the long term (e.g., technological, climatic changes, etc.).

Additionally, the protective assurance analysis dose limit is only a goal (an ALARA limit); the SRM does not specify if it applies to an inadvertent intruder, a member of the public or both. If it is a public dose limit then it is in conflict with the proposed limit (for the general public) of 25 mrem/yr for the compliance period under the above Item No. 4. Setting two different dose limits for the general public is unnecessarily confusing and creates an unintended regulatory conflict.

8. ***The Commission has approved the staff's proposal for applicants to provide a qualitative analysis covering a performance period of 10,000 years or more after site closure to evaluate the ability of the disposal system to mitigate long-term risks associated with the disposal of long-lived low-level radioactive waste.***

The waste classification system already accounts for long-term risks associated with the disposal of long-lived low-level radioactive waste by limiting the concentrations of such material. This requirement should be focused on sites that are considering disposal of large volumes of depleted uranium or sites that are considering expanding their acceptance criteria to other long-lived isotopes.

9. ***The proposed rule should include a clear statement that licensing decisions are based on defense in depth (DID) protections, such as siting, waste forms and radionuclide content, engineered features, natural geologic features of the disposal site, and performance assessment (PA) goals and insights, as well as scientific judgment. This combination of DID and PA should be identified as the "safety case" for licensing. The staff should clearly describe the attributes of the safety case in the proposed rule, as modified by this SRM, in terms of the types of DID protections and the role of the PA in satisfying performance criteria and establishing a safety case. Confirming changes should be made throughout the rulemaking package.***

Part 61 already requires licensing decisions to be based on defense in depth (DID) in such areas as waste forms, radionuclide content, engineered features, natural geologic features, and performance assessment.

It is important that any proposed changes to Part 61 rule language regarding DID should be general in nature to afford existing closed and operational sites flexibility in meeting any specific requirements. Detailed DID attributes should be identified in the technical guidance supporting the proposed revisions but not be required for compatibility. Several states could encounter problems if NRC chooses to make this provision a compatibility B or A category.

10. ***The staff should develop a specific question for the Federal Register notice that introduces this proposed rule regarding whether the compatibility designations assigned to the various sections of the proposed rule as modified by this SRM are appropriate and solicit comments on whether changes should be considered and for what reason. Although the Commission has assigned Compatibility “B” for the Compliance Period and the Protective Assurance Analysis Period, the staff should specifically solicit comments on that designation. In addition, a question should be added to the Federal Register notice regarding whether 500 mrem/yr is an appropriate analytical threshold for the Protective Assurance Analysis period.***

The original provisions of Part 61 allowed grandfathering of sites in operation prior to the implementation of the regulations. If a low-level waste site has demonstrated compliance with the current regulations and does not intend to change its acceptance criteria, it should be grandfathered and exempted from the proposed changes.

We appreciate the Commission’s desire to receive feedback since Agreement States value regulatory flexibility. Allowing Agreement States and other stakeholders this opportunity is extremely important.

11. ***The Advisory Committee on Reactor Safeguards (ACRS) is encouraged to continue to provide its independent review and recommendations on the technical basis supporting this rule, and the accompanying draft guidance, during the rulemaking period.***

We agree since the Advisory Committee on Reactor Safeguards (ACRS) can provide important guidance and direction to the Commission. This may allow additional opportunity for dialogue and feedback by Agreement States, and particularly sited states, via ACRS meetings. As a part of the ACRS’s consideration and discussion, we encourage the ACRS to seek the individual and collective input from the sited states.

12. ***The public comment period should be extended to 120 days.***

In light of the complexity of the issues, the volume of analysis and guidance, and the diversity of impacted stakeholders, the comment period should be extended to 120 days.

13. ***The revised Federal Register notice arising from the direction in the staff requirements memorandum should be provided to the Commission for its review no later than 10 business days prior to its transmittal for publication.***

We support the 10 business day time line prior to transmittal for publication.

Finally, the SRM appears to provide no additional health and safety benefits for disposal of routine low-level radioactive waste and seems to be driven more by the need to allow disposal of large volumes of depleted uranium at operating low-level radioactive waste sites.

Additionally, one potential unintended consequence of NRC's ongoing 10 CFR Part 61 rulemaking is that it may make future site development more difficult. The application of the new requirements to a site such as the Barnwell, South Carolina facility that is approximately 95% decommissioned (closed) for further waste burial does not seem to reflect stability or predictability. This may make states hesitant to authorize construction of such a facility in the future as they have no assurance that the rules will not change in the future, even when the majority of the site is in the post-closure phase.