

COMMENTS ON 10 CFR PART 61 PRELIMINARY RULE LANGUAGE AND REGULATORY BASIS DOCKETED
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Roger Seitz – Aiken, SC

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

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I appreciate the opportunity to provide comments on the 10 CFR Part 61 preliminary rule language and regulatory basis. The intent to provide a means for risk informed, performance based disposal of low-level radioactive waste is appreciated. However, I believe there are some modifications needed for the preliminary rule language to be brought into better agreement with ICRP recommendations and other precedents specific to near-surface disposal of waste. I also have some concerns about the subjective nature of content in the regulatory basis for the preliminary language.

I would like to begin by reiterating that, as was the case in the first comment period, my suggestions are influenced by a combination of technical and public policy making considerations, including:

- (1) maintaining perspective for decision making considering the increasingly speculative assumptions about human behavior and changes in the near-surface, natural environment associated with time frames of thousands of years,
- (2) maintaining perspective for decision making considering the relatively small, localized impacts associated with a LLW disposal facility compared to overwhelming global, catastrophic natural events that will displace or impact many millions of people that are expected to occur over time frames of thousands of years (e.g., an ice age), and
- (3) the importance of acknowledging precedents established in existing regulations and public policy that address near surface disposal of LLW and other waste streams, which have been promulgated with public involvement and with technical and policy-related considerations in mind.

Comments on the Preliminary Rule Language

§61.2, Definitions

- 1. Compliance Period.** The preliminary rule language establishes a compliance period of 10,000 years after closure. The basis for this time frame is inconsistent with other precedents from NRC, EPA and DOE associated with near-surface disposal. I recommend that the NRC adopt a two step approach for period of performance in the update to 10 CFR Part 61 with the first step being a compliance period of 1,000 years rather than 10,000 years. A second period should consider longer-term calculations beyond 1,000 years for sensitivity and uncertainty analysis in a less absolute and more qualitative context (not specific to compliance) to consider the potential for catastrophic consequences at longer times, and to aid with risk informed decision-making regarding design and implementation of disposal for waste streams where the hazards associated with the waste may increase by orders of magnitude over the time frame after 1,000 years (e.g., depleted Uranium).

Rationale. The approach described above acknowledges the precedents for near-surface disposal facilities and the short-lived nature of most LLW, but also acknowledges the need to conduct longer-term calculations to support disposal decision making for unique waste streams like depleted Uranium which pose increasing hazards over time frames beyond 1,000 years. However, the approach also enables the time frames after 1,000 years to be addressed from a less absolute perspective consistent with the increasingly speculative nature of assumptions on which calculations for those times are based as well as the perspective regarding the relative impacts of other global, catastrophic events expected to occur over thousands of years.

A compliance period of 1,000 years is consistent with precedents set in other promulgated rules and policies that address near-surface disposal and remediation of sites involving radioactive materials and/or waste. For example, the NRC in 10 CFR Part 20 (which includes provisions for disposal of radioactive material/waste, Paragraph 20.2002) and DOE in DOE Order 435.1 (DOE's directive that addresses disposal of LLW) both use a 1,000 year time of compliance. Likewise, the State of Idaho has also established a 1,000 year period of performance for the Grand View waste disposal facility, which is used for evaluations for disposal (at that facility) of depleted Uranium and other radioactive materials generated at NRC licensed facilities. The NRC has also specified a time frame of 1,000 years for near-surface disposal of by-product materials (10 CFR Part 40, Appendix A, criterion 6).

I also believe that the rule should emphasize the importance of conducting calculations beyond 1,000 years in order to provide an indication of the relative magnitude of potential longer term risks for wastes that pose significantly increasing hazards beyond that time. However, I believe that calculations based on such speculative assumptions and recognizing the major global consequences that are expected to occur should not be used in a compliance context, but should be used for information to support decision making regarding design and implementation of disposal actions. Such calculations can play a role for design and implementation of disposal for wastes such as depleted Uranium, which pose hazards that can increase by orders of magnitude over times longer than 1,000 years. However, for the vast majority of LLW, it is not likely to see such significant increases in potential peak hazards over time frames greater than 1,000 years.

This approach is also consistent with ICRP Publication 81 recommendations and recommendations from the IAEA (SSR-5 and SSG-23) that describe the use of quantitative comparisons with performance objectives over an initial period of hundreds to thousands of years followed by more qualitative interpretation of results for longer time frames.

- 2. Performance Period.** The purpose for this definition is not clear, especially as written, it adds confusion to the difference between a "performance period" and a "compliance period" as both definitions appear to imply the need to compare with performance objectives in a compliance framework. Such an approach contradicts the ICRP Publication 81 recommendations regarding the use of an initial period for compliance with performance objectives and a second period of time where more qualitative comparisons are made to inform decisions.
- 3. Inadvertent Intruder.** I would recommend not making any changes to the definition of an inadvertent intruder to avoid any potential implications regarding the existing waste

classification tables. The proposed change is relatively cosmetic and potentially causes more concern rather than providing any additional value.

- 4. Intruder Assessment.** I suggest removing this definition or making it more consistent with ICRP Publication 81 expectations associated with inadvertent intruder analyses and ensure that it does not call into question the basis for the waste classification tables. As written, this definition could be interpreted to imply that analyses beyond those considered in the development of the waste classification tables for Part 61 may be required and a potential need to update the tables. The definition also does not reflect the ICRP position that intrusion should be assessed using a limited number of stylized scenarios rather than something as general as “normal activities or other reasonable foreseeable pursuits”. A reasonable question would be Does the NRC consider the stylized scenarios considered in the development of Part 61 to be a sufficient coverage of “normal activities or other reasonably foreseeable pursuits...” for the purposes of addressing inadvertent intrusion?
- 5. Long-Lived Waste.** I suggest removing this definition. The need for this definition in a regulation is not clear. What is the significance of identifying something as long-lived waste? Is there intended to be an implication related to “long-lived waste” and near surface disposal? That poses significant concerns associated with industries that use near-surface disposal for NORM wastes and in a broader context could imply concerns related to disposal of hazardous wastes that do not decay in the near surface.
- 6. Performance Assessment.** I recommend adopting the definition of performance assessment from NCRP Report 152. That report is relatively well accepted in the United States. It is not clear why the NRC would want to develop their own definition of performance assessment, which is notably different from other existing definitions. The proposed definition in the preliminary rule language is overly focused on FEPs and does not capture the broader role of PA in the process of developing a disposal facility.

§61.2, Concepts

(4) I suggest that the inadvertent intruder be identified as something other than a performance objective (e.g. a performance measure). ICRP 81 and the IAEA both state that protection of an inadvertent intruder is treated in a different manner than performance objectives for protection of the public and imply considering intrusion in the context of an accidental situation rather than a practice. This approach highlights the hypothetical and accidental nature of inadvertent intrusion. Also, this discussion should be updated to reflect that the waste classification tables can be used in lieu of an inadvertent intruder assessment.

§61.13, Technical Analyses

(b) (discussion starting at bottom of page 14) The use of the words “any inadvertent intruder...” could easily be misinterpreted. To be consistent with NRC efforts to use updated dosimetry and dose coefficients, ICRP terminology for a “representative person” that is associated with the use of the newer dosimetry should also be adopted. The use of “any” opens up the discussion to endless speculation of intrusion especially given the long time frames being considered and the representative person concept is intended to help specify the receptor to be considered in an assessment. ICRP Publication 81 also refers to the use of a limited number of “stylized scenarios” rather than implying a need to consider a wide variety of potential events. This discussion needs to be revised to reflect the ICRP Publication 81 recommendations related to the

use of one or more stylized scenarios for inadvertent intrusion rather than being so open ended.

§61.41, Protection of the General Population...

I suggest the following modifications to the proposed text for 61.41 (a):

“... must not result in an annual dose exceeding an equivalent of 0.25 milliSievert (25 millirem), excluding radon, to a representative person...” Consistent with other rules involving radon exposures, I suggest that radon should be addressed using an additional performance objective specific to radon flux from the surface of the facility similar to what has been promulgated in existing rules (e.g., 10 CFR Part 40, Appendix A, criterion 6).

The modification reflects two significant changes. One is a change from “any member of the public” to “a representative person”. The ICRP is using the term “representative person” to reflect the receptor that is considered in a dose assessment and if NRC is changing to the use of the updated ICRP dosimetry and dose coefficients, the wording for the performance objective should also address the update to the use of “representative person” rather than any member of the public. I suggest that the ICRP recommendation be considered for use in the language used for the performance objective, because the ICRP provides a framework to help with interpretation of what is meant by a “representative person” rather than leaving the term “any member of the public” open for interpretation. Furthermore, it is difficult to define what is meant by any member of the public when considering time frames of thousands of years. The second change to the preliminary language is to add “excluding radon” from the total dose and adding an objective for radon flux. This is consistent with precedents in other promulgated rules that address situations that can lead to significant radon exposures [e.g., 40 CFR Part 190.10, 40 CFR Part 61 (subpart H), 40 CFR Part 61.192 (subpart Q), 10 CFR Part 40 (Appendix A, criterion 6)]. It is also consistent with not specifically considering the actual dose or risk from radon, when addressing the need for mitigation of radon in homes.

§61.42, Inadvertent Intrusion

ICRP Publication 81 refers to the inadvertent intruder differently than a performance objective for protection for all pathways (e.g., Part 61.41). It is recommended that wording other than “performance objective” be considered here, such as language consistent with the views of the ICRP. It is also recommended to use the term “a hypothetical inadvertent intruder” rather than “any inadvertent intruder”. This approach is consistent with the approach taken for the original basis for 10 CFR Part 61 and reflects the ICRP view that inadvertent intrusion is not an expected event; it is a stylized analysis that is conducted to evaluate the potential impacts of a loss of institutional control. It is also my understanding that the specification of 500 mrem was questioned during the initial Part 61 rulemaking, so it may be best to simply refer to ICRP recommendations, which do not specify a number but refer to ranges of acceptable values consistent with ICRP approaches applied for intervention or more recently accidents.

Comments on the Regulatory Basis

I have a general concern that this document is overly subjective in terms of assessing approaches used for time of compliance and mischaracterizes DOE's approach relative to other organizations.

Section 5.1.2.2, Table 1, Other Domestic Regulatory Agencies

1. This table would be more appropriate if it focused on time frames used for near surface disposal of waste. Given that Part 61 addresses near surface disposal, geologic disposal and underground injection are different concepts and are not relevant in this context. For example, the IAEA (SSG-23) draws a distinction between time frames that are used for assessments in support of geologic and near surface disposal.
2. If the table focuses on near surface disposal (including approaches used for disposal under 10 CFR Part 20.2002, mill tailings, hazardous waste, etc.), it becomes much clearer how consistent DOE is with other promulgated and well established regulatory approaches associated with near-surface disposal.
3. Another row should be included in the table for disposal exemptions granted under 10 CFR Part 20.2002. This would correct the absence of an example of NRC disposal decisions that are made using a compliance period of 1,000 years for disposal of wastes including depleted uranium and other long-lived radionuclides.
4. The column entitled "BASIS" is a subjective interpretation of "technical" and "non-technical" and should be removed. For example, initially NRC's basis for 20,000 years was listed as technical, now it is changed to 10,000 years and still listed as technical, while DOE developed a technical basis for 1,000 years and provided it to the NRC staff as part of this process, but NRC Staff have identified the DOE approach as non-technical. Furthermore, NRC needs to consider the fact that time frames used for compliance are not a strictly technical issue and involve policy decisions as well (see for example NAPA report), there is a blend of policy and technical considerations that need to be considered. It should be more clearly acknowledged that compliance times involve technical and policy considerations and to characterize DOE's approach as non-technical and others as technical is subjective and inappropriate.
5. In addition, it is unclear why NRC staff have stated that the 10 CFR Part 20 regulations are used for remediation, but neglected the use for disposal. For example, 10 CFR Part 20.2002 exemptions are used for disposal at the Grand View facility in Idaho. The waste regulated by 10 CFR Part 20.2002 may be remediation waste in origin but the required facilities are fully functioning disposal facilities. The role of Part 20.2002 for disposal should be more clearly discussed, especially considering the use of 1,000 years as the time of compliance, which is another example of a disposal approach consistent with the DOE compliance time. Notably, DOE also requires calculations to address potential peaks beyond 1,000 years, which is not a requirement under 10 CFR Part 20.

2. Section 5.1.2.3, International Approaches

This discussion is subjective and of questionable value in the context of developing U.S. disposal standards. First, because it is comparing time frames applied to near surface and other disposal concepts (geologic) and second, there are many different assumptions involved in development and reviews of safety assessments in different countries, in addition to simply period of performance. This is not an "apples to apples" comparison, involves subjective interpretation, and is easily misinterpreted.

Furthermore, the comparison of international standards and timeframes for analysis is inaccurate as described. Figure 1 is especially subjective and inaccurate and should be removed. The first inaccuracy is that the figure indicates that DOE uses "short" analyses, case-by-case or no additional limitations". Notably, it is a misnomer to characterize 1,000 years as "short" in the context of policy making. It is my opinion that radioactive waste is managed in a manner that considers protection of the public well beyond time frames considered in other industries (e.g., 1,000 years is a very long term analysis relative to other industries). This figure also ignores the fact that DOE routinely conducts calculations to assess hazards well beyond 1,000 years as was illustrated in examples shown in Appendix B of the Regulatory Analysis. DOE has consistently required that analyses be conducted beyond 1,000 years to evaluate potential for peaks after that time and that information is considered in a risk informed approach to decision-making. The figure is also inconsistent with the text, which specifically mentions Belgium, Sweden, Spain and Korea as identifying time frames of 1,000-2,000 years in their regulations as part of the assessment process (which is similar to DOE), which is not reflected in the figure. Also, as portrayed, why are disposal in accordance with NRC 10 CFR Part 20.2002, mill tailings disposal, mixed waste disposal facilities, etc. not included along with DOE and South Carolina.

In addition, each country's disposal facility and safety analyses have been designed differently than the standard U.S. facility. Given the short time allotted for this review resulting in an inability to investigate each assertion made by the NRC in their analysis and the note that NRC also did not have time to fully consider international approaches, these few examples call into question the accuracy of the remaining examples and further call into question the value of such a subjective comparison.

3. Appendix B

Although this appendix provides documentation illustrating that DOE routinely considers impacts well after 1,000 years, I believe this appendix is inappropriate for this document and should be deleted, especially without a complete explanation of how DOE uses the information for calculations conducted after 1,000 years in a risk-informed decision-making context. For example, although figures were selectively provided showing impacts increasing after 1,000 years, when the specific peak values are examined for the SRS E-Area, Hanford and SRS Saltstone, the increased dose values well after 1,000 years do not suggest any impacts that significantly exceed acceptable levels. The largest concentrations on the E-Area figure are on the same order as MCLs even at the peak after 10,000 years. Likewise, the F Tank Farm figure shows increases at times on the order of 20,000 to 40,000 years, but the NRC Staff are well aware that significant time and effort have been expended to address those peaks, even though they do occur well beyond 1,000 years. Notably, NRC staff have acknowledged to DOE based on further reviews that the peak in the 20,000 year time frame for F Tank farm is the result of overestimated inventory numbers. It is a significant concern that the NRC would include a figure like this with the implication that DOE ignores impacts after 1,000 years, when NRC Staff are also well aware that significant investments of time and funding are being made to address the assumptions that result in the potential peaks on the order of 40,000 years in the future.

RulemakingComments Resource

From: Roger Seitz [rogerseitz5@msn.com]
Sent: Monday, January 07, 2013 10:21 PM
To: RulemakingComments Resource
Subject: Comments for Docket ID NRC-2011-0012
Attachments: Seitz Comments Jan 7.pdf

Dear Sir/Madame,

Please find attached comments on the subject Docket.

Thank you for your consideration.

Roger Seitz