UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SECRETARY

February 12, 2014

COMMISSION VOTING RECORD

DECISION ITEM: SECY-13-0075

TITLE: PROPOSED RULE: LOW-LEVEL RADIOACTIVE WASTE DISPOSAL (10 CFR PART 61) (RIN 3150-A192)

The Commission acted on the subject paper as recorded in the Staff Requirements Memorandum (SRM) of February 12, 2014.

This Record contains a summary of voting on this matter together with the individual vote sheets, views and comments of the Commission.

Annette L. Vietti-Cook
Secretary of the Commission

Attachments:
1. Voting Summary
2. Commissioner Vote Sheets

cc: Chairman Macfarlane
Commissioner Svinicki
Commissioner Apostolakis
Commissioner Magwood
Commissioner Ostendorff
OGC
EDO
PDR

VOTING SUMMARY - SECY-13-0075

RECORDED VOTES

	APRVD	DISAPRVD	ABSTAIN	NOT PARTICIP	COMMENTS	DATE
CHRM. MACFARLANE	X				X	8/5/13
COMR. SVINICKI	X	X			X	11/25/13
COMR. APOSTOLAKIS	X	X			X	10/7/13
COMR. MAGWOOD	X	X			X	10/3/13
COMR. OSTENDORFF	X	X			X	10/18/13

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: Chairman Allison M. Macfarlane

SUBJECT: SECY-13-0075 – PROPOSED RULE: LOW-LEVEL RADIOACTIVE WASTE DISPOSAL (10 CFR PART 61) (RIN 3150-AI92)

Approved X **Disapproved** _____ **Abstain** _____

Not Participating _____

COMMENTS: **Below** X **Attached** X **None** ___

I approve publication of the proposed rule and draft guidance for public comment, subject to the attached comments.

SIGNATURE

8/5/13

DATE

Entered on "STARS" **Yes** X **No** ___

Chairman Macfarlane's Comments on SECY-13-0075

Proposed Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61)

I approve publication of the proposed rule and draft guidance for public comment.

I appreciate the staff's hard work in addressing disposal of depleted uranium and the subsequent direction by the Commission to address blending of wastes and other enhancements to the regulatory framework. The staff has also engaged various States, licensees, public, and other groups through many meetings and opportunities to comment on draft technical basis documents. It has been eight years since the Commission originally determined that the rule should be reexamined to address the disposal of large quantities of depleted uranium. It is time for the proposed rule and draft guidance to move forward in rulemaking.

I recognize there will be significant debate on issues such as the appropriate compliance period and use of a two-tiered performance assessment. The public, industry, the Department of Energy (DOE), and Agreement States have provided a diversity of technical and policy insights that have been valuable to the staff in developing the proposed rule and draft guidance. The Advisory Committee on Reactor Safeguards (ACRS) has recently expressed concerns regarding the 10,000-year compliance period and whether the proposed rule results in an unjustified increase in regulatory burden. They have indicated they plan to hold additional meetings to better understand the technical justification for some elements of the rule. I strongly encourage their independent review and recommendations on the technical basis supporting the rule, and the accompanying draft guidance, during the rulemaking period.

The low-level waste regulatory framework should ensure a robust safety case is made for each disposal site. This is challenging. The extremely long life of disposed radionuclides, such as depleted uranium and eventual degradation of man-made barriers is certain. The behavior and changes in geomorphology, hydrology, geochemistry, and climatology are less certain over geologic timeframes. Societal use of disposal properties over future millennia is even more speculative.[1] I believe that defining what constitutes an adequate level of safety for the disposal of long-lived radioactive waste, for several thousand generations ahead of us, may be one of the most daunting responsibilities of the Agency.

To ensure a robust safety case, the use of a quantitative performance assessment is an important tool in making an overall safety case for a disposal site. It is important to establish a reasonable level of assurance that potential exposures of future generations from these wastes will likely not exceed radiological standards that we find acceptable today (i.e., regulatory limits). The performance assessment helps to identify the importance of known features, events, and processes in the disposal system. Performance assessment can provide an understanding of the risk-significance of uncertainties that require additional research or analysis to make a safety case or the relative value of additional protective features to mitigate uncertainty.

But performance assessment should always be used only as a tool. I am cautious about the potential inclination of designers and decision makers to focus heavily on calculated compliance numbers alone in making a safety decision. It is easier to comprehend and explain a "known" quantified number with associated numerical limits than assessing complex systems and

[1] I am often reminded of the famous quote by former Secretary of Defense Donald Rumsfeld: "... there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns -- the ones we don't know we don't know." The geologic unknowns are what should concern us.

qualitatively evaluating uncertainties with technical expertise and professional judgment. As noted in the staff's paper, the State of Kentucky commented that "without express prohibition of certain sites and designs that should not be utilized to store extremely long-lived waste forms, such sites will be proposed and justified with models, despite the inherent risks."[2] I generally agree with this concern about the potential misuse of any complex modeling tool in this manner.

It is equally important to ensure a robust safety case is founded upon a thorough understanding of the geologic system and its inherent uncertainties. In short, does the system and proposed approach demonstrate how the natural and engineered barriers limit the release of radionuclide materials? Designers and decision makers should systematically apply scientific judgment and professional experience to consider the suitability of the disposal environment; the suitability of the waste concentrations and forms; and the effectiveness of natural and engineered barriers. They should examine available empirical evidence that supports or challenges the suitability of the site and compare the experiences with other sites (nationally and internationally). Designers and decision-makers should ask, does it make sense to dispose long-lived radioactive materials, such as depleted uranium, in shallow oxidizing disposal sites - - or is it more appropriate to consider intermediate or deep geologic disposal?

I generally believe that the two-tiered approach recommended in this proposed rule strives to achieve this balance and ensure a safety case is made for each disposal system. But I am concerned about the exact mechanics and use of this approach in a licensing decision. The NRC staff has considerable expertise on these issues and appears to apply an appropriate balance. It is critical that these approaches and techniques are appropriately adopted in the enhanced Part 61 regulations and captured in durable guidance for use by all future State and Federal regulatory professionals. The success of the proposed rule, including the two-tiered approach, hinges on successful development and use of the draft guidance document "Guidance for Conducting Technical Analyses for 10 CFR Part 61." Therefore, 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 the draft guidance is reviewed by the broader scientific and academic community and other government agencies with disposal experience, such as the DOE. The staff should add illustrative examples to the draft guidance that demonstrate the application of the second tier assessment for potential disposal scenarios of depleted uranium (e.g., similar to the type illustrative examples in the draft guidance for intruder scenario analyses). During the comment period, the staff should inform the Commission if the 75-day public comment period should be extended for additional review of this complex draft guidance document.

At this time, I agree with the 10,000-year compliance period for examining the disposal of long-lived radionuclides. There are legitimate viewpoints on the pros and cons of adopting shorter or longer compliance periods. The staff has thoroughly and systematically examined these various viewpoints and approaches in development of this proposed rule.[3] First, the 10,000-year period is consistent with the environmental analyses used for the original Part 61 framework that establishes the waste classification scheme being used today.[4] It is generally consistent with NRC staff practice in the past decade and the licensing basis for the majority of

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[2] See enclosure 3 of SECY-13-0075.

[3] "Regulatory Basis for Proposed Revisions to Low-Level Waste Disposal Requirement (10 CFR 61)," December 2012; and "Technical Analysis Supporting Definition of Period of Performance for Low-Level Waste Disposal," April 2011.

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

commercial disposal sites. The 10,000-year compliance period is more consistent with international approaches for managing long-lived wastes, in which limits or long-term analysis are used for near-surface disposal of long-lived wastes. Finally, the 10,000-year compliance period is more consistent with our Federal standards for the timeframes that are prescribed for the disposal of commercial high-level radioactive waste and defense-related transuranic wastes (40 CFR Part 191). We should strive to apply consistent evaluation standards for future generations that could be exposed to long-lived radioactive waste – whether it is radionuclides from depleted uranium wastes that were used to make nuclear fuel or the actual waste products that resulted from the use of that same fuel. In short, it is important to understand the ability of the natural system in impeding doses in potential periods after engineering barriers have deteriorated, the groundwater pathway is more dominant, sorption is likely higher, and long-lived radionuclides continue to present a hazard from in-growth of radium and lead daughter products.[5]

I reserve judgment on the proposed rule for inadvertent intruder scenarios. I believe that our standards should generally be protective against future occupation of an abandoned disposal site. This again addresses the fundamental question of whether the long lived wastes should be disposed at shallow or deeper depths. Nonetheless, I agree with some commenters, that it could be easy to over speculate and identify scenarios that could be difficult to disprove, and be unnecessarily prohibitive to shallow disposal of wastes. It again appears that the implementation of these requirements is dependent on the quality of the final guidance document. I wait to see feedback on this issue before making a final judgment. The staff should seek specific feedback on the guidance for intruder scenarios, in order to determine if the range of generic and site-specific scenarios (e.g., acute and chronic) is straightforward. The guidance should instill an appropriate level of regulatory predictability for licensees that update their analyses to satisfy this requirement.

8/5/13

Allison M. Macfarlane Date

[5] Some have commented that compliance times greater than 1,000 years are less meaningful or not "reasonably foreseeable" because of the unpredictability of society in such timeframes. I agree with concerns about this uncertainty, but I have no technical basis to believe that these concerns would be any different for a shorter compliance period of 500 or 1,000 years.

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER SVINICKI

SUBJECT: SECY-13-0075 – PROPOSED RULE: LOW-LEVEL RADIOACTIVE WASTE DISPOSAL (10 CFR PART 61) (RIN 3150-AI92)

Approved XX In Part Disapproved XX In Part Abstain _____

Not Participating _____

COMMENTS: Below ___ Attached XX None ___

SIGNATURE

11/25/13
DATE

Entered on "STARS" Yes √ No ___

Commissioner Svinicki's Comments on SECY-13-0075
Proposed Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61) (RIN 3150-AI92)

I approve in part and disapprove in part the proposed amendments to 10 CFR Part 61 (Enclosure 1 to SECY-13-0075), subject to the following comments. The staff has given thoughtful consideration to the complex issues at play here and has engaged many public stakeholders through a variety of means. Their work is to be commended. I find the conclusions and recommendations of our Advisory Committee on Reactor Safeguards (ACRS) compelling and have given due weigh to the Committee's advice to the Commission on this matter. I reserve judgment on the final form of any of the proposed amendments until after publication of the proposed rule and evaluation of the public comment record, when the Commission is presented with the draft final rule for its consideration.

I approve the publication of the proposed rule with a period of regulatory compliance of 1,000 years, with a site-specific analysis for the protection of the general public within a specified dose limit of 25 millirem. As noted by the ACRS (in its letter report dated July 22, 2013) and noted by my fellow Commissioners, "[i]ntroducing significant uncertainties to the performance analyses through speculation on human activities, waste and site performance, and earth processes for millennia is unlikely to improve either our decision making process or our understanding of the safety decision regarding near surface [low-level waste] disposal." An expansion of the period to 10,000 years may introduce, as others have noted, a "false comfort" in our understanding of long term uncertainties. Further, periods beyond 1,000 years are not ignored; rather, they strongly influence the safety case through the performance assessment. Importantly, as well, the NRC's defense-in-depth approach to risk management ensures that safety is not wholly dependent on any single element of the design, construction, maintenance or operation of a nuclear facility.

A further analysis should be performed for the period from the end of the compliance period through 10,000 years. To address the significant uncertainties inherent in these long timeframes, this analysis should assume a constancy of features, events, and processes unless scientific information compelling variation in these parameters is available. In general, this analysis should be guided by ALARA principles. Unacceptable consequences (i.e., those requiring the applicant to propose changes in the disposal site design or inventory limits, or alternative methods of disposal) should be represented by doses to future generations of the public in excess of 500 millirem per year. I approve the inclusion of a 10,000 year intruder analysis, built upon this same framework, which should be defined in greater detail in guidance documents. Finally, I approve 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 *Federal Register* Notice (FRN) and draft guidance document should be revised consistent with this modified framework. The revised FRN arising from the direction in the staff requirements memorandum resulting from the votes on this matter should be provided to the Commission for its review no later than 10 business days prior to its transmittal for publication.

Although I reserve judgment pending the comment on the proposed rule and development of a draft final rule, I conclude at this time that the proposed rule, as drafted, would have significant transboundary implications and would require a consistent regulatory approach across the Nation. Consequently, the proposed rule should be published with a compatibility category of "B". Finally, 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.

Kristine L. Svinicki 11/25/13

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: Commissioner Apostolakis

SUBJECT: SECY-13-0075 – PROPOSED RULE: LOW-LEVEL RADIOACTIVE WASTE DISPOSAL (10 CFR PART 61) (RIN 3150-AI92)

Approved __X__ Disapproved __X__ Abstain _____

Not Participating _____

COMMENTS: Below ___ Attached _X_ None ___

SIGNATURE

10/7/13

DATE

Entered on "STARS" Yes _x__ No ___

Commissioner Apostolakis' Comments on SECY-13-0075
PROPOSED RULE: LOW-LEVEL RADIOACTIVE WASTE DISPOSAL (10 CFR PART 61)

Summary

I approve publication of the proposed rule for public comment subject to the following changes:

1. The proposed rule should include a clear statement that licensing decisions are based on both the availability of defense-in-depth (DID) protections and PA goals and insights, which should be identified as the "safety case" for licensing. Types of DID protections and the role of the performance assessment (PA) in establishing these protections and satisfying performance criteria should be discussed. Conforming changes should be made throughout the rulemaking package.
2. The proposed period of regulatory compliance should be 1,000 years.
3. The proposed compatibility category should be "B."
4. The comment period should be changed from 75 days to 100 days.
5. The revised Federal Register Notice should be provided for Commission review at least 5 days prior to publication.

Discussion

In its staff requirements memorandum dated January 19, 2012, the Commission directed the staff to expand its effort to revise 10 CFR Part 61 to make it more risk informed. I commend the staff for its diligent work to develop a revised rule and its efforts to include the Agreement States and the public in its deliberations. In particular, I commend the staff for implementing the two-tiered approach. This approach allows the clear delineation of how the fundamental principle of DID and risk assessment (in this case, the PA) may be combined to ensure the protection of the public and the environment.

NRC's risk management approach has always been guided by the DID principle. This philosophy ensures that safety will not be wholly dependent on any single element of the design, construction, maintenance or operation of a nuclear facility. DID ensures that a facility is more tolerant of failures and unanticipated challenges. Although some NRC regulatory programs (such as the low-level waste –LLW- program) may not be using the DID terminology, the general approach of identifying barriers to protect workers and the public from exposure to radioactive material is common to all NRC and Agreement State activities.

As the agency has stated numerous times, starting in 1999 with the NRC's White Paper on Risk-Informed and Performance-Based Regulation "a risk-informed approach to regulatory decision making represents a philosophy whereby risk insights are considered together with other factors to establish requirements that better focus licensee and regulatory attention on design and operational issues commensurate with their importance to health and safety." The "other factors" essentially lead to DID protections.

In NUREG-2150, the Risk Management Task Force (RMTF) goes further and states that the goal of risk management should be to establish DID protections to:

- Ensure appropriate barriers, controls and personnel to prevent, contain, and mitigate exposure to radioactive material according to the hazard present, the relevant scenarios and the associated uncertainties; and

- Ensure that the risks resulting from the failure of some or all of the established barriers and controls, including human errors, are maintained acceptably low.

The proposed draft rule reflects this risk management approach.

Although it is implicit in the proposed draft rule, a clear delineation of the roles of DID and PA in the licensing decision of a LLW disposal site is needed. The licensees would be expected to identify DID protections included in the siting and design of the facility, as well as in the waste acceptance criteria. Examples include the selection of the site itself, the construction of engineered barriers, and the consideration of human intrusion. The role of the PA in establishing these protections and ensuring that the overall risks are acceptably low should also be clearly stated. Examples include satisfying the dose goals and adjusting the acceptance criteria based on PA insights regarding future peak doses.

The combination of DID and PA provides what is sometimes called in the literature the "safety case" for licensing a disposal facility. Chairman Macfarlane also states that the regulatory framework "should ensure that a robust safety case is made for each disposal site." In addition, a clear statement on what the safety case for a particular facility is would enhance significantly the communication among the various interested stakeholders.

Establishing a period for regulatory compliance is a challenge. Requiring regulatory compliance for thousands or even hundreds of thousands of years leads to speculation about future events and processes, as well as interminable debates without solid scientific basis. There is consensus that the short-lived radionuclides will have decayed after several hundred years. The engineered barriers will have degraded in several hundred years. It is also true that the dose from the very long-lived depleted uranium and its daughters will occur after a million years, i.e., after the proposed 10,000 year compliance period that the staff proposes.

I agree with the Advisory Committee on Reactor Safeguards (report dated July 22, 2013) that

> [i]ntroducing significant uncertainties to the performance analyses through speculation on human activities, waste and site performance, and earth processes for millennia is unlikely to improve either our decision making process or our understanding of the safety decisions regarding near surface LLW disposal.

Recognizing that the compliance period is one element of the safety case, we should have a high degree of confidence that the requirements of the compliance period can be met realistically. I, therefore, propose that the regulatory compliance period be 1,000 years. The proposal to use 10,000 years would introduce significant uncertainties through speculation on human activities, as well as waste and site performance. I agree with Commissioner Magwood that "[i]t provides false comfort to insist on an analysis based on guesswork and subjective speculation."

It is important to bear in mind that periods beyond 1,000 years are not ignored; they influence the safety case through the PA. Regarding the PA, the staff guidance should focus on using the information from the peak dose analyses for applicants or licensees to evaluate site-specific disposal system design enhancements.

All operating LLW disposal facilities are located in Agreement States. I appreciate their desire for flexibility with the radiation protection programs within each State's boundaries, but, in my view, the proposed rule would have significant transboundary implications and would require a consistent regulatory approach across the United States. Therefore, the staff should revise the proposed compatibility category to "B."

Staff should change the comment period from 75 days 100 days to allow all interested persons to review the proposed rule and staff's draft guidance documents.

George Apostolakis
10/7/13

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER MAGWOOD

SUBJECT: SECY-13-0075 – PROPOSED RULE: LOW-LEVEL RADIOACTIVE WASTE DISPOSAL (10 CFR PART 61) (RIN 3150-AI92)

Approved X Disapproved X Abstain _____

Not Participating _____

COMMENTS: Below ___ Attached X None ___

SIGNATURE

3 October 2013

DATE

Entered on "STARS" Yes X No ___

Commissioner Magwood's Comment on SECY-13-0075,
"Proposed Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61)"

As it has grappled with the complex matter of enhancing and modernizing the agency's rule guiding the disposal of low-level radioactive waste, the NRC staff has worked hard to respond to a range of Commission instructions, including the requirements of SRM- COMWDM-11-0002/COMGEA-11-0002. In doing so, the staff has held numerous public meetings in an attempt to reflect the sometimes divergent views of many very different stakeholders in its considerations. Staff's efforts have been exemplary and I commend the staff for proposing a rule that represents careful thought and study of the issue.

Revising 10 CFR Part 61 presents one of the most difficult regulatory issues faced by the agency. In many respects, this challenge is more difficult than the far more publicized matter of high-level waste disposal. Unlike high-level wastes, for example, low-level wastes are produced by a very wide range of industrial and medical activities; are in most instances addressed by States; and are comprised of many different materials presenting many different levels of risk to the public. The proposed rule changes are prompted in large part by the fact that the current rule was created at a time before materials that present long-enduring public health risks (such as blended wastes and large volumes of depleted uranium) were considered for disposal. At the same time, the great majority of low-level wastes generated in the United States represent a very low hazard.

The diversity of risks that characterize the low-level waste disposal challenge recalls the Tibetan myth of the Yeti catching marmots. In that story, a Yeti captures a marmot and sits on it to eat later. However, he soon spots another marmot and stands to catch it, thus releasing the first. While Yetis are, apparently, not particularly clever, we must be if we are to craft an approach that allows us to deal with the wide variety of wastes materials characterized as "low-level" wastes. To be successful, we must gather all the marmots at once.

In its effort to collect the relevant marmots, the clever NRC staff has recommended an approach (consistent with SRM- COMWDM-11-0002/COMGEA-11-0002) whereby low-level radioactive waste could be accepted at a given site using either the existing low level radioactive waste classification requirements or a site-specific technical analyses that considers site conditions and characteristics as well as the specific characteristics of the waste itself. The use of a site-specific analysis is a significant development that risk-informs low-level waste disposal and allows for the consideration of a very broad array of wastes.

The staff's proposal for these site-specific analyses would require that an applicant provide analysis to support a compliance period of 10,000 years. That is, the analyses—known as a "performance assessment" would need to demonstrate protection of the general population by assuring that annual doses to any member of the public not exceed 25 mrem/year over the entirety of the compliance period. In addition, the staff suggests that an applicant provide analysis assuring that an inadvertent intruder—who comes along hundreds or thousands of

years in the future and happens to drill for water or plant crops atop the waste cells—not receive doses exceeding 500 mrem/year.

The staff proposal also requires a performance period analysis that is comprised of a qualitative description of the risks presented by the waste disposal activity in the very long-term future—that is, 10,000 years or more following closure of the facility. In contrast to the specific dose limits reflected in the compliance period, this second tier of analysis covers a situationally defined time period over which an applicant must demonstrate that an appropriate effort has been made to minimize releases to the extent reasonably achievable.

This two-tier framework is generally consistent with Commission guidance and represents a rational path to provide a risk-informed, site-specific path to consider the disposal of low-level wastes. Importantly, the staff's approach facilitates consideration of whether a particular disposal site is suitable for future disposal of depleted uranium, blended wastes, or any other previously unanalyzed waste products. Staff also appropriately proposes changes to the rule to better align our requirements with contemporary health and safety standards. For all these reasons, I generally approve the staff's proposed approach.

One significant issue the staff's proposal presents to the Commission is the question of whether it is realistic and reasonable to anticipate a compliance period of 10,000 years. I believe staff has made a strong case that it is appropriate to consider an extended time frame. Most relevantly, a 10,000 year analysis period captures the impacts related to the eventual degradation of waste containers and geologic barriers. It is important that these effects be incorporated into the decision-making process.

However, there has been a much less compelling case to convince that any such analysis would be meaningful given the vast uncertainties associated with changes in site parameters and in the state of society over the coming 10,000 years. As the Advisory Committee on Reactor Safeguards noted in their July 22, 2013 letter to the Commission:

> *Introducing significant uncertainties to the performance analyses through speculation on human activities, waste and site performance, and earth processes for millennia is unlikely to improve either our decision making process or our understanding of the safety decisions regarding near surface [low-level waste] disposal.*

I agree with this viewpoint. Looking back 10,000 years in human history, we would find early farmers planting barley along the Nile, never dreaming of the great Egyptian civilization their descendants would establish thousands of years later. These farmers would have been unlikely to anticipate the environmental issues facing Egypt in 2013 B.C., let alone 2013 A.D. Despite our advances in technology, I doubt that our ability to predict the world 10,000 years from today is much improved over those Nile valley barley famers. It provides false comfort to insist on an analysis based on guesswork and subjective speculation.

Many stakeholders, including some state governments, have indicated a preference for a more modest 1,000 year compliance period. While an analysis based on such a time frame still

presents nontrivial challenges, it is more reasonable to expect that a detailed analysis covering 1,000 years would reflect more predictable changes in social patterns and living conditions and in environmental conditions in and around anticipated disposal cells.

Nevertheless, as mentioned above, staff's consideration of a 10,000 year period has merit that I do not believe can be entirely discounted. There is value in both perspectives. We have a responsibility to both provide for a workable rule and to assure that appropriate actions are taken to protect future generations. I therefore suggest a modification to the staff's proposal. I recommend that staff's 10,000 year compliance period be structured as follows:

a) Licensees and applicants should complete a **Compliance Analysis** which would require a site-specific technical analysis for the protection of the general public (*i.e.*, a performance assessment) over the first 1,000 years of the compliance period with a specific dose limit of 25 mrem/yr. A 1,000 year analysis period minimizes speculation about future society and environmental characteristics, but captures the effects of failed engineered barriers. This analysis should use the best available science to determine the environmental conditions on and around the waste site.

b) Licensees and applicants should complete a **Protective Assurance Analysis** which would cover the period from the end of the compliance analysis thru 10,000 years. Because of the very significant uncertainties associated with very long-term societal developments and very long-term changes to natural systems, I recommend that, for the purpose of this analysis, the natural environment (*i.e.,* the "features, events, and processes [FEPs]") should be assumed to remain invariable from the end of the compliance analysis thru 10,000 years *unless* specific, documented scientific information is available that compels changes to be made to the models. ALARA principles should apply for this analysis; should the protective assurance analysis demonstrate that the proposed disposal could present an unacceptable hazard i.e., doses in excess of 500 mrem/yr to future generations, the licensee or applicant would be compelled to make changes in the disposal site design or anticipated inventory limits, or to turn to an alternative disposal method.

Further, I approve staff's proposal to require a 10,000 year intruder assessment analysis so long as such an assessment is built upon the same assumptions as the compliance and protective assurance analyses discussed above. However, in order to avoid boundless speculation, I suggest that the rule clearly indicate that the intruder assessment should be based on intrusion scenarios that are realistic and consistent with activities in and around the disposal site at the time of site closure. These scenarios should be detailed in guidance documents.

I also approve staff's proposed requirement for licensees and applicants to provide a qualitative analysis covering a "performance period" of 10,000 years or more after site closure. This analysis is needed to evaluate the ability of the disposal system to mitigate long-term risks associated with the disposal of long-lived low-level radioactive waste—*i.e.*, those materials bearing concentrations of long-lived radionuclide exceeding those listed in the proposed Table A of 10 CFR 61.13(e). This analysis will provide decision-makers with information regarding long-

term uncertainties associated with the disposal of such wastes and to identify whether any additional measures need to be considered to protect future generations.

Finally, with regard to the staff's proposed recommendation on compatibility, I believe that the obvious trans-boundary issues associated with this rule require consistent application between the various Agreement States. Therefore, I find clear cause to designate this rule to have a compatibility designation of "B" for the entire rule. However, the final determination will depend upon the final form of the rule itself. Thus, I will reserve final judgment until I have heard from the various stakeholders regarding what they believe is the appropriate level of compatibility for the various sections. I suggest that staff develop a specific question for the *Federal Register* notice introducing this proposed rule regarding whether the compatibility designations assigned to the various sections of the proposed rule are appropriate and solicit comments on whether changes should be considered and for what reason.

While our ability to forecast the future may be little better than the Nile river valley famers of 10,000 years ago, we bear a responsibility that they did not: to make good decisions to manage wastes that could impact the lives of our successors in the very long-term future. With the modifications and clarifications I have suggested, I believe the revised 10 CFR Part 61 will provide the agency with the framework it has long needed to provide for the disposal of low-level wastes that result from medical, industrial, and energy production activities that are important to today's world while assuring that we have taken responsible actions to protect the public of hundreds, thousands, and tens of thousands of years in the future.

10/3/13

William D. Magwood, IV **Date**

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: Commissioner Ostendorff

SUBJECT: SECY-13-0075 – PROPOSED RULE: LOW-LEVEL RADIOACTIVE WASTE DISPOSAL (10 CFR PART 61) (RIN 3150-AI92)

Approved __X__ Disapproved _X__ Abstain _____

Not Participating _____

COMMENTS: Below ___ Attached _X_ None ___

SIGNATURE

10/18/13

DATE

Entered on "STARS" Yes ___ No ___

Commissioner Ostendorff's Comments on SECY-13-0075

Proposed Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61) (RIN 3150-AI92)

I approve in part and disapprove in part the issuance of the "Proposed Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61)," subject to the attached clarifying edits and the comments below. I once again commend the staff for developing a thorough proposed rule that addresses very complex issues. This rulemaking has undergone a number of adjustments since its inception in 2008, including following Commission direction to engage in significant stakeholder outreach, which has informed and enhanced the proposed rule.

I believe the elements of the proposed rule—a compliance period followed by a longer performance period analysis, as well as an intruder assessment—provides the best framework for regulating low level waste disposal. I approve the two tier approach proposed by the staff but at this stage of the rule's development, disapprove the use of a 10,000 year compliance period.

The selection of the specific period of compliance has led to considerable dialogue with stakeholders and colleagues on the Commission. I believe it appropriate to make specific comments on factors that lead me to believe that the proposed 10,000 year period of compliance is not appropriate based on what we know at this point in the rulemaking process. First, the staff's "Technical Analysis Supporting Definition of Period of Performance for Low-Level Waste Disposal" issued in April 2011 notes that a compliance period is "the period of time over which the disposal facility performance can be *estimated quantitatively with relatively high precision* (emphasis added)." Second, the Staff Requirements Memorandum on COMWDM-11-0002/COMGEA-11-0002-Revision to Part 61 dated January 19, 2012, approved a two tier approach with a compliance period "that covers the *reasonably foreseeable future* (emphasis added)." Third, the Advisory Committee on Reactor Safeguards, in its July 22, 2013, letter on Revisions to Low-Level Radioactive Waste Disposal Requirements (10 CFR Part 61) noted concerns on significant uncertainties in longer periods of time. I struggle to see the benefit in the Commission regulating compliance for periods greater than 1,000 years for Low-Level Radioactive Waste Disposal Requirements. I agree with Commissioner Magwood that a 10,000-year compliance period "provides false comfort." Thus, I agree with Commissioners Apostolakis and Magwood, that 1,000 years is a more appropriate time frame for a compliance period. That said, I reserve final judgment on the appropriate period of compliance pending review of comments on the draft rule. I will note that the regulatory requirements of this proposed rule are not limited to the 1,000-year compliance period. Rather, the second tier performance period analysis (subsequent to the first tier compliance period) will encompass a longer time horizon using qualitative measures.

With respect to other aspects of the proposed rule, I approve the proposed 10,000-year intruder assessment analysis subject to the conditions expressed by Commissioner Magwood's concept of "Protective Assurance Analysis" holding static the variables in the assessment at 1,000 years. I also concur with Commissioner Apostolakis that defense-in-depth (DID) principles "ensure that safety will not be wholly dependent on any single element of the design, construction, maintenance or operation of a nuclear facility," and that the staff's two-tiered approach "allows for the clear delineation of how the fundamental principle of DID and risk assessment may be

combined to ensure the protection of the public and the environment" for Low-Level Radioactive Waste Disposal. Staff should clearly describe the attributes of the two-tiered approach proposed in this draft rule, as modified by this SRM, in terms of defense-in-depth principles for Low-Level Radioactive Waste Facilities. That being said, if staff identifies the current two-tiered approach as not applicable to our defense-in-depth philosophy they should begin evaluating how to define and implement DID for Low-Level Radioactive Waste Facilities outside of this rule. Finally, regarding the Compatibility Categorization of the rule, I believe that for the site-specific waste acceptance criteria (proposed section 61.58), trans-boundary implications do exist and therefore, staff should change section 61.58 to Compatibility Category "B."

NUCLEAR REGULATORY COMMISSION

10 CFR Parts 20 and 61

RIN 3150-AI92

[NRC-2011-0012]

LOW-LEVEL RADIOACTIVE WASTE DISPOSAL

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is proposing to amend its regulations that govern low-level radioactive waste (LLRW) disposal facilities to require new and revised site-specific technical analyses, to permit the development of site-specific criteria for LLRW acceptance based on the results of these analyses, and to facilitate implementation and better align the requirements with current health and safety standards. This rule would affect LLRW disposal licensees or license applicants that are regulated by the NRC or the Agreement States.

DATES: Submit comments on the rule by **[INSERT DATE: 75 DAYS FROM DATE OF PUBLICATION]**. Submit comments specific to the information collections aspects of this proposed rule by **[INSERT DATE: 30 DAYS FROM DATE OF PUBLICATION]**. Comments received after these dates will be considered if it is practical to do so, but the NRC is able to ensure consideration only for comments received on or before these dates.

ADDRESSES: You may submit comments by any of the following methods (unless this document describes a different method for submitting comments on a specific subject):

SUPPLEMENTARY INFORMATION:

I. ~~I.~~ Accessing Information and Submitting Comments.

A. Accessing Information.

B. Submitting Comments.

II. Background.

A. Existing Regulatory Framework.

B. Low-Level Radioactive Waste Classification System.

C. Previous Public Interactions.

III. Discussion.

A. What action is the NRC taking?

B. Who would this action affect?

C. Why do the regulatory requirements need to be revised?

D. When does this rule become effective?

E. What LLRW streams are affected by this rule?

F. What are site-specific technical analyses?

1. Performance assessment.

2. Intruder assessment.

3. Performance period analyses.

4. Updated technical analyses for closure.

G. Why is a 10,000-year compliance period appropriate?

1. Options considered for selection of analyses timeframes.

2. NRC proposed option.

H. What are waste acceptance criteria (WAC)?

1. Options considered.

2. NRC proposed option.

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The NRC staff also briefed the Advisory Committee on Reactor Safeguards (ACRS), Radiation Protection and Nuclear Materials Subcommittee, on June 23 and August 17, 2011, and the full committee on July 13 and September 8, 2011. The NRC staff again briefed the ACRS, Radiation Protection and Nuclear Materials Subcommittee, on April 9 and June 18, and the full committee on July 10, 2013. Summaries and transcripts of these meetings can be found at the ACRS' website, http://www.nrc.gov/about-nrc/organization/acrsfuncdesc.html.

Based on early comments and interactions with the ACRS, the NRC staff revised the preliminary proposed rule language.

III. Discussion.

A. What action is the NRC taking?

The NRC is proposing to amend 10 CFR part 61 to require LLRW disposal licensees or license applicants to prepare new and revised site-specific technical analyses to ensure that LLRW streams that are significantly different from the LLRW streams considered in the current 10 CFR part 61 regulatory basis can be disposed of safely and meet the performance objectives in 10 CFR part 61, subpart C. These new and revised analyses would also more easily identify any additional measures that would be prudent to implement for continued disposal of radioactive LLRW at a particular facility.

The NRC is also proposing to amend 10 CFR part 61 to require LLRW disposal facility licensees or license applicants to develop site-specific criteria for the acceptability of LLRW for disposal. These amendments maintain the existing LLRW classification system, but permit disposal facility licensees or license applicants to account for facility design, disposal practices, and site characteristics to determine criteria for accepting shipments of LLRW for disposal at

C. Why do the regulatory requirements need to be revised?

~~Development of 10 CFR part 61 was based on commercial LLRW streams that were being disposed of at that time and did not contemplate some of the LLRW streams that licensees are seeking to dispose of now. The regulatory requirements in 10 CFR part 61 would be revised to require site-specific technical analyses and technical requirements for the analyses to ensure that LLRW streams that are significantly different from the LLRW considered in the current 10 CFR part 61 regulatory basis can be disposed of safely and meet the performance objectives in 10 CFR part 61, subpart C, for the protection of public health and safety. The site-specific technical analyses and technical requirements for the analyses are further discussed in sections III.F and III.G of this notice.~~

Recently, the industry and the NRC have identified new LLRW streams that were not envisioned during the development of 10 CFR part 61. These LLRW streams include depleted uranium (DU) from enrichment facilities, LLRW from the U.S. Department of Energy (DOE) operations, and blended LLRW streams in quantities greater than previously expected. In addition, new technologies might result in the ~~future~~ generation of different LLRW streams not previously evaluated during the development of the current 10 CFR part 61 regulations.

~~Some radionuclides, such as isotopes of uranium, were not expected to be generated in sufficient quantities or concentrations in commercial LLRW streams to warrant inclusion in the LLRW classification tables. The NRC derived concentration limits for uranium, but these limits were not included in the final rule because the NRC determined that, based on the relatively small quantities of uranium expected to be generated by commercial facilities at the time, uranium did not pose a sufficient hazard to warrant inclusion in the 10 CFR 61.55(a) tables (47 FR 57456).~~

The renewed interest in licensing new uranium enrichment facilities in the United States

requirements imposed for each class of LLRW. However, as they are presently written, the regulations do not explicitly require an analysis of inadvertent intruder doses. Differences between LLRW disposal inventories, disposal practices, and the underlying assumptions used to develop the LLRW classification tables in 10 CFR 61.55 can result in varying doses with respect to the protection of an inadvertent intruder. Therefore, the new proposed regulatory provisions require licensees and license applicants to conduct an analysis of inadvertent intruder doses.

The proposed revisions would add a requirement for licensees and license applicants to conduct a site-specific intruder assessment to demonstrate compliance with 10 CFR 61.42. The proposed intruder assessment would quantitatively estimate the radiological exposure of an inadvertent intruder at an LLRW disposal facility following an assumed loss of institutional controls at the end of the active institutional control period. The results of the intruder assessment would then be compared to the performance objective in 10 CFR 61.42. The intruder assessment would ~~have to~~ identify the intruder barriers, examine the capability of the barriers, and address the effects of uncertainty on the performance of the barriers. The capabilities of the barriers to inhibit contact with the disposed LLRW or limit the radiological exposure of an inadvertent intruder and the time period over which the capability persists must be demonstrated and a technical basis must be provided. In performing the proposed intruder assessment, licensees would be expected to employ a methodology similar to that used for a performance assessment, but the intruder assessment would assume that an inadvertent intruder occupies the LLRW disposal site after closure, engages in normal activities, and is unknowingly exposed to radiation from the LLRW.

With the intruder assessment requirement, the NRC is proposing to specify an intruder dose limit as described in the original 10 CFR part 61 analysis to develop the LLRW classification tables. The regulatory basis for 10 CFR part 61 assumed that inadvertent

appendix G to 10 CFR part 20 ensure that specific manifesting requirements, which were previously linked directly to the LLRW classification requirements, are revised to maintain consistency with the proposed requirements for LLRW acceptance in 10 CFR part 61. The proposed revisions to appendix G to 10 CFR part 20 also ensure that information important for States and Compacts to carry out their responsibilities under the Low-Level Radioactive Waste Policy Act of 1980 (as amended in 1985) will continue to be reported.

I. What other changes are proposed?

The NRC is proposing additional changes to the 10 CFR part 61 regulations to facilitate implementation and better align the requirements with current health and safety standards. These changes would include: 1) adding new definitions to 10 CFR 61.2, "Definitions," and updating concepts in 10 CFR 61.7; 2) implementing changes to appendix G to 10 CFR part 20, to conform to proposed LLRW acceptance requirements; 3) modifying site suitability requirements in 10 CFR 61.50, to be consistent with the proposed analyses framework; and 4) Updating the dose calculation system used in 10 CFR part 61.

1. Adding new definitions to 10 CFR 61.2 and updating concepts in 10 CFR 61.7.

Currently, 10 CFR 61.2 defines common terms used in 10 CFR part 61, and 10 CFR 61.7 provides conceptual information for the disposal facility, LLRW classification and near-surface disposal, and licensing process for LLRW disposal facilities. These concepts include descriptions of: a) the parameters for near-surface disposal in engineered facilities and the layout of land and buildings necessary to carry out the disposal; b) the safety objectives for near-surface LLRW disposal, which emphasize the stability of the wasteforms and disposal sites; and c) the licensing processes that the licensees or license applicants go through during the preoperational, operational, and site closure periods.

10 CFR 61.56. The container must be labeled with the appropriate LLRW class, and the licensee who transfers the LLRW must implement a quality assurance program to assure compliance with 10 CFR 61.55 and 10 CFR 61.56. Since the proposed 10 CFR part 61 requirements would require licensees or license applicants to develop criteria for LLRW acceptability using either the existing LLRW classification system or the results of site-specific technical analyses, these requirements would be revised so that shippers are preparing, labeling, and providing quality assurance in accordance with the disposal facility operator's criteria for LLRW acceptability.

3. Modifying the site suitability requirements in 10 CFR 61.50 to be consistent with the proposed analyses framework.

The site suitability requirements in 10 CFR 61.50 specify the minimum characteristics a disposal site must ~~have to~~ be acceptable for use as a near-surface disposal facility. The primary factors considered for disposal site suitability are isolation of LLRW—which is dependent on the radiological characteristics of the LLRW—and disposal site features that ensure that the long-term performance objectives of subpart C of this part are met, as opposed to short-term convenience or benefits. The concept of site characteristics is explained in 10 CFR 61.7. Site characteristics should be considered in terms of the indefinite future, take into account the radiological characteristics of the LLRW, and be evaluated for at least a 500-year timeframe. Site characteristics and site suitability requirements play an integral role in ensuring that the site is appropriate for the type of LLRW proposed for disposal. When the site suitability requirements were originally developed, it was envisioned that LLRW would primarily contain short-lived radionuclides with low concentrations of long-lived radionuclides. The NRC developed the LLRW classification framework around this concept. However, the regulation at 10 CFR 61.55(a)(6) allows long-lived LLRW not currently listed in table 1 or 2 of 10 CFR 61.55

exposures to any inadvertent intruder to the extent reasonably achievable at any time during the performance period. Compliance with the proposed 10 CFR 61.42(b) would be demonstrated through analyses that meet the requirements specified in the proposed 10 CFR 61.13(e).

Section 61.50 Disposal site suitability requirements for land disposal.

Current 10 CFR 61.50 specifies site suitability requirements for the minimum characteristics a disposal site must ~~have to~~ be acceptable for use as a near-surface LLRW disposal facility. Site suitability requirements play an integral role in ensuring that the site is appropriate for the type of LLRW proposed for disposal.

The NRC proposes to revise 10 CFR 61.50 to clarify the interpretation of site characteristics. The technical content of the site suitability characteristics would not be changed. However, the site suitability characteristics would be reorganized to distinguish the hydrological site characteristics from other characteristics.

Section 61.52 Land disposal facility operation and disposal site closure.

Current 10 CFR 61.52 imposes requirements to ensure the integrity of the LLRW, the proper marking of the disposal unit boundary, and the proper maintenance of the buffer zone.

The NRC proposes to revise 10 CFR 61.52(a)(3) and (a)(8) to enhance its readability and to conform to the proposed new requirements in 10 CFR 61.52(a)(12) and (a)(13).

The NRC proposes to add new paragraphs (a)(12) and (a)(13). Proposed 10 CFR 61.52(a)(12) would only allow the disposal of LLRW meeting the disposal facility's LLRW acceptance criteria, and proposed 10 CFR 61.52(a)(13) would require licensees to prepare updated site-specific analyses using the details of the final closure plan and LLRW inventory.

a. Revise section II (Certification); and

b. Revise section III, paragraphs III.A.1, III.A.2, III.A.3, III.C.3, III.C.4, and III.C.5.

The revisions read as follows:

Appendix G to Part 20 -- Requirements for Transfers of Low-Level Radioactive Waste Intended for Disposal at Licensed Land Disposal Facilities and Manifests

* * * * *

II. * * *

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

III. * * *

A. * * *

1. Prepare all wastes according to the land disposal facility's criteria for waste acceptance developed in accordance with § 61.58 of this chapter;

2. Label each disposal container (or transport package if potential radiation hazards preclude labeling of the individual disposal container) of waste in accordance with § 61.57 of this chapter;

a. Revise the definitions of "Inadvertent intruder;" "Site closure and stabilization," "Stability," and "Waste;" and

b. Add the definitions of "Compliance period," "Intruder assessment," "Long-lived waste," "Performance assessment," and "Performance period" in alphabetical order.

The revisions read as follows:

§ 61.2 Definitions.

* * * * *

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

* * * * *

Inadvertent intruder means a person who might occupy the disposal site after closure and engage in normal activities, such as agriculture, dwelling construction, resource exploration or exploitation (e.g., well drilling) or other reasonably foreseeable pursuits that might unknowingly expose the person to radiation from the waste included in or generated from a previously approved low-level radioactive waste facility.

* * * * *

Intruder assessment is an analysis that (1) assumes an inadvertent intruder occupies the site and engages in normal activities or other reasonably foreseeable pursuits that might unknowingly expose the person to radiation from the waste; (2) examines the capabilities of intruder barriers to inhibit an inadvertent intruder's contact with the waste or to limit the

factors including the design of the land disposal facility, operational procedures, characteristics of the environment surrounding the land disposal facility, and the radioactive waste acceptable for disposal.

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

(2) A performance assessment is an analysis that is required to demonstrate protection of the general population from releases of radioactivity. A performance assessment identifies the specific characteristics of the disposal site (e.g., hydrology, meteorology, geochemistry, biology, and geomorphology); 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 performance of the disposal site. A performance assessment examines the effects of these processes and interaction on the ability of the disposal site to limit waste releases and estimates the annual dose to a member of the public for comparison with the appropriate performance objective of subpart C of this part.

(3) ~~It is possible, but unlikely, that persons~~ Inadvertent intruders might occupy the site in the future and engage in normal pursuits without knowing that they were receiving radiation exposure. ~~These persons are referred to as inadvertent intruders~~. Protection of inadvertent intruders can involve two principal controls: institutional control over the site after operations by the site owner to ensure that no such occupation or improper use of the site occurs; or,

designating which waste could present an unacceptable dose to an intruder, and disposing of this waste in a manner that provides some form of intruder barrier that is intended to prevent contact with the waste. These regulations incorporate both types of protective controls.

(4) Intruder assessment must~~D~~ demonstrating protection of inadvertent intruders by ~~requires~~ requiringan assessment of potential radiological exposures should an inadvertent intruder occupy the disposal site following a loss of institutional controls after closure. The intruder can be exposed to radioactivity that has been released into the environment as a result of disturbance of the waste or from radiation emitted from waste that is still contained in the disposal site. The results of the intruder assessment are compared with the appropriate performance objective of subpart C of this part. 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 the disposal site following a loss of institutional controls after closure, and engages in activities that unknowingly expose the intruder to radiation from the waste.

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

migration, a maximum disposal site inventory based on the characteristics of the disposal site may be established to limit potential exposure.

(2) Institutional control of access to the site is required for up to 100 years. This permits the disposal of Class A and B waste without special provisions for intrusion protection, since these wastes contain types and quantities of radionuclides that generally will decay during the 100-year period and will present an acceptable hazard to the intruder. However, waste that is Class A under 61.55(a)(6) may not decay to acceptable levels in 100 years. For waste classified under 61.55(a)(6), safety is provided by limiting the quantities and concentrations of the material consistent with the disposal site design. Safe disposal of waste classified under 61.55(a)(6) is demonstrated by the technical analyses and compliance with the performance objectives. The government landowner administering the active institutional control program has flexibility in controlling site access, which may include allowing productive uses of the land provided the integrity and long-term performance of the site are not affected.

(3) Waste that will not decay to levels that present an acceptable hazard to an intruder within 100 years is typically 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 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 at least 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

concentration limits in Tables 1 and 2 of 10 CFR 61.55. LLRW streams from commercial uranium enrichment facilities and blended LLRW, which might result in large quantities of material near the upper bounds of an LLRW class, also were not considered. Further, new technologies might result in the future generation of different LLRW streams not evaluated when the current 10 CFR Part 61 regulations were developed. Thus, if LLRW differs significantly in quantity and concentration from what was considered in the development of the current 10 CFR Part 61, then it might be possible to dispose of LLRW that meets the disposal requirements but results in an intruder dose (if calculated) that exceeds the dose limit used to develop the LLRW classification tables (i.e., 5 milliSieverts per year (mSv/yr) (500 millirem per year (mrem/yr))).

1.2 Background

The NRC adopted the current 10 CFR Part 61 in 1982 (47 FR 57446). The regulations place emphasis on an integrated systems approach to the disposal of commercial LLRW, including site selection, disposal facility design and operation, minimum waste form requirements, and disposal facility closure. To reduce reliance on institutional controls, 10 CFR Part 61 emphasizes passive, rather than active, systems to limit and retard the release of LLRW to the environment.

The regulations at 10 CFR Part 61, Subpart C, contains performance objectives, which set standards for a) 10 CFR 61.41, "Protection of the general population from the releases of radioactivity;" b) 10 CFR 61.42, "Protection of individuals from inadvertent intrusion;" c) 10 CFR 61.43, "Protection of individuals during operations;" and d) 10 CFR 61.44, "Stability of disposal site after closure." License applicants under 10 CFR Part 61 must prepare an assessment of potential dose impacts to the general population to demonstrate that they will meet the 10 CFR Part 61, Subpart C performance objectives. License applicants must also demonstrate adequate protection of potential inadvertent intruders into the LLRW disposal facility, who might occupy the site at any time after institutional controls over the LLRW disposal facility are removed and are unaware of the radiation hazard from the LLRW. Currently, licensees demonstrate protection of inadvertent intruders by complying with the LLRW classification (10 CFR 61.55) and segregation requirements (10 CFR 61.52, "Land disposal facility operation and disposal site closure,") and by providing adequate barriers to inadvertent intrusion.

Explicit dose limits for an inadvertent intruder are not currently provided in 10 CFR Part 61 because an intruder dose assessment is not required, but the LLRW classification concentrations limits for radionuclides, in Tables 1 and 2 of 10 CFR 61.55, were based on a dose of 5 mSv/yr (500 mrem/yr) to an inadvertent intruder. The final LLRW classification tables were developed assuming that only a fraction of the LLRW being disposed would approach the LLRW classification limits and that the dose to an intruder exposed to a large volume of disposed LLRW at the classification limits could not exceed 5 mSv/yr (500 mrem/yr). By complying with the LLRW classification and segregation requirements, a licensee can demonstrate that an inadvertent intruder will be protected if the LLRW stream proposed for disposal is sufficiently similar to that considered by the regulatory basis for the current 10 CFR Part 61 regulations and if the underlying assumptions are not compromised.

analyses and LLRW acceptance plan would be incurred as one-time implementation costs. All four affected licensees are assumed to be Agreement States' licensees, the NRC assumes that licensees' initial analyses would be conducted after the Agreement States' adoption of the compatible regulations, or at a time determined by the Agreement States.

3. The NRC assumes that all LLRW disposal facilitates would update site-specific technical analysis and LLRW acceptance plans once during the 10-year regulatory analysis period.

3.2.3 Labor rate and full-time equivalent (FTE) assumptions

1. The NRC's labor rates are determined using the methodology in Abstract 5.2, "NRC Labor Rates," of NUREG/CR-4627, "Generic Cost Estimates, Abstracts from Generic Studies for Use in Preparing Regulatory Impact Analyses." This methodology considers only variable costs (including salary and benefits) that are directly related to the development, implementation, and continuing support of the proposed amendments. Currently, the NRC hourly labor rate is $126, including all benefits. The estimation of costs for rulemaking is based on professional NRC FTE, without administrative staff support. Based on data from the NRC's time and labor system, the number of hours in 1 year that directly relate to a professional staff's implementation of assigned duties is 1,375; excluding hours such as leave, training, and completing administrative tasks. Therefore, an NRC professional staff FTE hourly rate is based on 1,375 hours. The NRC labor rate for one FTE is $173,250.

2. As described in the ~~Office of Management and Budget (~~OMB~~)~~ Circular A-76, "Performance of Commercial Activities," the number of productive hours in 1 year is 1,776. As this actual value is likely to vary from State to State and no specific data are available, the FTE costs for the States and licensees are based on the number of hours estimated in OMB Circular A-76.

3. The NRC staff determined Agreement State labor rates using National Wage Data available on the Bureau of Labor Statistics (BLS) web site (www.bls.gov). Because exact hourly rates for each state vary from State to State, nationwide mean hourly rates are used. Also, the exact rulemaking burden varies from State to State depending, among other things on the mix of different professional skills and administrative support required. For review of licensee documents, the NRC estimates $31.54/hour, using the BLS Employer Costs for Employee Compensation data set for "Environmental Scientist." These rates are multiplied by 1.5 to account for items such as pension, insurance, overhead, and other legally-required benefits. For the development and review of site-specific technical analyses and LLRW acceptance plans associated with this proposed rulemaking, the NRC uses a labor rate of $47.31/hour, 1.5 times the $31.54 hourly rate from the BLS's employer cost data set for a state government "Environmental Scientist."

4. Licensee labor rates were also obtained from Bureau of Labor Statistics National Wage Data available on the BLS web site. The NRC selected an appropriate mean hourly labor rate depending on the listed industry and the occupation (e.g., manufacturing, health and safety, etc.) and multiplying by 1.5 to account for

The Honorable Barbara Boxer
Chairman, Committee on Environment
and Public Works
United States Senate
Washington, DC 20510

Dear Madam Chairman:

The U.S. Nuclear Regulatory Commission (NRC) is proposing to amend its regulations that govern low-level radioactive waste (LLRW) disposal facilities to require new and revised site-specific technical analyses, to permit the development of criteria for LLRW acceptance based on the results of these analyses, and to facilitate implementation and better align the requirements with current health and safety standards. This rule would affect LLRW disposal licensees and license applicants that are regulated by the NRC or the Agreement States, and waste brokers and shippers. Enclosed is a copy of the proposed rule which is being transmitted to the *Federal Register* for publication.

Sincerely,

Rebecca Schmidt, Director
Office of Congressional Affairs

Enclosure:
Federal Register notice

cc: Senator David Vitter

- Revise the application for closure to include updates to the technical analysis.

The proposed rule would also add a new requirement to develop criteria for the acceptance of low-level radioactive waste for disposal based either on the results of the technical analyses or on the existing waste classification requirements.

This rule would affect low-level radioactive waste disposal licensees or license applicants that are regulated by the NRC and the Agreement States (the 37 States that regulate radioactive materials under agreements with the NRC), waste brokers, and waste shippers.

The proposed rule anticipates a need to dispose of large quantities of depleted uranium from newly licensed uranium enrichment facilities. Depleted uranium actually becomes more radioactive as it decays over centuries, and the current regulations did not anticipate large quantities of it being disposed of commercially as Class A low-level radioactive waste. In addition, the industry anticipates blending some Class A waste with more radioactive Class B and Class C wastes that currently lack a disposal path. Blending could create large quantities of Class A waste near the upper classification limit of radioactivity. The current regulations anticipated only a small amount of waste near the upper limit.

Comments will be accepted until **[insert date – 75 days after publication in FR]**. They may be submitted over the Federal Government's rulemaking website, www.regulations.gov, using Docket ID NRC-2011-0012. They may also be faxed to 301-415-1101; e-mailed to Rulemaking.Comments@nrc.gov; or mailed to Secretary, U.S. Nuclear Regulatory Commission, Washington, D.C., 20555-0001, ATTN: Rulemaking and Adjudications Staff.

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