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

SECRETARY

February 17, 2009

COMMISSION VOTING RECORD

DECISION ITEM: SECY-08-0170

TITLE: FINAL RULE: 10 CFR PART 63, "IMPLEMENTATION OF A DOSE STANDARD AFTER 10,000 YEARS" (RIN 3150-AH68)

The Commission (with all Commissioners agreeing) approved the subject paper as recorded in the Staff Requirements Memorandum (SRM) of February 17, 2009.

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 Klein
Commissioner Jaczko
Commissioner Lyons
Commissioner Svinicki
OGC
EDO
PDR

VOTING SUMMARY - SECY-08-0170

RECORDED VOTES

	APRVD	DISAPRVD	ABSTAIN	NOT PARTICIP	COMMENTS	DATE
CHRM. KLEIN	X					12/17/08
COMR. JACZKO	X				X	1/29/09
COMR. LYONS	X					12/18/08
COMR. SVINICKI	X				X	12/22/08

COMMENT RESOLUTION

In their vote sheets, all Commissioners approved the staff's recommendation and Commissioners Jaczko and Svinicki provided additional comments. Subsequently, the comments of the Commission were incorporated into the guidance to staff as reflected in the SRM issued on February 17, 2009.

AFFIRMATION ITEM

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

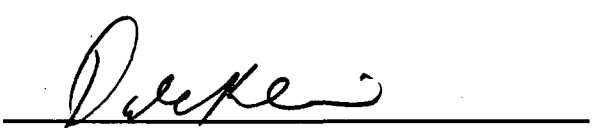
FROM: CHAIRMAN KLEIN

SUBJECT: SECY-08-0170 – FINAL RULE: 10 CFR PART 63, "IMPLEMENTATION OF A DOSE STANDARD AFTER 10,000 YEARS" (RIN 3150-AH68)

Approved XX **Disapproved** _____ **Abstain** _____

Not Participating _____

COMMENTS: **Below** ___ **Attached** ___ **None** XX



SIGNATURE

12/17/2008

DATE

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

AFFIRMATION ITEM

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER JACZKO

SUBJECT: SECY-08-0170 – FINAL RULE: 10 CFR PART 63, "IMPLEMENTATION OF A DOSE STANDARD AFTER 10,000 YEARS" (RIN 3150-AH68)

Approved __X__ Disapproved _____ Abstain _____

Not Participating _____

COMMENTS: Below ___ Attached _X__ None ___

Approved subject to the attached comments and edits.

_____
SIGNATURE

01/29/2009
DATE

Entered on "STARS" Yes _X__ No ___

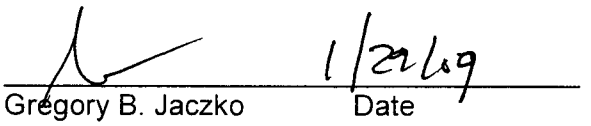
Commissioner Jaczko's Vote on SECY-08-0170
Final Rule: 10 CFR Part 63, "Implementation of a Dose Standard After 10,000 Years"

I approve the final rule, subject to these comments and attached edits.

This final rule presents three primary issues for Commission consideration. The first issue is the implementation of a dose standard for a proposed repository at Yucca Mountain for the period after 10,000 years. As the "Background" section of the Statement of Considerations makes clear, the Energy Policy Act of 1992 requires NRC's regulations to be consistent with EPA's standards. Later sections of the Statements of Consideration, however, confuse this fact. Thus, I have proposed a series of edits to ensure a consistent response.

The second issue is that of DOE worker dose. Here the NRC proposes to clarify that EPA's weighting factors, proposed for calculating dose to the public, should be used for dose calculations for workers, as well. I approve the manner in which the staff addressed this issue.

The third issue is the NRC's specification of a value for climate change. I believe the staff's approach to this issue is reasonable, but I have lingering questions about whether it is the best approach. In this rule, the NRC has determined the deep percolation rate distribution values to be used to represent climate change. If we proceed in this fashion, I believe we may, at a minimum, be coming very close to crossing the line on a matter better left for adjudication.



Gregory B. Jaczko Date

Commission Jaczko's Edits to SECY-08-0170 (FRN for Part 63)

INSERT A (pg. 14)

While EnPA does not require NRC regulations to be *identical* to EPA's, EnPA does direct the Commission to modify its technical criteria to be consistent with EPA's standards for a geologic repository at the Yucca Mountain site. Thus, NRC is required to adopt EPA's post 10,000 year standard, and the NRC has done so. The NRC's notice of proposed rulemaking notified potential commenters that comments such as these on EPA's revised standards should be directed to EPA for EPA's response.

INSERT B (pg. 18)

As explained in response to issue 1 under NRC Adoption of EPA standards of this document, EnPA requires the Commission to modify its technical criteria to be consistent with EPA's standards for a geologic repository at the Yucca Mountain site. The NRC's notice of proposed rulemaking notified potential commenters that comments such as these on EPA's revised standards should be directed to EPA for EPA's response.

INSERT C (pg. 24)

The NRC's notice of proposed rulemaking notified potential commenters that comments, such as these on EPA's revised standards should be directed to EPA for EPA's response.

INSERT D (pg. 62)

As explained in response to issue 1 under NRC Adoption of EPA standards of this document, EnPA requires the Commission to modify its technical criteria to be consistent with EPA's standards for a geologic repository at the Yucca Mountain site.

mean the two must be identical. Rather, the State asserts, NRC must recognize that compliance with EPA's standards is necessary but not sufficient to provide adequate protection of public health and safety and the environment. The State also asserts that NRC should promulgate supplemental standards, in its regulations, that will provide the additional protection the State believes is needed. With respect to EPA's proposed standards, the State and other commenters particularly objected to EPA's 3.5 mSv/year (350 mrem/year) post-10,000 year standard and use of the median to assess compliance. The State and other commenters also objected to many other features of the EPA standards, including limitations on the FEPs, use of a two-tier standard, and defining the period of geologic stability as ending at 1 million years. In support of its comments, the State attached a copy of the comments on the EPA proposed standards it had submitted to EPA.

Replace w/ Insert A

Response. NRC agrees that its mandate, under the EnPA, to modify its regulations to be consistent with EPA's standards does not require the two be identical, and does not require NRC to adopt standards it believes to be inadequate to protect public health and safety and the environment. NRC has reviewed EPA's proposed standards and the comments EPA received on those standards (as well as the comments provided to NRC on EPA's proposal). To assist the efficiency of the process, EPA has also consulted with NRC during preparation of the draft final standards, and the Office of Management and Budget has invited NRC to attend meetings during its review of EPA's draft final standards. Thus, NRC is familiar with EPA's final standards, which differ from EPA's proposal, and is also familiar with EPA's reasons for concluding that its final standards provide adequate protection of public health and safety and the environment. We agree that EPA's final standards are adequately protective and will adopt nearly identical standards to be consistent with EPA's standards. We find EPA's responses to the comments it received to be satisfactory. NRC is satisfied for the reasons EPA stated, that EPA's final standards provide adequate protection of public health and safety and the

environment, and that there is no need for NRC to supplement those standards.

The Commission believes it would be helpful to provide a brief perspective regarding the approach taken by EPA to provide adequate protection. First with respect to the 1.0 mSv/year (100 mrem/year) post-10,000 year standard, the appropriateness of EPA's two-tiered standard must be evaluated with due consideration to the unprecedented compliance period of 1 million years. The EPA proposal provides an extremely high level of protection for the initial 10,000 years. The 0.15 mSv/year (15 mrem/year) limit represents a small portion (15 percent) of the overall public dose limit of 1 mSv/year (100 mrem/year). This level is so protective that should the proposed repository produce releases at the maximum level allowed no one would receive a dose larger than the public dose limit, even if exposed to five additional repositories. The EPA acknowledges that some realistic judgment must be made for how long such a stringent level of protection can or needs to be demonstrated. EPA determined that 10,000 years is an appropriate length of time for demonstrating compliance with this strict limit. EPA has selected standards that remain protective, recognizing there is a limit to how far into the future it is reasonable to measure compliance with numerical criteria applicable today, tomorrow, and over the next 10,000 years. As EPA has pointed out, there is strong consensus in the international radioactive waste community that dose projections for periods of tens to hundreds of thousands of years are best viewed as qualitative indicators of system performance, not firm predictions to be compared with numerical criteria. Nevertheless, EPA has chosen to address the Court's ruling in *NEI v. EPA* by establishing a numerical standard for the time of peak dose so that there is a clear test of compliance. Upon consideration of the comments it received, EPA selected the nationally and internationally recognized public dose limit of 1.0 mSv/year (100 mrem/year) as the dose limit, for the period after 10,000 years out to 1 million years. Although the margin of safety is smaller than provided during the first 10,000 years, future generations in the period between 10,000 years and 1 million years will receive the **same** level of overall protection that is

afforded members of the public today through the overall public dose limit. Further, this dose limit is applied to the RMEI, which is representative of a small fraction of a population group and not an entire population, which, by definition, is not "maximally exposed" and would receive doses lower than the allowed limit, if any at all. The NRC agrees with such an approach.

Second, NRC agrees with EPA's approach of using the FEPs included in the performance assessment for the initial 10,000 years as a basis for FEPs to be included in the performance assessment after 10,000 years. EPA provided a basis for this approach that is consistent with the standard practice for performance assessments.

Why has this similar approach been used? The performance assessment for the initial 10,000 years is required to consider an extremely wide range of FEPs. FEPs may be excluded only if there is less than one chance in 100,000,000 per year of their occurring, or if the consequences (e.g., dose to the RMEI) would not be significantly changed by their omission. The performance assessment for the initial 10,000 years already considers such a wide range of FEPs, with such low probabilities of occurrence, that it is highly unlikely that different, realistic FEPs, with the potential to degrade repository performance, would be overlooked. Demonstration of this practice can be found in the many analyses conducted by NRC and others prior to EPA's publication of the proposed standards for the period after 10,000 years. For example, shortly after the NAS report was published, NRC performed calculations to estimate potential doses at Yucca Mountain over 1 million years. These calculations used an approach similar to that proposed and adopted by EPA in its final standards. FEPs selected for the 10,000-year analysis were assumed to exist and operate beyond 10,000 years out to 1 million years (*see* NUREG-1538, "Preliminary Performance Based Analyses Relevant to Dose Based Performance Measures for a Proposed Geologic Repository at Yucca Mountain," T. McCartin and M. Lee (eds.), 2001). Subsequent NRC analyses have used a similar approach (e.g., NUREG-1746, "System-Level Repository Sensitivity Analyses, Using TPA 3.2 Code," R. Codell,

et al., (2001); "System-Level Performance Assessment of the Proposed Repository at Yucca Mountain using the TPA Version 4.1 Code," Revision 2, S. Mohanty, *et.al.*, Center for Nuclear Waste Regulatory Analyses (CNWRA), 2002-05, 2004). DOE also has used a similar approach in its Final Environmental Impact Statement for Yucca Mountain (2002) and for its Total System Performance Assessment for Site Recommendation (2000).

Finally, the specific FEPs that must be included in the performance assessment for the period after 10,000 years provided in EPA's final standards provide a reasonable test of repository safety. EPA's approach considers:

(1) The potential effects from early failures of the engineered barrier system from seismic and igneous events;

(2) The most likely degradation process for the waste package, namely, general corrosion;

(3) Wetter conditions, at the repository horizon, arising from potential climate change; and

(4) All the other features, events, and processes analyzed for the initial 10,000 years.

The Commission is confident that such evaluation of repository safety will provide the information to understand the behavior of the potential repository and to aid the NRC in reaching the requisite safety decisions.

Issue 2: Should NRC extend the compliance period beyond 1 million years if it is determined that the peak dose may occur beyond the 1 million-year period?

Comment. The State commented that EPA's requirement that the post-10,000 year performance assessment should end at 1 million years is unnecessarily prescriptive. The State believes that if the trends in dose projection are not clear or heading upward and geologic stability is maintained, extending the assessment beyond 1 million years may be required to

establish the performance of the entire repository system. The State believes that NRC has the authority to consider not only the magnitude of the peak, but also the timing and overall trends of dose projections as it evaluates the license application.

INSERT B

Response: As explained in the response to the comment on Issue 1, NRC reviewed the comments EPA received on its proposal to end the period of geologic stability at 1 million years and EPA's reasons, as a matter of policy, for retaining that requirement in its final rule. For the reasons explained by EPA in its final rule, NRC agrees that EPA's definition of *period of geologic stability* as ending at 1 million years after disposal is reasonable and NRC has incorporated that definition into its final rule. EPA appropriately discussed the inherent difficulties in performing calculations for such an unprecedented period for comparison with a numerical standard.

It is always possible to speculate about the potential for doses occurring even further in the future. Continuing the calculation beyond 1 million years would introduce further complications regarding the geologic stability of the site while adding little if any additional understanding of repository performance. For example, if the analysis were extended tens of thousands of years, a period of time typically considered very long, such an extension is very small with respect to 1 million years. If the potential repository can be shown to be safe for the unprecedented period of 1 million years, the Commission sees no merit in extending estimates of repository performance to time periods when the fundamental stability of the geologic setting is in doubt.

Issue 3: Has NRC illegitimately used rulemaking to resolve issues that must be resolved in an adjudicatory proceeding?

Comment. The State of Nevada commented that the proposed rule violates fundamental principles of administrative law because it fails to conform to the usual distinctions in agency administrative processes between "rulemaking" and "adjudication." This is because the rule

choice to use rulemaking or adjudication to achieve its mission.[2] Finally, the Commission does not agree that resolving the issues the commenter has labeled "determinations of adjudicative fact" deprives the State of its right to a hearing under section 189a. of the AEA on these issues. As the Supreme Court has stated, "the statutory requirement for a hearing ... does not preclude the Commission from particularizing statutory standards through the rulemaking process and barring at the threshold those who neither measure up to them nor show reasons why in the public interest the rule should be waived" (*Federal Power Commission v. Texaco, Inc.*, 377 U.S. 33, 39 (1964)).[3]

The commenter also believes that, as explained in its comments to EPA, EPA's "findings of adjudicative fact," in its final rule, now being adopted in NRC's final rule, are without any technical basis and are contrary to sound science, and for that reason violate both EnPA and the AEA. The ~~NRC has reviewed the State's comments to EPA and EPA's responses to those comments. NRC does not agree that EPA's rules are without any technical basis or contrary to sound science for the reasons explained by EPA in its final rule.~~ INSERT C

[2]The Eleventh Circuit initially construed the provisions of the SSA in terms of the distinction between adjudicative facts and legislative facts and concluded that the effect of age on disability was an adjudicative fact that could not be determined in a rulemaking. *Broz v. Schweiker*, 677 F.2d 1351 (11th Cir. 1982) (*Broz I) Certiorari Granted, Judgment Vacated by Heckler v. Broz,* 461 U.S. 952 (1983). Upon remand for reconsideration in light of *Campbell,* the Eleventh Circuit, in *Broz II,* reaffirmed its original decision upon finding that the Supreme Court had left open the validity of the guidance with respect to its use in determining the effect of age on disability.

[3]The commenter believes that the rules which resolve these issues will be incapable of actually being applied as written because they will turn out to be based on outdated scientific evidence. If this should happen, any person can petition to amend the rules. In addition, NRC's procedural rules enable a party to an adjudicatory proceeding to petition that application of a rule be waived in circumstances when the rule would not serve the purposes for which it was adopted. *See,* 10 CFR 2.335(b).

period after 10,000 years?

Comment. Two commenters expressed concern over how FEPs associated with atmospheric releases of radioactivity and exposure of residents downwind of Yucca Mountain will be considered in the performance assessment for the period after 10,000 years, including FEPs associated with seismic and igneous FEPs.

Response. The performance assessment for the period after 10,000 years must include consideration of potential atmospheric releases of radioactivity. The NAS report, *Technical Bases for Yucca Mountain Standards* (1995), pp 6-7, recommended that the exposure scenario be specified in the standards because of the difficulties in projecting where people may reside and how exposures might occur in the distant future (e.g., thousands to hundreds of thousands of years in the future and longer). Accordingly, EPA specified characteristics of the RMEI (66 FR 32134; June 13, 2001). ~~The location specified for the RMEI ensures that potential doses from atmospheric releases of radioactive material will be considered in the performance assessment.~~

Issue 7: Does the fact that the limitations on FEPs in the performance assessments are being established through rulemaking rather than adjudication, based on data available in 2005, mean that there will be no flexibility to take into account data and models used in DOE's license application or that DOE will have no incentive to further reduce uncertainties?

Comment. The State of Nevada believes that the assumptions being used to account for uncertainty in the post-10,000 year period, and which are incorporated through this rulemaking into the limitations on the FEPs to be considered in DOE's performance assessments, are premature and render the rule inflexible because they are based on data available in 2005. NRC's rules must be sufficiently flexible to take into account data and models used in DOE's license application. The State fears that because the rules are premised on uncertainties as

would be based on NRC's independent technical review and would be subject to a potential hearing as part of the amendment process.

Issue 5: Should NRC incorporate into the final rule requirements for compliance monitoring and measures to be taken in the event of non-compliance?

Comment. Some commenters pointed out that NRC's proposed rule appears to be silent with regard to requirements for compliance monitoring and related measures to be taken if said monitoring demonstrates noncompliance with established standards. The commenters encouraged NRC to incorporate such requirements into the final rule.

Response. Part 63 contains requirements for monitoring up to the time of permanent closure in Subpart F. Should the NRC grant the DOE a license to operate the repository, DOE must also provide a description of its program for post-permanent closure monitoring in its application to amend its license for permanent closure. *See*, § 63.51(a)(2). The commenters' concerns regarding further monitoring and related measures can be considered at that time.

Issue 6: Will adoption of the EPA standards necessitate revision of the "S-3" rule?

Comment. The State of Nevada believes that NRC's adoption of EPA's standards with no added protections will require NRC to revisit its "S-3" rule, 10 CFR 51.51, because this rule currently includes a "zero-release" assumption that the long-term effects of disposing of spent fuel and HLW will be essentially zero because there would be no releases that would harm people or the environment after the repository is sealed. The State believes that this will no longer be the case if NRC adopts EPA's 3.5 mSv (350 mrem) standard for the post-10,000 year period.

INSERT D

Response. ~~For the reasons explained earlier (*see* response to Issue 1 under NRC Adoption of EPA Standards of this document), the Commission considers EPA's final post-~~

~~closure standards to be reasonable and fully protective of public health and safety and the environment.~~ Moreover, The question whether the "zero-release" assumption of the S-3 rule may need to be revisited in the future is not presented in this rulemaking proceeding.

IV. Summary of Final Revisions

Section 63.2 Definitions.

The definition of "performance assessment" is revised to exclude the limitation of "10,000 years after disposal," consistent with EPA's modified definition of "performance assessment." The definition for "total effective dose equivalent" is revised to be consistent with Part 20.

Section 63.102 Concepts

A discussion of the implementation of total effective dose equivalent (TEDE) is added to the concepts section to clarify how the weighting factors specified in EPA's final standards are to be used for calculating potential exposures.

Section 63.114 Requirements for Performance Assessment.

This section specifies the requirements for the performance assessment used to demonstrate compliance with the postclosure performance objectives. This section is revised to conform to EPA's final standards that specify what DOE must consider in the performance assessment for the period after 10,000 years i.e., the performance assessment methods meeting the existing requirements for the initial 10,000 years are appropriate and sufficient for the period after 10,000 years.

AFFIRMATION ITEM

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER LYONS

SUBJECT: SECY-08-0170 – FINAL RULE: 10 CFR PART 63, "IMPLEMENTATION OF A DOSE STANDARD AFTER 10,000 YEARS" (RIN 3150-AH68)

Approved X Disapproved _____ Abstain _____

Not Participating _____

COMMENTS: Below ___ Attached ___ None X

Peter B. Lyons
SIGNATURE

~~11~~ 12/18 /08
DATE

Entered on "STARS" Yes X No ___

AFFIRMATION ITEM

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER SVINICKI

SUBJECT: SECY-08-0170 – FINAL RULE: 10 CFR PART 63, "IMPLEMENTATION OF A DOSE STANDARD AFTER 10,000 YEARS" (RIN 3150-AH68)

Approved XX **Disapproved** _____ **Abstain** _____

Not Participating _____

COMMENTS: **Below** XX **Attached** XX **None** ___

The rule language for § 63.114(b) should be edited to insert "to" between "used" and "satisfy". It should read "...methods used to satisfy the...", as edited in the attached.

SIGNATURE

12/22/08
DATE

Entered on "STARS" Yes √ No ___

(5) Provide the technical basis for either inclusion or exclusion of specific features, events, and processes in the performance assessment. Specific features, events, and processes must be evaluated in detail if the magnitude and time of the resulting radiological exposures to the reasonably maximally exposed individual, or radionuclide releases to the accessible environment, for 10,000 years after disposal, would be significantly changed by their omission.

(6) Provide the technical basis for either inclusion or exclusion of degradation, deterioration, or alteration processes of engineered barriers in the performance assessment, including those processes that would adversely affect the performance of natural barriers. Degradation, deterioration, or alteration processes of engineered barriers must be evaluated in detail if the magnitude and time of the resulting radiological exposures to the reasonably maximally exposed individual, or radionuclide releases to the accessible environment, for 10,000 years after disposal, would be significantly changed by their omission.

(7) Provide the technical basis for models used to represent the 10,000 years after disposal in the performance assessment, such as comparisons made with outputs of detailed process-level models and/or empirical observations (e.g., laboratory testing, field investigations, and natural analogs).

(b) The performance assessment methods used to satisfy the requirements of paragraph (a) of this section are considered sufficient for the performance assessment for the period of time after 10,000 years and through the period of geologic stability.

5. In § 63.302, the definition of "period of geologic stability" is revised to read as follows:

§ 63.302 Definitions for Subpart L.

* * * * *

Period of geologic stability means the time during which the variability of geologic characteristics and their future behavior in and around the Yucca Mountain site can be bounded, that is, they can be projected within a reasonable range of possibilities. This period is defined to end at 1 million years after disposal.

* * * * *

6. Section 63.303 is revised to read as follows:

§ 63.303 Implementation of Subpart L.

(a) Compliance is based upon the arithmetic mean of the projected doses from DOE's performance assessments for the period within 1 million years after disposal, with:

(1) Sections 63.311(a)(1) and 63.311(a)(2); and

(2) Sections 63.321(b)(1), 63.321(b)(2), and 63.331, if performance assessment is used to demonstrate compliance with either or both of these sections.

7. Section 63.305, paragraph (c) is revised to read as follows:

§63.305 Required characteristics of the reference biosphere.

* * * * *

(c) DOE must vary factors related to the geology, hydrology, and climate based upon cautious, but reasonable assumptions of the changes in these factors that could affect the Yucca Mountain disposal system during the period of geologic stability, consistent with the requirements for performance assessments specified at § 63.342.

* * * * *