UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD
Before Administrative Judges:

09-892-HLW-CAB04
Thomas S. Moore, Chairman
Paul S. Ryerson
Richard E. Wardwell

In the Matter of:	)	January 6, 2010
	)	
U.S. Department of Energy	)	
	)	Docket No. 63-001
(High Level Waste Repository	)	
Construction Authorization Application)	)	
	)	

U.S. DEPARTMENT OF ENERGY CONSOLIDATED REPLY BRIEF ON PHASE 1 LEGAL ISSUE SAFETY CONTENTIONS

Donald J. Silverman
Counsel for the U.S. Department of Energy
Morgan, Lewis & Bockius LLP
1111 Pennsylvania Avenue, N.W.
Washington, DC 20004

James Bennett McRae
Martha S. Crosland
U.S. Department of Energy
Office of the General Counsel
1000 Independence Avenue, SW
Washington, DC 20585

TABLE OF CONTENTS

Page

TABLE OF CONTENTS
(continued)

Page

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD
Before Administrative Judges:

09-892-HLW-CAB04
Thomas S. Moore, Chairman
Paul S. Ryerson
Richard E. Wardwell

In the Matter of:	)	January 6, 2010
	)	
U.S. Department of Energy	)	
	)	Docket No. 63-001
(High Level Waste Repository	)	
Construction Authorization Application)	)	
	)	

U.S. DEPARTMENT OF ENERGY CONSOLIDATED REPLY BRIEF
ON PHASE 1 LEGAL ISSUE SAFETY CONTENTIONS

In its October 23, 2009 "Order (Identifying Phase I Legal Issues for Briefing)," Construction Authorization Board (CAB) 04 approved the parties' joint statement of legal issues relating to NEI-SAFETY-005, NEV-SAFETY-009, -010, -011, -012, -013, & -019, NEV-SAFETY-041, NEV-SAFETY-146 & -201, NEV-SAFETY-149, NEV-SAFETY-161, NEV-SAFETY-169, and NEV-SAFETY-171.[1] CAB 04 also directed the parties to "brief [the legal issue in NEV-SAFETY-162] in the form stated by Nevada"[2] and instructed that the legal issue presented by NEV-SAFETY-202 be briefed in the same manner and pursuant to the same schedule as all other Phase I legal issues.[3] On December 7, 2009, the parties, including the U.S.

---

1 CAB 04, Order (Identifying Phase 1 Legal Issues for Briefing) (Oct. 23, 2009) (unpublished) (CAB 04 Order); *see* U.S. Department of Energy, State of Nevada and Nuclear Energy Institute Joint Proposal Identifying Phase 1 Legal Issues for Briefing, Attachment 1 (Oct. 6, 2009) (Joint Proposal Identifying Phase 1 Legal Issues for Briefing).

2 CAB 04 Order at 2.

3 CAB 04 Order at 1.

Department of Energy (DOE or Department), the NRC Staff,[4] the State of Nevada (Nevada)[5] and the Nuclear Energy Institute (NEI)[6] filed their Initial Briefs. In accordance with the CAB 04 Order, the Department submits this consolidated Reply Brief on Phase 1 legal issue contentions.

NEI-SAFETY-05

I. Introduction

The two legal issues that DOE and NEI agreed must be resolved with regard to NEI-Safety-05 are:

> (1) whether the [NRC] regulations [*i.e.*, 10 C.F.R. §§ 20.1002, 20.1003, 20.1101, 50.40 and 63.111] require [as low as reasonably achievable] ALARA considerations at individual nuclear plant sites remote from the [Geologic Repository Operations Area] GROA to be addressed in DOE's LA; and
>
> (2) whether DOE must demonstrate that the repository not only meets applicable safety and environmental regulatory standards, but also must show that it does so without any alleged unnecessary expenditures of resources.[7]

As discussed below, DOE does not have an ALARA obligation with respect to workers at nuclear power plants remote from the GROA, and is only required to demonstrate that the repository will meet applicable safety and environmental regulations, not that it will do so without incurring unnecessary expenditures of resources.

---

4 NRC Staff Brief on Phase I Legal Issues (Dec. 7, 2009) (NRC Staff Initial Brief).

5 State of Nevada's Opening Brief on Phase I Contention Legal Issues (Dec. 7, 2009) (Nevada Initial Brief).

6 The Nuclear Energy Institute's Brief on Phase I Legal Issue No. 1 (Dec. 7, 2009) (NEI Initial Brief).

7 *See* U.S. Department of Energy, State of Nevada and Nuclear Energy Institute Joint Proposal Identifying Phase 1 Legal Issues for Briefing, Attachment 1 at 1 (Oct. 6, 2009).

II. Argument

A. DOE does not have an ALARA obligation to workers at nuclear power plants remote from the GROA.

NEI argues that DOE "must consider dose impacts that occur within the GROA *and at reactor sites*—where those dose impacts could be avoided if DOE were to change certain design elements for criticality control, without compromising acceptability of postclosure performance."[8] NEI is concerned about "unnecessary . . . *occupational doses* for [nuclear] plant employees . . ." that could result when nuclear power plants take certain actions (*e.g.*, inserting disposal control rod assemblies into some fuel assemblies) to comply with DOE requirements.[9] According to NEI, DOE must consider how its design and operations could impact the dose received by nuclear power plant workers engaged in fuel assembly-related activities.[10] In short, NEI is asserting that DOE must apply ALARA principles in order to reduce doses to workers who are: (1) employed by *other* NRC licensees, and not by DOE; (2) working at NRC-licensed facilities located hundreds or thousands of miles from the GROA and not controlled by DOE; and (3) exposed to occupational doses that are attributable solely to radioactive waste located at these remote facilities. This novel view has no support in the NRC regulations or in prior NRC practice.

Doses to workers at nuclear power plants are considered "occupational doses." Section 20.1002 requires both Part 50[11] and Part 63 licensees to comply with Part 20. Section

---

8 NEI Initial Brief at 9, 11 (emphasis added).

9 *See id*. at 8 (emphasis added).

10 *See id*. at 9.

11 As discussed in DOE's Initial Brief on NEI-Safety-05, Section 50.40(a) requires Part 50 licensees to comply with ALARA principles in designing and operating their own facilities. DOE Initial Brief on NEI-Safety-05 at 4. In fact, NEI acknowledges that Part 50 licensees are subject to the same ALARA obligations as DOE. NEI Initial Brief at 9. Citing Section 50.34a(a), NEI further claims that a Part 50 licensee's obligation is similar to that of DOE in that a Part 50 licensee's ALARA obligation extends to doses occurring offsite due to normal operations and expected operational occurrences. *See* NEI Initial Brief at n.6. Section 50.34a(a) provides that:

20.1101(b), which requires licensees to make occupational doses and doses to members of the public ALARA, states that:

> The licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).

An "occupational dose" is defined as "the dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation or to radioactive material . . . ."[12] The term "member of the public" is defined as "any individual except when that individual is receiving an occupational dose."[13] The terms thus are mutually exclusive. Since NEI's stated concern is with "occupational doses" to nuclear power plant workers, the extent of DOE's obligation to make doses to members of the public ALARA is not at issue here.[14]

There is no requirement for DOE to make "occupational doses" for workers at remote nuclear power plants ALARA. The plain text of § 63.111(a), which sets forth Performance Objectives for the repository, provides that *the GROA* "must meet the requirements of Part 20."

> An application for a construction permit shall identify design objectives, and the means to be employed, for keeping levels of radioactive material in effluents to unrestricted areas as low as is reasonably achievable.

This regulation requires a nuclear plant to keep ALARA the levels of radioactive material in effluents that are directly released by the plant. Section 50.34a(a) does not require the power plant to consider how its design and requirements will affect ALARA compliance at another NRC licensee's facility. Therefore, this is not analogous to what NEI claims DOE is obligated to do—consider how its design could affect how another licensee will act and whether that action will be in compliance with ALARA.

12 10 C.F.R. § 20.1003.

13 *Id*.; 10 C.F.R. § 63.202.

14 Furthermore, with regard to making doses to "members of the public" ALARA, the only dose to members of the public that DOE must consider is the dose that results from waste stored at the repository. DOE Initial Brief on NEI-Safety-05 at 5-6. NEI claims that the additional doses will occur while the waste is at the nuclear power plant sites. *See* NEI Initial Brief at 9-11. Because the ALARA principle only applies to doses to members of the public from waste stored at the repository, DOE does not have an ALARA obligation with respect to doses from waste located at nuclear power plant sites. DOE Initial Brief on NEI-Safety-05 at 6. Thus, even classifying a nuclear power plant worker as a "member of the public" with respect to waste stored at the repository would not change the fact that DOE's ALARA obligations do not extend to waste stored at other locations.

Its only reference to doses beyond the GROA concerns doses to "any *real member of the public* located beyond the boundary of the site."[15] There is no mention of doses to radiation workers located outside the GROA in § 63.111(a), nor is there any other provision in the NRC regulations that would assign ALARA responsibility to DOE for radiation workers at nuclear power plants remote from the GROA.

NRC licensees are responsible for their own licensed operations. Nuclear power plants licensees, for example, have an obligation to make doses to their workers ALARA.[16] NEI repeatedly notes that neither Part 20 nor Part 63 explicitly limit the reach of a licensee's ALARA responsibilities for radiation workers to those on its own site. However, there is no need to do so, any more than there is to state in each section of the Commission's regulations that its requirements apply to that licensee, that facility specifically and to it alone. The limitation is understood implicitly because it is so obvious.

In addition, there are good reasons why the obligation of a licensee to apply the ALARA principle is limited to circumstances under its control and subject to its license. If, as NEI incorrectly alleges, DOE were required to take into account the practices of other facilities, and the effects of them on one's own facility design and practices, this would require information (*e.g.*, ALARA dose constraint exceedance reports under 10 C.F.R. § 20.1101(d)), and actions (*e.g.*, corrective action reports under 10 C.F.R. § 20.2203(b)(1)(iv)) not reasonably available to DOE.[17] As a practical matter, implementing and monitoring such design and operational effects at other licensees' facilities, or preventing changes to them by other licensees at their own

---

[15] 10 C.F.R. § 63.111(a)(2) (emphasis added).

[16] *See* 10 C.F.R. § 50.40.

[17] *See* NRC Staff Initial Brief at 6.

facilities, is beyond any licensee's control. As a result, any such system would be entirely impractical.

NEI, despite its knowledge of the nuclear industry, has not pointed to a single example of the application of the alleged requirement to other licensees. If NEI's argument were correct, ALARA inter-facility evaluations should be required to take place between NRC-licensed facilities at all points in the chain of the fuel cycle (*e.g.*, enrichment facility to fuel fabricator, fuel fabricator to reactor, reactor to low level waste disposal facility), since the manner of operation of one facility may have operational implications for handling of fuel or other NRC-controlled materials at another. DOE is unaware of any such requirements.

Most importantly, the Part 63 Rulemaking clearly reflected an understanding that the reach of ALARA for occupational doses was limited to the licensed site:

- The Statements of Consideration for the final Part 63 rule, discuss use of the "deep-dose equivalent" concept in measuring compliance with dose limitations "for actual doses to workers at the Yucca Mountain repository."[18]

- In the Public Comments and Responses Section of the Final Rule, in response to a comment about the multi-staged licensing process, the Commission stated that before a license to receive and possess source, special nuclear, or byproduct material at the GROA can be made, the Commission must make certain findings. Those findings include that *"[a]ctivities to be conducted at the GROA* comply with the rules and regulations of the Commission, *which will include radiation protection for workers . . . .*"[19] The language demonstrates that with regard to workers, DOE only has to consider the dose for workers involved in activities at the GROA.

The Yucca Mountain Review Plan (YMRP) and implementing guidance also support DOE's position:

---

[18] *See* Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, NV, 66 Fed. Reg. 55,732, 55,735 (Nov. 2, 2001); NRC Staff Initial Brief at 5.

[19] 66 Fed. Reg. at 55737 (emphasis added).

- The YMRP does not contain any criteria requiring DOE to consider how its operations will impact ALARA efforts at nuclear power plants remote from the GROA.[20]

- The Interim Staff Guidance that amends the YMRP specifically limits the workers that DOE must consider to those that are onsite. It provides that "DOE should demonstrate that the aggregated annual dose does not exceed the annual dose objectives of 10 CFR 63.111(a)(2), for off-site members of the public and the annual dose limits, for *on-site persons (public and workers)*, in Part 20.[21]

In sum, DOE's ALARA obligation to workers is limited to workers who are exposed to radioactivity at the Yucca Mountain site. DOE does not have an obligation to consider how its actions may affect the doses received by workers at nuclear power plants that are remote from the Yucca Mountain site.

B. DOE is only required to demonstrate to the NRC that the repository complies with applicable safety and environmental regulations, not that it complies without incurring unnecessary costs.[22]

NEI does not provide any statutory or regulatory support for its assertion that DOE is required to demonstrate that the repository design will not result in unnecessary expenditures. NEI claims that "the unnecessary margin built into the criticality analysis will result in unnecessary costs to be paid from the Nuclear Waste Fund."[23] As an initial matter, NEI admits that licensing proceedings under the Atomic Energy Act (AEA) and National Environmental

---

20 *See* DOE Initial Brief on NEI-Safety-05 at 6-8.

21 Division of High-Level Waste Repository Safety—Interim Staff Guidance, HLWRS-ISG-03 Preclosure Safety Analysis—Dose Performance Objectives and Radiation Protection Program (May 23, 2007) (LSN# DN2002481852) (emphasis added).

22 NEI Initial Brief at 12. Even though it recognizes the limits of the agreed-upon legal issue, NEI attempts to raise issues regarding other alleged consequences that result from insertion of control rods, including "unnecessary operational complexity and increased environmental impacts caused by the control rods . . . and potential licensing delays with respect to TAD canisters or with respect to this proceeding." *Id*. Furthermore, the title of Section B of NEI's Brief is "DOE Must Demonstrate that the Repository Meets Applicable Safety and Environmental Standards, *Without Unnecessary Margin*." *Id*. at 11 (emphasis added). NEI's arguments highlighted above and the title of this section of its Initial Brief do not address this legal issue and suggest a fundamental misunderstanding of what the legal issue is. The second portion of this legal issue *only* concerns whether DOE has to demonstrate to the NRC that there are no *unnecessary expenditures*.

23 *Id*. at 13.

Policy Act (NEPA) do not require the applicant to address cost when it asserts that "[t]he NWPA adds a factor [*i.e.*, cost] to the NRC licensing decision that does not exist in other NRC licensing proceedings based only on the . . . [AEA and/or NEPA]."[24] NEI then makes numerous assertions regarding why DOE is required to show that its repository design will not cause unnecessary expenditures.[25] It does not, however, cite any particular portion of the NWPA that says that DOE must demonstrate that its design can be implemented without causing unnecessary expenditures from the Nuclear Waste Fund.

In fact, as discussed in DOE's Initial Brief on NEI-Safety-05, DOE is only required to demonstrate to the NRC that the repository meets the applicable safety and environmental standards, not that its design will meet those requirements without unnecessary expenditures.[26]

III. Conclusion

For the foregoing reasons, DOE is not required to address the ALARA considerations at individual nuclear plant sites remote from the GROA. Furthermore, DOE's burden before the NRC is to demonstrate that the repository will meet applicable safety and environmental standards. DOE is not required also to demonstrate that the repository will meet those standards without incurring any alleged unnecessary expenditures.

NEV-SAFETY-009, -010, -011, -012, -013, and -019

I. Introduction

The legal issue before the Board is:

> Whether 10 C.F.R. § 63.305 requires DOE to project future levels of anthropogenic greenhouse gas emissions such as CO_2 and evaluate the impact of these gases on future climate at Yucca

---

[24] *Id*.

[25] *See id*. at 13-15.

[26] S*ee* DOE Initial Brief on NEI-Safety-05 at 8-9.

> Mountain in the 10,000-year performance assessment, or whether it is sufficient under that regulation for DOE to analyze the effects of anthropogenic greenhouse gas emissions on future climate based upon the historical geologic record.[27]

Nevada claims that nothing in 10 C.F.R. § 63.305 or any other NRC regulation "gives DOE the right to specify and analyze climate change processes (FEPs) based solely upon the geologic record."[28] Nevada supports this claim through a cursory review of the language in the regulation and by ignoring the extensive and directly relevant regulatory history. Nevada's position is incorrect, as demonstrated below and in the Initial Briefs filed by DOE and the NRC Staff.[29]

II. Argument

A. Nevada's Interpretation of § 63.305 Is Conclusory and Unsupported.

Nevada asserts that under 10 C.F.R. § 63.305, DOE "cannot ignore relevant and up-to-date scientific evidence and estimate climate change processes (a subset of [unspecified] FEPs) based solely upon the historical geologic record."[30] To support this conclusion, Nevada purports to parse the text of § 63.305.[31] DOE agrees that the text of a regulation that is clear on its face is controlling.[32] But the "plain language" of Part 63 simply does not establish what the disputed terms—"cautious, but reasonable assumptions" and "consistent with present knowledge"—mean.[33] However, the application of those terms in this context can be readily understood from the regulatory history, which establishes that the Commission intended DOE to be able to rely

---

27 Joint Proposal Identifying Phase 1 Legal Issues for Briefing at 1; *see* CAB 04 Order.

28 Nevada Initial Brief at 4.

29 *See* U.S. Department of Energy Brief on Nev-Safety-009, -010, -011, -012, -013 and -019 (Dec. 7, 2009) (DOE Initial Brief on Nev-Safety-009, -010, -011, -012, -013 and -019); NRC Staff Initial Brief at 11-15.

30 Nevada Initial Brief at 5.

31 *See id*. at 2-4.

32 *See Hydro Res., Inc.* (P.O. Box 777, Crownpoint NM 87313), CLI-06-14, 63 NRC 510, 516 (2006).

33 *See generally* DOE Initial Brief on Nev-Safety-009, -010, -011, -012, -013 and -019.

upon the geologic record.[34] In particular, as DOE demonstrated in its Initial Brief, in accordance with Congress's instructions in the Energy Policy Act of 1992, the EPA contracted with the National Academy of Sciences (NAS) to provide findings and recommendations on this and other issues. The NAS did so and its report recommended reliance on the geologic record.[35] The EPA then promulgated 40 C.F.R. § 197.15, which likewise required DOE to project changes in climate specifically based on the geologic record. In this regard, the EPA specifically concluded that "[t]he evidence preserved in the *relatively recent geologic record* provides a means to reasonably bound the range of possible conditions."[36] As Congress mandated, the NRC's current regulations are consistent with that EPA standard and should be interpreted to authorize use of the same geologic-record standard.[37] Indeed, just this year, the NRC re-affirmed that *"[a]ll climate predictions are based on and calibrated to evidence of past climates contained in the geologic record.*"[38]

In arguing for a different conclusion, Nevada relies primarily on a single fragment of text from the Commission's extensive Statements of Consideration on the topic of climate change in the Part 63 Final Rule. That fragment reads as follows: "the Commission [stated], among other things, that 'it is important to include the consideration of climate change in both the geosphere and the biosphere performance assessment calculations to ensure that the conceptual model of

---

34 *See U.S. Department of Energy* (High-Level Waste Repository), CLI-08-12, 67 NRC 386, 391 (2008) ("Recourse to regulatory history is not necessary *unless the language and structure of the regulation reveal an ambiguity that must be resolved*.") (emphasis added) (*citing Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-900, 28 NRC 275, 288 (1988)).

35 *See* NAS, Technical Bases for Yucca Mountain Standards at 9, 77-78, 91-92 (Aug. 1, 1995).

36 66 Fed. Reg. at 55,757 (emphasis added).

37 DOE Initial Brief on Nev-Safety-009, -010, -011, -012, -013 and -019 at 5.

38 Implementation of a Dose Standard After 10,000 Years, 74 Fed. Reg. 10,811, 10,818 (Mar. 13, 2009) (emphasis added).

the environment is consistent with our scientific understanding of reasonably anticipated natural events.'"[39]

This fragment, on its face, does not support Nevada's argument, much less does it do so when read in the context of the rest of the relevant regulatory history. Indeed, the language quoted by Nevada does not even address the relevant legal issue. The quotation addresses "reasonably anticipated *natural events*," not anthropogenic effects.[40] The text on which Nevada relies is therefore simply not relevant. Nor does Nevada even discuss, much less refute, the significant evidence from the regulatory history, discussed above and in the Initial Briefs, demonstrating that a different conclusion is compelled here. Nevada's Initial Brief thus makes no attempt to harmonize Nevada's reading of this single fragment with the rest of the regulatory history.[41]

In the end, Nevada, dissatisfied with the outcome of the Part 63 rulemaking, essentially asks the Board to revise the Commission's determination as to how climate change is considered in the first 10,000 years. This is impermissible, because under 10 C.F.R. § 2.335(a), no rule or regulation of the Commission is subject to attack in a Commission adjudicatory proceeding absent a waiver petition containing the requisite showing of "special circumstances," which has not been made.[42] Therefore Nevada may not advocate stricter requirements than the NRC rules impose.[43]

---

39 Nevada Initial Brief at 4-5 (*quoting* 66 Fed. Reg. at 55,757).

40 66 Fed. Reg. at 55,757.

41 Nevada also makes additional arguments based on the interplay between 10 C.F.R. §§ 63.342 and 63.305. According to Nevada, the only "qualifications" on the term "cautious, but reasonable assumptions" are found in § 63.342. This claim ignores the regulatory history of § 63.305 discussed above.

42 *See Tenn. Valley Auth.* (Bellefonte Nuclear Power Plant, Units 3 & 4), CLI-09-03, 69 NRC __, slip op. at 9 (Feb. 17, 2009).

43 *See Fla. Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), LBP-01-6, 53 NRC 138, 159, *aff'd*, CLI-01-17, 54 NRC 3 (2001).

B. There Is No Technical Dispute with DOE's Application.

Nevada concludes its brief by asserting that "how the effects of anthropogenic greenhouse gas emissions on climate change should be considered presents a technical question, not a legal one."[44] Similarly, Nevada claims that "[i]f DOE intends to argue that the effects of anthropogenic greenhouse gas emissions on climate are enveloped in the TSPA by climate changes based on the geologic record . . ., then the issues presented by the relevant Nevada contentions are purely technical."[45] These statements are incorrect, as applied to the current situation.

Based upon analyses by the NAS, the EPA, and its own technical Staff, the Commission's 2001 Final Rule has already resolved the technical question, by permitting reliance on the geologic record, and the appropriate result at this point is to apply the Commission's established rule.[46] Nevada's contentions do *not* challenge the *manner* in which DOE has used the geologic record to model climate change, or the adequacy of the LA under § 63.305 (as correctly interpreted), so there is no factual dispute with DOE.[47] Instead, there is only a challenge to the Commission's rule. As noted above, that challenge is not subject to litigation in this proceeding.

III. Conclusion

Nevada provides no legal authority in support of its interpretation of the alleged plain language of the regulation. Instead, the initial round of pleadings makes it clear that the legal

---

44 Nevada Initial Brief at 4.

45 *Id*. at 2 n.1.

46 *See* DOE Initial Brief on Nev-Safety-009, -010, -011, -012, -013 and -019 at 3-5; NRC Staff Initial Brief at 12-14.

47 Nevada is therefore also incorrect when it states that, to resolve this legal issue in DOE's favor would require the conclusion that DOE is "legally entitled to ignore the effects of anthropogenic greenhouse gas emissions." Nevada Initial Brief at 5. Instead, DOE accounts for such effects in the manner specified by the Commission: through reliance on the geologic record.

issue raised in these contentions is a challenge to a Commission rule and must be dismissed on legal grounds. In fact, acceptance of Nevada's argument would result in the very speculation that the Commission sought to avoid in its rule. Specifically, given the fact that society has begun to address human-induced global warming and the dire consequences for civilization of not dealing with this issue, it would be utterly speculative to attempt to project the effect of human activity on climate change over a 10,000-year period.

NEV-SAFETY-202 and Postclosure Aspects of NEV-SAFETY-011 and -019

I. Introduction

According to Nevada, the legal issue to be resolved is:

> Whether 10 C.F.R. § [63].342(c) requires climate change processes included as FEPs in the first 10,000 years to be carried forward for the next 990,000 years.[48]

Nevada incorrectly claims that 10 C.F.R. § 63.342(c) requires DOE to use the same methodology used for assessment of climate change during the first 10,000 years after repository closure to assess climate change through the period of geologic stability.[49] As discussed below, Nevada's argument is incorrect.

II. Argument

Nevada misconstrues 10 C.F.R. § 63.342(c). Nevada's position is not only contrary to the clear language of § 63.342(c), but also is wholly inconsistent with the extensive regulatory

---

[48] *See* Nevada Initial Brief at 6. The NRC Staff has interpreted the legal issue similarly. *See* NRC Staff Initial Brief at 15-16.

[49] It is DOE's understanding that Nevada is arguing that if climate change is analyzed as a FEP in the first 10,000 year period, then the same methodology used during the first 10,000 years must be used for the post-10,000 year performance assessment, rather than the methodology permitted under 10 C.F.R. § 63.342(c)(2). *See id*.; State of Nevada's New Contentions Based on Final NRC Rule at 2, 4 (May 12, 2009).

history, which makes it clear that EPA and NRC intended the use of a specified deep percolation rate for modeling climate change for the post-10,000 year period.

Nevada's legal position relies on the use of the phrase "and also" at the end of the first paragraph in § 63.342(c).[50] Nevada incorrectly reads that phrase to require that DOE extrapolate its climate change analyses for the first 10,000 year period into the post-10,000 year period in lieu of utilizing the deep-percolation flux rate methodology specified in § 63.342(c)(2).[51] As explained in DOE's Initial Brief, the logical reading of the regulation is that the phrase "and also" is designed to ensure that DOE consider the effects of four specific factors—climate change, and seismic, igneous and general corrosion effects—in the post-10,000 year period, even if these factors were not required to be analyzed in the pre-10,000 year period.[52] Indeed, with respect to each of these four factors, the pertinent clause of § 63.342(c) provides that the analysis "may be limited" to a particular analytical method appropriate to each.[53]

In its Initial Brief, the NRC Staff explains that "and also" in § 63.342(c)(2) "was intended to qualify the directive to carry forward all FEPs from the 10,000 year performance assessment using the constraints described in § 63.342(c)(1), (c)(2), and (c)(3)."[54] Indeed, that is what DOE

---

50 *See* Nevada Initial Brief at 6-7 (citing the language of § 63.342(c) that "DOE must evaluate all of the features, events, or processes included in paragraph (a) of this section, and also: . . . (2) DOE must assess the effects of climate change.").

51 *See id.* at 6-8.

52 *See* U.S. Department of Energy Brief on Nevada-Safety Contention 202 and Post 10,000 Year Aspects of Nevada-Safety Contentions 011 and 019 at 3-4 (Dec. 7, 2009) (DOE Initial Brief on NEV-SAFETY-202).

53 Thus, DOE "must assess" the effects of climate change, but its analysis "*may be limited to*" use of deep-percolation-flux rates. § 63.342(c)(2) (emphasis supplied). Similarly, DOE "must assess" seismic and igneous activity, § 63.342(c)(1), but its analysis of seismic events "*may be limited to*" damage to drifts in the repository, failure of waste packages, and changes in water table levels, § 63.342(c)(1)(i), and the analysis of igneous events "*may be limited to*" volcanic effects directly intersecting the repository. § 63.342(c)(1)(ii) (emphasis supplied). Similarly, DOE "must assess" general corrosion, but "*may use*" a constant representative corrosion rate. § 63.342(c)(3) (emphasis supplied). In each case, the requirement to assess a scenario in the post-10,000-year period is given context by a permitted specified methodology.

54 NRC Staff Initial Brief at 18.

has done. DOE included climate change in the post-10,000 year assessment, and performed the analysis in accordance with the method permitted by § 63.342(c)(2).

The regulatory history of § 63.342(c) reinforces the conclusion that this provision was created to *focus* analysis in the post-10,000 year period to the most important effects of climate change, not to require duplicative or speculative analyses — regardless of whether a climate change FEP was included or excluded in the first 10,000 years. As explained in DOE's Initial Brief, the EPA expressed significant concern with modeling certain aspects of repository performance over a million-year period.[55] The NRC shared the EPA's concerns with the unavoidably speculative nature of attempts to predict climate change over the million-year period.[56] In promulgating its final rule, the NRC clarified its requirements with respect to those FEPs, such as climate change, for which the rule required analysis in the post-10,000 year period, but also permitted use of a specified methodology.[57] The NRC's stated intent in prescribing the limitations in § 63.342(c) was to *focus* the analysis for the post-10,000 year period on "those aspects of the FEPs considered most important to performance and the treatment of the uncertainties used in the performance assessment for the initial 10,000 years."[58]

---

55 *See* DOE Initial Brief on NEV-SAFETY-202 at 5.

56 *See* DOE Initial Brief on NEV-SAFETY-202 at 7.

57 *See* 74 Fed. Reg. at 10,818. Using the seismic analysis also set forth at § 63.342(c) as an example, the NRC explains:

> [T]he consideration of seismic events in the performance assessment for the period after 10,000 years would be based on the same seismic hazard curve, including its uncertainties, that was used in the performance assessment for the initial 10,000 years. However, the analysis for the period after 10,000 years *would only consider the aspects of the seismic events that might be the most important to repository performance* . . ..

Id. (emphasis added). The fact that the analyses and uncertainties for all aspects of seismic events had already been developed for the first 10,000 year period does not change the NRC's position that, under § 63.342, they need not all be carried through the longer timeframe. The same is true of the climate change analysis.

58 *Id*.

The NRC Staff agrees with DOE's interpretation of the regulation. As summarized by the Staff in its Initial Brief:

> Because the Commission chose a range of deep percolation values that already incorporates processes and effects related to climate change, it would be unnecessary and counter to the norms of regulatory interpretation to require DOE to carry forward any climate change FEPs from the initial 10,000 year period. The EPA and NRC rulemakings limited what DOE was required to consider with respect to climate change FEPs to that described in 40 C.F.R. § 197.36(c) and 10 C.F.R. § 63.342(c) for the post 10,000 year period.[59]

In sum, both the language of § 63.342 and its regulatory history are clear that DOE must analyze the effects of climate change in the post-10,000 year period and that it may do so using the deep percolation methodology set forth in 10 C.F.R. § 63.342(c).

III. Conclusion

As a matter of law, DOE may use the deep percolation rates specified in § 63.342(c)(2) as the exclusive method to analyze the effects of climate change in the post-10,000 year period.

NEV-SAFETY-041

I. Introduction

The legal issue before the Board is:

> Whether 10 C.F.R. § 63.342(c) requires the post-10,000 year performance assessment to include the continued effects of erosion if, assuming for purposes of legal argument, in the 10,000-year assessment erosion is shown to increase infiltration and seepage rates and thereby be potentially adverse to performance, with that potential increasing over time both before and after 10,000 years, but there is no showing that erosion causes increases in radiological exposures or releases within the first 10,000 years.[60]

---

[59] *See* NRC Staff Initial Brief at 19.

[60] Joint Proposal Identifying Phase 1 Legal Issues for Briefing at 3.

For the reasons discussed below, the Board should find that: (1) whether a feature, event or process (FEP) must be included in the post-10,000 year performance assessment is governed by § 63.342 (and not by § 63.102(j) as Nevada asserts in its Initial Brief); and (2) DOE is not required to include an erosion FEP in the post-10,000 year performance assessment unless the FEP will result, during the first 10,000 years after repository closure, in a significant change in the magnitude and timing of radiological exposures to the reasonably maximally exposed individual (RMEI) or in radiological releases to the accessible environment.[61]

II. Argument

A. Section 63.342, not Section 63.102(j), governs whether a FEP must be included in the post-10,000 year performance assessment.

The resolution of this issue turns on both the agreed-upon definition of the legal question and on which regulation (§ 63.342 or § 63.102(j)) governs whether a FEP must be included in the post-10,000 year performance assessment. First, DOE and Nevada agreed that the legal issue before the Board was how to interpret § 63.342(c).[62] There is no mention of § 63.102(j) (which refers to FEPs "potentially adverse to performance") in the statement of the legal issue.[63] Nevada does not use § 63.102(j) to support its interpretation of § 63.342(c). Instead, it states that the "regulatory language [of § 63.102(j)] is dispositive."[64] Nevada is, in effect, attempting to change the legal issue before the Board, and therefore Nevada's arguments on § 63.102(j) should be dismissed on that basis alone.

---

61 Section 63.342(a), of course, also includes a probability criterion not at issue in the context of the above legal issue.

62 *See* CAB 04 Order; Joint Proposal Identifying Phase 1 Legal Issues for Briefing at 3.

63 *See id*.

64 Nevada Initial Brief at 10.

In any event, Nevada is wrong on the merits. Whether a FEP must be included in the performance assessment for the period after 10,000 years is governed by § 63.342, not § 63.102(j).

Section 63.102(j) does not contain the criteria that DOE must use to determine whether a FEP must be included in the post-10,000 year performance assessment. Section 63.102 is titled "Concepts."[65] By its own terms, § 63.102 merely "provides a functional overview of . . . Subpart E [*i.e.*, §§ 63.101, 63.102, 63.111-63.115, and 63.121]."[66] In this regard, in the preamble to the 2001 final rule, the Commission stated that Subpart E, "*except for . . . § 63.102, 'Concepts' . . .* contains performance objectives for the geologic repository operations area through permanent closure (preclosure) and the geologic repository after permanent closure (postclosure) . . . , and requirements for the analyses used to demonstrate compliance with the performance objectives."[67] Thus, the Commission has specifically stated that § 63.102 (unlike other regulations in Subpart E) does not contain requirements with which the analyses used to demonstrate compliance with the performance objectives must comply (*e.g.*, like requirements that must be followed to determine which FEPs should be included in performance assessments for the repository).

By contrast, § 63.342 does govern whether a FEP must be included in the post-10,000 year performance assessment. In promulgating § 63.342, the Commission specifically stated that "[t]his section specifies how DOE will identify and consider features, events and processes in the dose assessments described in Subpart L to Part 63."[68] In response to a comment about whether

---

65 10 C.F.R. § 63.102.

66 *Id*.

67 66 Fed. Reg. at 55,782 (emphasis added).

68 74 Fed. Reg. at 10,827.

"FEPs that are screened-in for the first 10,000 years after repository closure are the only FEPs that need [to] be considered for the entire post-closure period," the Commission stated that "[t]he requirements for FEPs to be included in the performance assessment for the period after 10,000 years are specified at § 63.342."[69] That conclusion is controlling here.

B. The FEPs included in the post-10,000 year performance assessment are limited to those that cause a significant change to the results of the performance assessment for the first 10,000 years, or are specifically identified in § 63.342(c)(1)-(3).

In its Initial Brief, DOE explained the process under § 63.342 for determining whether a FEP must be included in the post-10,000 year performance assessment.[70] Under § 63.342(c), only those FEPs included in the performance assessment for the first 10,000 years and certain seismic, igneous, climate change and general corrosion FEPs specified in § 63.342(c)(1)-(3) are required to be included in the post-10,000 year performance assessment.[71] Pursuant to § 63.342(a), FEPs that must be included in the performance assessment for the first 10,000 years are limited to those that will cause a significant change in the results of the performance assessment.[72] This means that, under § 63.342, only those FEPs that will cause a significant change in the magnitude and timing of radiological exposures to the RMEI or of radiological releases to the accessible environment during the first 10,000 years after closure (and those specified at § 63.342(c)(1)-(3)) must be included in the post-10,000 year performance assessment.[73]

---

69 *Id*. at 10,817.

70 U.S. Department of Energy Brief on Contention Nev-Safety-041 at 2-4 (Dec. 7, 2009) (DOE Initial Brief on NEV-SAFETY-041).

71 *Id.* at 2.

72 *See id.* at 3-4.

73 *Id*.

Erosion is not one of the FEPs specified in § 63.342(c)(1)-(3) that must be considered in the post-10,000 year performance assessment. Therefore, erosion must be considered as a FEP in the post-10,000 year period only if it is included as a FEP for the initial 10,000 year period pursuant to § 63.342(a). Nevada states that § 63.102(j) requires the consideration of the land surface erosion FEP "if it is expected to materially affect compliance with the dose standard referred to in 10 C.F.R. § 63.113(b), *or* if it is expected to be 'potentially adverse to performance.'"[74] While Nevada fails to articulate why the language of § 63.102(j) is relevant to the application of § 63.342(a),[75] it appears to be arguing that the language in § 63.342(a)[76] should be construed to mean the same thing as the above-quoted language in § 63.102(j).[77]

DOE does not dispute that the above-quoted language of § 63.102(j) can be read to mean the same thing as the first sentence of § 63.342(a). Both provide for screening out FEPs on the basis of probability. There is no language in § 63.102(j), however, that is contrary to or inconsistent with the second sentence of § 63.342(a) that provides for screening out FEPs on the basis of consequence. Even if one assumes there is a potential adverse effect on performance, there may be no significant change in the *results* of the performance assessment, *i.e.*, no significant change in the magnitude and timing of radiological exposures to the RMEI or of radiological releases to the accessible environment. The agreed-upon legal issue explicitly

---

74 Nevada Initial Brief at 10 (emphasis in original).

75 *Id.*

76 Section 63.342(a) states: "DOE's performance assessments conducted to show compliance with §§ 63.311(a)(1), 63.321(b)(1), and 63.331 shall not include consideration of very unlikely features, events, or processes, i.e., those that are estimated to have less than one chance in 100,000,000 per year of occurring. In addition, DOE's performance assessments need not evaluate the impacts resulting from any features, events, and processes or sequences of events and processes with a higher chance of occurring if the results of the performance assessments would not be changed significantly in the initial 10,000-year period after disposal." *See* 10 C.F.R. § 63.342(a).

77 Section 63.102(j) states: "Those features, events, and processes expected to materially affect compliance with § 63.113(b) or be potentially adverse to performance are included, while events (event classes or scenario classes) that are very unlikely (less than one chance in 10,000 over 10,000 years [which is the same as one chance in 100,000 per year]) can be excluded from the analysis." *See* 10 C.F.R. § 63.102(j).

requires the Board and parties to assume "there is *no* showing [of any] increases in radiological exposures or releases within the first 10,000 years."[78] One cannot credit this portion of the CAB-approved legal issue, and at the same time, speculate that a "potential adverse impact" could cause an increase in doses or releases within the first 10,000 year period, let alone a "significant" one, that would prevent DOE from exercising the discretion granted by § 63.342(a) to exclude FEPs which would not significantly change the results of the performance assessment.

Finally, Nevada misstates a statement in the SAR to suggest that DOE and Nevada are in agreement on the significance of a potential impact on an intermediate element of the post-closure analysis, such as infiltration or seepage rates. Nevada quotes the SAR as follows:

> to the extent a particular FEP has no significant effect on radiological exposure, or radionuclide release, *or on an intermediate-performance measure that can be linked to radiological exposure or radionuclide release*, that FEP can be excluded (screened out) . . . .[79]

When read in context the obvious point of this excerpt from the SAR was to recognize a simple fact: if a FEP can have no significant effect on an "intermediate" performance measure that could be linked to doses or releases, there is no reason for further evaluation because there can be no significant effect on dose, and the analysis can therefore be truncated. It does not follow that the inverse of this statement is also true. DOE emphatically disagrees with Nevada's suggestion in its Initial Brief that DOE has admitted that it is "prohibite[d]" from screening out a FEP that may have some effect on an intermediate performance measure like infiltration or seepage.[80]

---

78 Joint Proposal Identifying Phase 1 Legal Issues for Briefing at 3 (emphasis added).

79 Nevada Initial Brief at 10 (quoting SAR § 2.2.1.2 at 2.2-17) (emphasis in original).

80 *Id.*

III. Conclusion

For the reasons stated above, the Board should find that: (1) § 63.342(c) requires DOE to include a FEP in the post-10,000 year performance assessment if and only if the FEP is included in the performance assessment for the first 10,000 years, or if the FEP is identified in § 63.342 (c)(1-3); (2) § 63.342(a) is explicit that the performance assessment for the first 10,000 years need not include any FEP if its inclusion would not change the results of the performance assessment significantly in the initial 10,000-year period after disposal; and (3) the inclusion of a FEP on erosion could not change the results of the performance assessment (much less change the results significantly) in the initial 10,000-year period after disposal if there is no showing that erosion causes increases in radiological exposures or releases within the first 10,000 years. It would be contrary to the regulatory language and the intent of NRC and EPA to require DOE to include a FEP simply because the FEP may have a potential adverse effect on an intermediate performance measure like infiltration or seepage, where there is no showing this potential effect could change the results of the performance assessment (that is, significantly increase radiological exposures or releases).

NEV-SAFETY-146 and -201

I. Introduction

The legal issue before the Board is:

> Whether, under 10 CFR Part 63, DOE is required to provide and rely upon final design information in the LA.[81]

DOE's Initial Brief articulated the reasons why this question should be answered in the negative, based on the plain language of Part 63, its regulatory history, and historical NRC practice. As

[81] Joint Proposal Identifying Phase 1 Legal Issues for Briefing at 3.

discussed therein, there are multiple provisions of Part 63 that make it clear that a "final" design is not required at the Construction Authorization stage.[82] Those explicit provisions are supported by a clear regulatory history and prior Commission practice.[83]

II. Argument

A. Design Detail and Finality

In its Initial Brief, Nevada alleges that a "final" design is required and that "[a] final design would be a level of design detail equivalent to the level of design detail provided in a Final Safety Analysis Report for a nuclear power reactor."[84] Nevada goes on to allege that DOE's LA relies on "preliminary or conceptual" design information.[85] Apparently in Nevada's view if the design is not "final" it must be "preliminary or conceptual" and therefore cannot provide sufficient detail. DOE disagrees with Nevada's characterization that the design information set forth in the LA is "preliminary or conceptual" and the implication that the level of detail is insufficient. However, the legal question before the Board is whether there is a legal requirement to include "final" design in the LA. The specific level of detail (short of "final" design) that is sufficient at the Construction Authorization stage is a factual matter not presently before the Board under this legal issue.[86]

Nevada attempts to make much of the fact that there will be only "one" application, "to be reviewed in sequential stages" and that application will be "merely" (Nevada's words)

---

82 *See* U.S. Department of Energy Brief on Consolidated Contentions Nev-Safety-146/Nev-Safety-201 at 2-5 (Dec. 7, 2009) (DOE Initial Brief on Consolidated Contentions Nev-Safety-146/Nev-Safety-201).

83 *See id*. at 5-10.

84 Nevada Initial Brief at 11. Nevada cites no legal basis for its position that *under Part 63*, "final" design information should be construed as the "equivalent" level of detail provided in a reactor FSAR.

85 *Id.* at 11-12.

86 Nevada cites a 2007 DOE "Master Risk Register" document (LSN# DN20024700358) which suggests a "risk" that the level of design might be "Insufficient for the NRC Acceptance Review and Docketing." Nevada Initial Brief at 12. This merely reflects DOE's awareness that its design detail had to be sufficient for the NRC to accept the LA for docketing, which the NRC has done, making this a moot point not before the Board.

updated at the receipt and possession stage.[87] Nevada cites 10 C.F.R. §§ 63.21, 63.24, 63.31 and 63.41.

Nevada states that Part 63 "does not refer" to preliminary design, which is true. However, Part 63 contains no language that can be construed to require a "final" design at this stage. A review of the relevant provisions of Part 63 demonstrates that they require DOE to submit an LA that provides sufficient information to demonstrate compliance with the performance objectives and other requirements of Part 63, but that they also afford DOE the flexibility to further refine the design based on new information. The regulations do not impose a legal requirement to submit a "final" design at the Construction Authorization stage.

In particular, § 63.21 defines the content of the LA. Nevada has identified no part of that provision that requires submission of a final design in connection with submission of the LA. Even more to the point, Part 63 requires DOE to identify in its LA items that "might affect design" or that "may significantly influence the *final* design," and to "update" the LA in accordance with specified criteria, including "additional … design and other data obtained during construction" and "[o]ther information bearing on the Commission's issuance of a license that was not available at the time a construction authorization was issued."[88] These provisions would make no sense if DOE's design was required to be "final" at the time of LA submittal. Moreover, § 63.31 identifies the criteria to be used by the NRC to determine whether to issue the Construction Authorization. Nevada has not identified in its Initial Brief any missing information that would preclude the NRC from making these findings, nor has it explained why those criteria require a "final design" at this stage.

---

87 *See* Nevada Initial Brief at 12-14.

88 10 C.F.R. §§ 63.21(c)(1), (c)(3), 63.24(b); *see* DOE Initial Brief on Consolidated Contentions Nev-Safety-146/Nev-Safety-201 at 2.

Finally, § 63.41 sets forth the findings to be made for issuance of the receipt and possession license, and specifically anticipates that those findings will be based in part on a determination that the Geologic Repository Operations Area (GROA) has been substantially completed in conformity with "the application *as amended*."[89] This clearly contemplates modifications, as necessary, to the LA to ensure that the § 63.41 findings can be made. Nevada correctly states that in Part 63 "[t]here are no requirements to submit a 'final' Safety Analysis report."[90] The above regulations set forth an LA and LA amendment process particular to Part 63 that are sufficient to allow the NRC to obtain the requisite information to make the necessary regulatory findings.

B. History of Part 63 Relative to Parts 50 and 60

Nevada discusses the regulatory history of Parts 50 and 60.[91] Nevada points out that in the two-step licensing process under Part 50, there is a requirement for a Preliminary Safety Analysis Report to support the Construction Permit and a Final Safety Analysis Report to support issuance of the Operating License.[92] No such process is set forth in Part 63. Instead, there is a set of requirements[93] providing for the LA to be updated to address the findings needed for issuance of the receipt and possession license.[94]

---

89 10 C.F.R. § 63.41 (emphasis added).

90 Nevada Initial Brief at 13.

91 *See id.* at 14-19.

92 *See id.* at 14-16.

93 *See* 10 C.F.R. § 63.24.

94 The regulatory requirements in Parts 63, 50 and 60 are different, but the basic two-step process is relatively similar.

Nevada also cites SECY-80-474, "the Commission decision paper on the final [Part 60] rule," which discusses the standard that DOE provide information "reasonably available at the time of docketing."[95] Nevada quotes that SECY as follows:

> [I]f the issue is one that is important *at the construction authorization stage*, the reasonably available standard [in § 60.24(a)] is intended to require DOE to develop and provide information in detail.[96]

Nevada goes on to state that:

> A broader reading, that no information (including final design information) need ever be included in the license application if it was not "reasonably available at the time of docketing" would completely eviscerate 10 C.F.R. § 60.21 ….[97]

The plain language above (which relates to Part 60, not Part 63) does not support Nevada's position. First, the quote from the SECY paper talks explicitly about information "important at the construction authorization stage." This underscores the multi-phased nature of the repository licensing process, as well as the fact that this must be information important at this stage of the proceeding, and other information important at later stages of the proceeding (*e.g.*, such as at the time of the receipt and possession licensing) can be provided later via an amendment to the LA.

Second, contrary to Nevada's statement about a "broader reading" above, it is not and never has been DOE's position that the "reasonably available" language allows it to provide *any* modicum of information, no matter how sparse, and still satisfy the regulations. The "reasonably available" language in the rules does not eliminate the need to produce adequate information to support the findings for issuance of a Construction Authorization. By the same token, in no way

---

[95] Nevada Initial Brief at 17 (citing SECY-80-474 (memorandum requesting finalization of 10 C.F.R. Part 60, Disposal of High-Level Radioactive Wastes In Geologic Repositories – Licensing Procedures (Oct. 17, 1980) (LSN# NRC000024671))).

[96] *Id*. (quoting SECY-80-474 at Enclosure B) (emphasis added).

[97] *Id.*

does the need to provide such adequate information translate into an unstated requirement to provide "final" design information or information needed to support receipt and possession licensing. Nevada simply cannot fairly rely on these provisions and rationales relating to Parts 50 and 63 to override the plain language of Part 63 and the logical licensing structure set forth therein.

Finally, Nevada quotes directly from the notice of final rulemaking on Part 63 as follows:

> DOE must provide *sufficient information at each stage of the licensing process to support that stage*, and DOE must provide sufficient detail necessary to allow NRC to review DOE's design.[98]

This quote underscores the need to ensure that sufficient information is provided at "each stage … to support that stage" rather than that a full "final" design is required at the outset.

III. Conclusion

In short, there is no legal requirement that DOE must submit a "final" repository design at this stage of the proceeding.

NEV-SAFETY-149

I. Introduction

The legal issue before the Board is:

> [w]hether, under 10 C.F.R. § 63.114, DOE may rely upon its quality assurance program and procedures as a basis for excluding from consideration in the TSPA potential deviations from repository design or errors in waste emplacement.[99]

Nevada's overall position on this issue appears to be that DOE may not screen out of detailed consideration in the TSPA, potential deviations from the repository design or errors in

[98] *Id.* at 20 (quoting 66 Fed. Reg. at 55,739) (emphasis added).

[99] Joint Proposal Identifying Phase 1 Legal Issues for Briefing at 4.

waste emplacement caused by human error on "purely legal grounds," but instead must use the same frequency and consequence criteria that apply to other FEPs.[100] DOE agrees with Nevada that potential deviations from repository design or errors in waste emplacement caused by human error may not be excluded, as a matter of law, merely because DOE has a QA program. However, there is nothing in Part 63 that prevents DOE from taking the effects of its QA program into account in deciding whether to include or exclude a particular FEP based on the frequency and consequence criteria.

II. Argument

A. DOE's Disposition of FEP 1.1.03.01.0A

The relevant FEP (FEP 1.1.03.01.0A) was excluded by DOE based on the consequence and probability criteria of § 63.114.[101] DOE did not exclude the FEP on the basis of a view that events covered by a QA program are excluded, as a matter of law, without a review of the probability or consequences. Specifically, the analysis of FEP 1.1.03.01.0A states, among other things:

> Repository construction, operation, and closure will be subject to a quality assurance program and quality control procedures that will evaluate and disposition any deviations from the design. Of particular relevance, control procedures imposed during the repository operation phase *will aim to ensure that any errors in waste emplacement are rectified before repository closure*.
>
> Inadequate quality controls on operational issues such as these are discussed in detail in excluded FEP 1.1.08.00.0A (Inadequate Quality Control and Deviations from Design), and are excluded

---

100 *See* Nevada Initial Brief at 21.

101 *See* U.S. Department of Energy Brief on Nevada-Safety Contention 149 at 3, n. 6 (Dec. 7 2009) (DOE Initial Brief on NEV-SAFETY-149); *see also* SAR Table 2.2-5 at 2.2-210. DOE also had corrected an error (changed from "excluded by regulation" to "excluded on the basis of low consequence") in the *Features, Events, and Processes for the Total System Performance Assessment: Analyses*, ANL-WIS-MD-000027 REV 00 (LSN# DEN001584824) (FEP Analyses Report). *See Scientific Analysis/Calculation Error Resolution Document*, ANL-WIS-MD-000027 ERD 01, dated May 23, 2008, (LSN# DEN001595379) at 2.

> from the performance assessments. *As a result of the rigorous quality assurance/quality control requirements* governing emplacement of waste packages and inspection and approval of such emplacement, *errors in emplacement location resulting in waste packages being placed substantially closer to each other than specified by design, or being placed on a known fault, are not expected. The regulatory requirements for performance confirmation and quality assurance require that any deviation from design be evaluated for potential impact, and that significant deviations which are detected during the operational period be corrected*.[102]

This language focuses on the ability of the QA program to detect and prevent significant deviations and thereby reduce potential consequences.[103]

B. DOE Has Accounted for, and not Arbitrarily Excluded, Human Error in FEP Screening.

Nevada erroneously claims that DOE's position is that human errors may be ignored (screened out) in conducting the TSPA, "*no matter how likely they may be and no matter what their consequences may be*."[104] That is not DOE's position. In excluding FEP 1.1.03.01.0A on the basis of low consequence, DOE made a technical determination that this FEP will have no significant impact on the doses predicted by the TSPA.

Contrary to Nevada's claim that "DOE's legal position with respect to NEV-SAFETY-149 is at odds with its licensing practice and legal position with respect NEV-SAFETY-147 and 148"[105] (both relating to potential drip shield installation errors), the fact that DOE screened-in some FEPs involving potential human errors, while screening out FEP 1.1.03.01.0A, illustrates that the screening of these FEPs was based on technical judgments about whether such FEPs will

---

102 FEP Analyses Report at 6-39 (emphasis added).

103 Since its submission of the license application, DOE has submitted a more detailed analysis of FEP 1.1.03.01.0A in response to the NRC's request for additional information. This more detailed analysis supports the initial determination that this FEP is excluded based on low consequence. Letter to John H. Sulima, NRC, from Jeffrey R. Williams, DOE, Mar. 4, 2009, Enclosure 1 (LSN#DEN001611309) at 4. Nevada has not raised any issues regarding this more detailed analysis.

104 Nevada Initial Brief at 22 (emphasis added).

105 *Id.*

have a significant effect on TSPA results, and not on some purely legal grounds. This is clearly shown by the discussion of FEP 1.1.08.00.0A "Inadequate Quality Control and Deviations from Design," which summarizes the analysis results for a number of other human error FEPs and the bases for their inclusion or exclusion.[106]

Nevada also argues that the characterization of the FEP "concept" in 10 C.F.R § 63.102(j) is "manifestly incomplete," in that it omits any description of "events."[107] Nevada then argues that the term "events" encompasses human errors, since neither the text of Part 63 nor its history contains any exclusion for human error or any statement that quality assurance *per se* may be a basis for excluding any event.[108] From this, Nevada contends that deviations from the repository design or errors in waste emplacement caused by human error can only be excluded based on their probability or consequences.[109] Nevada does not challenge DOE's determination that the probability and consequences of this particular FEP meet the criteria for exclusion based on low consequence. Nevada also does not claim that DOE omitted any "events" from its analysis.

III. Conclusion

DOE and Nevada appear to agree that while the coverage of a potential event by a QA program does not operate as a matter of law to exclude consideration of a FEP, the effects of a QA program can be taken into account in determining the probability and consequences of the event.

---

106 FEP Analyses Report at 6-52 to -61.

107 Nevada Initial Brief at 22-24.

108 *Id.* at 23-24.

109 *Id*. at 24.

NEV-SAFETY-161

I. Introduction

The legal issue before the Board is:

> [w]hether, under NWPA § 121(b)(1)(B) or 10 C.F.R. §§ 63.113 (a) through (d) and 63.115(a) through (c), DOE is required to evaluate the absence or failure of all drip shields.[110]

DOE properly designed the repository's multiple barrier system as an integrated whole. DOE is not required to demonstrate the independent contributions of drip shields or any other individual system component to repository performance. Although the legal issue asks whether DOE must consider the *absence* of all drip shields, Nevada did not address that issue in its Initial Brief. Rather, Nevada evidently concedes that DOE will install drip shields as provided in the LA.[111] Thus, the issue is whether DOE must consider the *failure* of all drip shields. In fact, as discussed below, DOE's performance assessment did consider the possible failure of drip shields, including the failure of *all* drip shields, as required by the criteria set forth in 10 C.F.R. § 63.342.

II. Argument

A. DOE Properly Assessed the Possibility of Drip Shield Failure in Accordance with the Regulatory Requirements.

DOE has satisfied the requirements of § 63.113 for a multiple barrier system. There is no dispute that DOE's system consists of engineered barriers, including drip shields, that work in concert with the natural geologic barrier. Nevertheless, Nevada insists that DOE must pretend

---

110 *See* Joint Proposal Identifying Phase 1 Legal Issues for Briefing at 4.

111 *See* Nevada Initial Brief at 25 ("The issue here is not whether, in evaluating DOE's LA, the NRC should presume that DOE will renege on its promise to install drip shields . . . ."). To the extent the Board addresses the issue of the absence of all drip shields, DOE respectfully refers the Board to the arguments in its Initial Brief on Nev-Safety-161.

that the drip shields will be "neutralized" and provide no protection.[112] Part 63, however, does not require the TSPA to be supplemented by evaluating what the results of the TSPA would be if a particular barrier or component such as the drip shields were removed from the analysis.

DOE did consider the possibility of drip shield failure as part of its analysis of FEPs that could impact the repository's performance based on the criteria set forth in §§ 63.114 and 63.342. It is undisputed that DOE considered FEPs that could "reasonably occur," including those that could cause drip shield failures.[113] DOE *included* FEPs involving seismic and igneous scenarios that could result in the failure of *all* drip shields.[114] DOE properly excluded from the performance assessment those scenarios that are unrealistic.[115] There is no requirement that DOE analyze the complete failure of drip shields or any other barrier component except in the context of these regulatory screening criteria. The regulations simply do not require the further "neutralization" analysis that Nevada demands.

B. The Regulations Do Not Require Redundancy or any Specific Measure of Protection from Individual Components of the Multiple Barrier System.

Nevada tries to impose performance assessment standards that exceed Part 63 requirements and that previously have been rejected by the D.C. Circuit. First, Nevada tries to impose a "defense in depth" concept to require an analysis that assumes an individual component of the engineered barrier system will be "neutralized." Nevada bases its argument on, and quotes at length from, statements in a 1998 draft white paper.[116] However, DOE did not rely on that draft white paper in preparing the SAR, nor was it relied upon in developing the TSPA. Nevada

---

112 *Id.* at 27.

113 *See* SAR § 2.2, Table 2.2-1; FEP Nos. 2.1.03.01.0B, 2.1.03.02.0B, 2.1.03.03.0B, 2.1.03.04.0B, 2.1.03.05.0B.

114 *See, e.g.*, SAR §§ 2.2.1.4.1.3.2.2, 2.2.1.4.1.3.2.4.

115 *See, e.g.*, 10 C.F.R. § 63.342 (requiring DOE to exclude low probability FEPs from the TSPA).

116 *See* Nevada Initial Brief at 25-27 (citing LSN# DN2001037869).

nevertheless asserts that DOE "already performed one or more drip shield neutralization analyses" and suggests that the existence of such analyses somehow creates a regulatory requirement to include this information in the LA.[117]

Nevada also incorrectly suggests that the regulatory definition of performance assessment "implies" that "redundancy" is required in the multiple barrier system.[118] The fact that the natural barriers and the engineered barrier system "work in combination" to "enhance the resiliency of the geologic repository"[119] hardly requires, as Nevada would have it, that the barriers perform redundant functions. Resiliency does not imply redundancy. Indeed, the NRC has made clear that the performance of the barrier system components "cannot and should not be considered either truly independent or totally redundant."[120] The Commission confirmed this in the final rule, stating that it would not prescribe "arbitrary, minimum performance standards for subsystems to build confidence in the system's overall performance."[121] The Commission discussed at some length its reasons for rejecting separate performance requirements for individual barriers: the need to provide design flexibility; the uncertainty of estimates yielded by subsystem evaluations; and the improvement in analytical techniques, which "obviate, in the Commission's view, the need to prescribe arbitrary, minimum performance standards for subsystems to build confidence in a system's overall performance."[122] Thus, a multiple barrier

---

117 *See id.* at 27. These analyses were undertaken in connection with a 2005 TSPA analysis that was not completed or published. The 2005 TSPA analysis was conducted using an older TSPA model (v.3.xxx) than the version (v5.005) used in the SAR for demonstrating Part 63 compliance. These materials are part of the historical analyses performed by DOE. The fact that DOE conducted these draft analyses does not create a Part 63 requirement.

118 *See id.* at 28.

119 10 C.F.R. § 63.102(h).

120 Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada, 64 Fed. Reg. 8,640, 8,648 (proposed Feb. 22, 1999).

121 66 Fed. Reg. at 55,758.

122 *Id*.

system means just that: the components must work in concert to enhance the repository's resiliency, but no single component has to meet any particular performance metric.

Nevada also asserts that each individual barrier's capability must be described "quantitatively."[123] Nevada is incorrect. Although the performance assessment as a whole must "quantitatively estimate radiological exposures to the reasonably maximally exposed individual at any time during the compliance period," there is no requirement that the performance of individual components of the multiple barrier system be quantified.[124] In fact, the D.C. Circuit previously rejected Nevada's argument:

> Section 121 [of the NWPA] does not, as Nevada contends, require that each barrier type provide a quantified amount of protection or, indeed, independent protection. Its silence instead gives NRC flexibility in determining how best to "provid[e] for the use of a system of multiple barriers in the design of the repository."[125]

Nevada makes much of recommendations from the Advisory Committee on Nuclear Waste (ACNW) that DOE should perform "hypothetical calculations wherein barriers are assumed to perform to a lesser degree than anticipated."[126] The ACNW's recommendations are not controlling. Moreover, the ACNW recognized that detailed guidance for demonstrating compliance of the multiple barrier system would be set forth in the YMRP.[127] Not surprisingly, Nevada does not reference the YMRP because the YMRP recommends no such analysis.[128] To the contrary, the YMRP explicitly rejects Nevada's approach:

---

123 *See* Nevada Initial Brief at 28.

124 *See* 10 C.F.R. § 63.102(j).

125 *Nuclear Energy Inst. v. EPA*, 373 F.3d 1251, 1295 (D.C. Cir. 2004) (internal citations omitted).

126 *See* Nevada Initial Brief at 28-29.

127 *Id.* (quoting LSN# NRC000003289 at 4).

128 *See* U.S. Nuclear Regulatory Commission, *Yucca Mountain Review Plan*, Final Report, NUREG-1804, Rev. 2 (July 2003) (NUREG-1804).

> There are no quantitative limits placed on the capability of individual barriers. The intent of the review is to understand the capability of each barrier to perform its intended function and the relationship of that barrier's role in limiting radiological exposure in the context of the overall performance assessment.[129]

Finally, Nevada misreads the NRC's Statements of Consideration (SOC) accompanying the promulgation of Part 63 to try to impose a quantitative requirement on each individual barrier component.[130] At the outset of its discussion of "Multiple Barriers and Defense in Depth," the NRC was clear that: "The final rule adopts a single quantitative performance goal for individual protection and separate limits for ground-water protection as specified by the EPA standards. Beyond these, the final rule does not place quantitative limits on individual barriers."[131] Although the NRC suggested that certain quantitative analyses might provide insights about the overall performance assessment, the Commission concluded that a *qualitative* approach was most appropriate for evaluating each component's capability.[132]

Thus, the Commission adopted quantitative performance requirements for the barrier system as a whole (10 C.F.R. §§ 63.311, 63.331 and 63.321) and explicitly rejected an approach (like the one Nevada recommends) that would require a quantitative standard for each component measured in isolation. Nothing in the regulations (or in the NRC's SOC) requires DOE to employ a "neutralization" analysis to determine an individual component's contribution to the system's overall performance. The regulations require only that DOE consider those FEPs that are reasonably likely to impact repository performance.

---

129 *Id.* at § 2.2.1.1.2 at 2.2-4.

130 *See* Nevada Initial Brief at 30.

131 66 Fed. Reg. at 55,758.

132 *Id.* at 55,759.

III. Conclusion

As discussed above, DOE conducted the proper analysis in accordance with the regulatory criteria (10 C.F.R. §§ 63.114, 63.342). Part 63 does not require this analysis to be supplemented by evaluation of various scenarios in which the effects of an individual barrier or component such as drip shields are omitted. Accordingly, this legal issue should be resolved in DOE's favor and the contention dismissed in its entirety.[133]

NEV-SAFETY-169

I. Introduction

The legal issue before the Board is:

> [w]hether 10 C.F.R. §§ 63.21(c)(7) and 63.31 allow DOE to submit in the LA a description of its retrieval plans without having a full retrieval plan available for review.[134]

There is no dispute that the Safety Analysis Report (SAR) in the LA includes a description of DOE's plans for retrieval and alternate storage of the radioactive wastes.[135] The plain language of § 63.21(c)(7) requires no more than that description.

Nevada's insistence that DOE make the full retrieval plan available for review cannot be squared with the plain language of the regulation. Moreover, Nevada's demand for a full retrieval plan at the Construction Authorization stage ignores the multi-phased nature of this proceeding. There simply is no requirement for a full, detailed retrieval plan to be made available at this stage of the proceeding.

---

[133] Nevada suggests that even if DOE prevails on this legal issue, there would remain a question whether a neutralization analysis should be required as a "policy or technical matter." Nevada Initial Brief at 31-32. As demonstrated by the SOC, the regulations already reflect the Commission's well considered views on the relevant policy and technical issues, and the Board is not empowered to resolve policy issues, which are the province of the Commission's rulemaking procedures.

[134] *See* Joint Proposal Identifying Phase 1 Legal Issues for Briefing at 4.

[135] *See* SAR § 1.11 at 1.11-1 to -2.

II. Argument

DOE agrees with Nevada that the "natural reading" of a regulation should prevail.[136] The plain language of § 63.21(c)(7) requires nothing more than a "description."[137] DOE provided a description of its retrieval plans in SAR § 1.11 that is sufficient to enable the NRC to make the requisite determinations under § 63.31. Because DOE's LA satisfies § 63.21(c)(7)'s requirement for a "description," the legal issue presented should be resolved in DOE's favor.[138]

Nevada argues that the regulation mandates that DOE provide a full, detailed retrieval plan. Neither the regulation's text nor relevant regulatory history supports Nevada's reading.

In fact, the SOC accompanying Part 63 draw a clear distinction between "descriptions" and the plans themselves. For example, the proposed § 63.21(b)(3) called for a "detailed plan" for providing physical protection for high-level waste. The NRC explicitly rejected that requirement in favor of a "description" of the plan.[139] This change (consistent with other provisions requiring only a "description" of plans) was intended to address the concern that not all information required for a detailed plan would be available at the Construction Authorization stage.[140] Thus, the Commission considered, and rejected, just the kind of requirement that Nevada now seeks to impose.

In addition, Nevada's argument is inconsistent with the multi-phased nature of the licensing process. At the Construction Authorization stage, DOE must demonstrate that it can "design (and build) the repository in such a way that the retrieval option is not rendered

---

136 Nevada Initial Brief at 33.

137 10 C.F.R. § 63.21(c)(7).

138 *See Fla. Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-01-6, 53 NRC 138, 159, *aff'd*, CLI-01-17, 54 NRC 3 (2001) (dismissing contention on the basis that petitioner sought "to impose requirements in addition to those set forth in the regulations").

139 66 Fed. Reg. at 55,738-39.

140 *Id.*

impractical or impossible."[141] The fact that DOE is required to show that it *can design* and build the repository without rendering the retrieval option *impractical or impossible* underscores that no requirement for a full retrieval plan was contemplated at this stage. This language clearly reflects the Commission's understanding that design will need to continue beyond the Construction Authorization stage. The regulations thus require DOE to provide sufficient information at this stage to enable the NRC to develop reasonable confidence (*i.e.*, reasonable assurance) that DOE has not inadvertently foreclosed reasonable options for retrieval should such retrieval be necessary. Descriptions of basic concepts, parameters and methods that will be employed to achieve retrieval are required, but not the details of a full plan. Such information, short of a full plan, can be (and is in fact) sufficient to enable the NRC to conduct the requisite reasonable assurance review at the Construction Authorization stage under § 63.31.

Moreover, Nevada's interpretation is undercut by its admission that "in some cases it may be the Commission's intent that a description would be the means to review and determine whether satisfactory plans can be developed on a timely basis in the future …."[142] Such a description is exactly what the language quoted above regarding whether DOE "can design and build" without rendering retrieval "impractical or impossible" is intended to require.[143]

III. Conclusion

DOE has submitted a description of its retrieval plans as required by § 63.21(c)(7) and has explained how its design has preserved the option of waste retrieval. This will enable the

---

141 *Id.* at 55,743; *see also* 10 C.F.R. § 63.111(e) (preclosure design standards for waste retrievability).

142 Nevada Initial Brief at 32.

143 Nevada contends that the Commission expects the Staff to conduct a "detailed review" of the retrieval plan as part of the Construction Authorization review. *See id.* at 33 (citing 66 Fed. Reg. at 55,743). In light of the above clear language and intent of § 63.21(c)(7), DOE does not believe this language in the regulatory history should be read literally to require formal "plans" at this stage. It appears the Commission was simply underscoring the importance of ensuring retrieval would not be rendered "impractical or impossible." To read this language otherwise is to reject the plain language and intent of the regulations themselves discussed above.

NRC to make the requisite determinations under § 63.31. The regulations require nothing more at the Construction Authorization stage of the proceeding. Accordingly, the legal issue presented by NEV-Safety-169 should be resolved in DOE's favor, and the contention dismissed in its entirety.

NEV-SAFETY-162

I. Introduction

The legal issue before the Board is:

> [w]hether, in making the pre-construction authorization finding required by 10 C.F.R. § 63.31(a)(2), it must be considered whether, given DOE's plan to install drip shields only after all of the wastes have been emplaced, it will be impossible to make the pre-operational finding in 10 C.F.R. § 63.41(a) that construction of the underground facility has been substantially completed in accordance with the license application, as amended, the Atomic Energy Act, and applicable NRC regulations.[144]

The essence of Nevada's position on this legal issue is as follows:

> [Because DOE does not intend to install the drip shields until the waste has been emplaced in the repository,] [i]t necessarily follows that no *definitive disposal safety finding* can be made until after the radiological hazards have already been introduced, because a definitive disposal safety finding would include a finding that systems and components necessary for disposal safety have been properly fabricated and installed.[145]

Nevada goes on to state:

> The legal issue poses the question whether it can possibly be within the contemplation of the Commission that there would be no definitive disposal safety finding until *after* the operating license has been issued and all 70,000 MTHU of … waste have been emplaced, and if not, whether this must be taken into account now, at the construction authorization stage.[146]

---

144 State of Nevada's Legal Issue for Nev-Safety-162 at 1 (Oct. 6, 2009).

145 Nevada Initial Brief at 34-35 (emphasis added).

146 *Id*. at 35 (emphasis in original).

With little or no reference to regulatory authority (and the position that "[t]here is no regulatory history directly on point"[147]), Nevada attempts to: (1) conflate requirements and regulatory findings that the Commission has made clear apply at different stages of this multi-phased proceeding; and (2) create the impression that a significant safety issue will exist if Nevada's interpretation of the regulations is not accepted. For the reasons discussed below, Nevada's position must be rejected.

II. Argument

A. Nevada is Improperly Conflating Separate Regulatory Requirements.

First, as discussed in DOE's Initial Brief, the Commission regulations on their face clearly distinguish between the findings to be made at the Construction Authorization stage (§ 63.31) and those to be made at the later license to receive and possess stage (§ 63.41).[148] The NRC Staff has concurred with DOE's position in this regard.[149] Nevada has pointed to no language in the regulations or regulatory history that would require the NRC to "import" into the Construction Authorization proceeding findings explicitly designated for consideration and resolution only after DOE files an LA amendment for receipt and possession (which DOE has not done).

Second, Nevada's position is built upon the alleged "impossibility" of making certain findings at the later receipt and possession LA amendment stage. As discussed previously by DOE, the § 63.41(a) findings that Nevada alleges will be "impossible to make" involve a determination that "underground storage space required for initial operation [is] substantially

---

147 *Id*. at 38.

148 U.S. Department of Energy Brief on Contention Nev-Safety-162 at 2-3 (Dec. 7, 2009) (DOE Initial Brief on Nev-Safety-162).

149 NRC Staff Initial Brief at 42-45.

complete."[150] The drip shields are simply not part of that determination, since they neither constitute "space," nor are they "required for initial operation."[151] Nevada's entire argument breaks down once it is recognized that the regulations simply do not define such required space as including the drip shields. The finding that Nevada claims would be rendered "impossible" is thus not required under the NRC's regulations, and the premise of Nevada's argument is therefore incorrect.

In any event, whether the findings to be made at the receipt and possession stage can be made at that time in the future is a determination to be made only after DOE files an LA amendment for the receipt and possession of licensed material. Because DOE has not filed such an LA amendment, the issue is not yet ripe.

B. There is No Safety Issue Raised By Nevada's Allegations.

Nevada also argues that the Commission could not possibly have contemplated that there would be no "definitive disposal safety finding" until after all of the wastes have been emplaced.[152] Nevada attempts to create the impression that, if its interpretation is not accepted, there will be a logical gap in the Commission's safety findings and that activities affecting safety will be authorized without appropriate consideration of relevant criteria. Nevada is incorrect.

First, although Nevada refers to the alleged need for a "definitive disposal safety finding" at the Construction Authorization stage, there is no such single "definitive disposal safety finding" in Part 63. Nevada relies on the language of § 63.31(a)(2), which states that the Commission may authorize construction if it determines:

---

150 10 C.F.R. § 63.41(a)(2).

151 DOE Initial Brief on Nev-Safety-162 at 5. Nevada states, without any legal support whatsoever, that the drip shields are part of such "space," and ignores the "required for initial operation" language in § 63.41(a)(2). *See* Nevada Initial Brief at 36.

152 Nevada Initial Brief at 34-35.

> That there is reasonable expectation that the materials can be disposed of without unreasonable risk to the health and safety of the public.[153]

On its face, this provision requires a "reasonable expectation" and not a definitive finding. Beyond that it is not at all clear why this is the "definitive disposal safety finding" when other parts of the regulations, governing later stages in the licensing process, contain fundamental safety findings. Those provisions include:

- § 63.41 – which requires the NRC to find, among other things, before issuing the license to receive and possess, that:
  - "[t]he activities to be conducted at the [GROA] will be in conformity with the application, as amended, … the [AEA] and the Energy Reorganization Act, and the rules and regulations of the Commission" (§ 63.41(b));
  - "[t]he issuance of the license will not be inimical to the common defense and security and will not constitute an unreasonable risk to the health and safety of the public" (§ 63.41(c)); and
- §§ 63.45 and 63.51 – which require the NRC to consider, before issuing an amendment for permanent closure under § 63.46, various factors and to reach the same determinations "that govern the issuance of the initial license, to the extent applicable," including any other information "bearing on permanent closure that was not available at the time a license was issued" (§§ 63.45(b) & 63.51(a)(7)).

Nor has Nevada explained why, as a matter of law, the "reasonable expectation" finding in § 63.31 (which it dubs the "definitive disposal safety finding") cannot be made based, in part, on DOE's commitments to install the drip shields. In this regard, DOE's ability to meet that commitment is a factual question not now before this Board in the context of this legal issue. Thus, even if, as Nevada alleges, the § 63.31 "reasonable expectation" determination does "look[] forward in time," there is no legal reason it cannot be based in part on DOE's design commitments. Moreover, Nevada explicitly acknowledges that this "reasonable expectation" finding "previews the safety findings *that must* be made at the later receipt and possession

[153] *Id.* at 36.

(operation) stage of NRC review."[154] Thus, Nevada admits that this is a finding to be made at a later stage.

Perhaps most significantly, Nevada's safety concerns are largely resolved by the waste retrievability provisions of the NRC regulations. The basic scheme established by the NRC to ensure safety envisions the following:

- construction (but not receipt and possession) may commence once the § 63.31 findings are made;
- receipt and possession may commence once the § 63.41 findings are made;
- once waste is received and before permanent closure, DOE *must* "preserve the option of retrievability" through the design of the repository pursuant to § 63.111(e).[155]

In essence, DOE must be able to retrieve the waste, if necessary, prior to permanent closure. If that option is preserved, there is a mechanism to remove the waste from the repository prior to permanent closure in the event that should become necessary.

Nevada next asserts that the performance confirmation program requirements create a safety issue.[156] Section 63.131 requires DOE's "performance confirmation" program to, have started during site characterization, continue until closure and, among other things, confirm that "engineered systems [such as the drip shields] are functioning as intended and anticipated."[157] Further, § 63.133 requires that a program for testing of engineered systems and components used in the design, must be initiated as early as practicable.[158] Nevada cites § 63.131(a)(2) and states that "useful data about [the] functioning [of the drip shields] … cannot happen here."[159] It bases

---

154 *Id.*

155 *See also* § 63.102(c).

156 Nevada Initial Brief at 37-38.

157 10 C.F.R. § 63.131(a)(2), (b).

158 10 C.F.R. § 63.133(a), (b).

159 Nevada Initial Brief at 37.

this assertion on its belief that the Commission "must have understood that [the drip shields] would be installed well before permanent closure," and that since they are not, performance confirmation cannot be accomplished.[160]

On the contrary, performance confirmation for testing engineered systems and components, including evaluation of materials and design for drip shields, will be developed and initiated as early as practicable consistent with § 63.133.[161] The LA repeatedly and explicitly makes clear that drip shield performance will be part of the performance confirmation program that has been underway and will continue until actual permanent closure.[162]

On pages 39-40 of its Initial Brief, Nevada discusses a portion of the Part 63 final rulemaking in which a commenter asked whether DOE "should be allowed to begin to place wastes … once … there is enough space for initial operation ...."[163] DOE agrees with Nevada as to the pertinence of this discussion, but sees its import quite differently. Opponents of early disposal had pointed to the need to afford adequate radiological protection for workers and the availability of protective measures in the event of a radiological emergency.[164] The Commission, in explaining the requirements of § 63.41, permitting disposal of waste once the GROA was "substantially completed" but not before then, stated:

---

160 *Id.*

161 *See* SAR § 4.2.3 at 4-33 ("The Performance Confirmation Program for testing engineered systems and components used in design will be developed and initiated as early as practicable during construction, and will continue into the operational period . . . and will include evaluation of materials and design for drip shields . . . ."). In fact, part of the Performance Confirmation Program, which as previously discussed includes drip shield performance, "includes monitoring a thermally accelerated emplacement drift [specifically drift # 3] after waste emplacement . . . for a selected period *during preclosure*." SAR § 1.3.4.2.3 (emphasis added).

162 *See, e.g.*, SAR § 4.2.1 at 4-14 (reference to drip shields as part of the EBS subject to performance confirmation, including assessment in a "thermally accelerated" environment, and corrosion processes); Table 4-1 at 4-45 to -47 (Performance Confirmation Activity Relationships to Performance Assessment Parameters, Purpose, Barrier or Event).

163 66 Fed. Reg. at 55,737.

164 *Id.*

> Construction is deemed substantially complete, for this purpose, if among other things, DOE has completed construction of sufficient underground storage space for *initial* operations. Thus, Part 63 provides DOE flexibility to plan for efficient repository operations for receipt and emplacement of waste because of the significant length of time required to complete excavation of the entire underground facility.[165]

The concern was with having "sufficient underground storage space" for "*initial* operations." There is also a recognition of the need to give DOE "flexibility" because of the "length of time required to complete excavation of the entire underground facility."[166] There is no mention, much less any assertion of, a requirement for findings of the kind being advocated by Nevada. Further, the stage of licensing at which these determinations would be made is at the Receive and Possess stage — not the Construction Authorization stage. So, far from supporting Nevada's argument, the passage referred to by Nevada supports DOE's position.

Finally, Nevada states that if this legal issue is not resolved in its favor, this would "still leave open the technical or policy question posed in that contention whether DOE's plan to defer installation of drip shields can be justified as safe."[167] DOE does not concur that there is any "policy" question before the Board, but does agree that if the legal issue is resolved in DOE's favor, compliance of DOE's drip shield installation plan with the regulations cited in the contention is an issue that remains for litigation.

---

165 *Id*. at 55,737-38 (emphasis in original).

166 *Id.*

167 Nevada Initial Brief at 41.

III. Conclusion

The NRC is not required to make the § 63.41 findings as part of the current Construction Authorization review, nor is there any safety issue raised by this conclusion. For the reasons discussed above, this legal issue should be resolved in DOE's favor.

NEV-SAFETY-171

I. Introduction

The legal issue before the Board is:

> Whether, under 10 C.F.R. §§ 63.113, 63.114, and Part 63 Subpart G, the Performance Margin Analysis (PMA) can be used to validate or provide confidence in the TSPA, if its data and models are not qualified under DOE's quality assurance program.[168]

This issue appears to have arisen because of a statement in the LA that some of the data used in connection with the PMA were unqualified. The use of the term "unqualified" referred to the fact that the data had not been qualified for use as direct inputs in the TSPA. Thus, the legal issue must be read to be whether there is a legal prohibition per se against using data or models in connection with an analysis whose purpose is to validate and provide confidence (such as the PMA) if the data or model has not been qualified for direct use in the TSPA.

DOE must comply with NRC's QA requirements, and documents such as the PMA must be developed in accordance with DOE's Quality Assurance Requirements Document (QARD) and the procedures that implement the QARD. There is no dispute about these requirements. The only matter at issue is whether a QA plan can provide, in certain specified circumstances, for the use of "unqualified" data or models in developing documents such as the PMA that are utilized only to validate and to provide confidence in models, such as the TSPA. There is no

---

[168] Joint Proposal Identifying Phase 1 Legal Issues for Briefing at 4.

legal prohibition on the use of certain data and models in developing the PMA if their use is suitable for that purpose and provided for in the QA program applicable to the PMA, even if the material is not qualified for direct use in the TSPA. Neither Nevada nor the NRC Staff has cited a legal basis to support a contrary position.

II. Argument

In its Initial Brief, Nevada's introduction and conclusion both argue that the PMA is a "performance assessment" that does not fully comply with DOE's QA plan or NRC's QA regulations.[169] Contrary to Nevada's assertions, the PMA is an analysis of certain aspects of the TSPA, and is not itself a performance assessment. (*Compare* the definitions of performance assessment in 10 C.F.R. §§ 63.2 and 63.102(j) with the description of the PMA in subsection 2.4.2.3.2.3.2.4 of the SAR (SAR at 2.4-245, 246)).[170]

As explained in DOE's Initial Brief and the SAR, the PMA is one of a number of activities that were conducted to validate the TSPA model.[171] The PMA analyzes the TSPA by relaxing some of the key conservative assumptions in submodels comprising the TSPA model, in order to determine the overall effect of the conservative assumptions on total mean dose.[172] The PMA uses alternative assumptions to assess whether the TSPA's use of the conservative assumptions actually resulted in increasing the estimated doses.[173] The PMA also quantifies the resulting dose increase and assesses whether the TSPA's use of the conservative assumptions

---

169 Nevada Initial Brief at 41, 44-45.

170 Moreover, as discussed above, the PMA and the data and models it uses comply with all applicable DOE and NRC QA requirements for a comparative analysis, such as the PMA. *See* TSPA Report App. C at C-4 (LSN# DEN001579005).

171 U.S. Department of Energy Brief on Contention Nev-Safety-171 at 2-3 (Dec. 7, 2009) (DOE Initial Brief on Nev-Safety-171); SAR at 2.4-122.

172 *Id.*; SAR at 2.4-236.

173 SAR at 2.4-246.

introduced risk dilution.[174] The overall results of the PMA confirm that the assumptions considered to be conservative do increase the estimated doses and provide added confidence that the TSPA results are reasonable. Thus, the PMA uses alternative assumptions — hypothetical variations of data and models — to assess the effects of assumptions used in the TSPA.

Under the heading "regulatory language," Nevada asserts that the PMA is within the scope of 10 C.F.R. § 63.142 because it involves "[t]he gathering of scientific data" and constitutes both an "analysis of samples and data" and a collection of "scientific studies."[175] This argument is founded on the incorrect assumption that development of the PMA involved acquisition and analyses of samples and data within the meaning of § 63.142(a).

DOE agrees with the conclusion that the PMA is subject to appropriate QA requirements. Nevada does not, however, identify any applicable QA requirements with which the PMA did not comply.

In this connection, DOE acknowledges that its Initial Brief included statements about limits on the applicability of 10 C.F.R. Part 63 Subpart G to the PMA that were broader than intended. To be clear, technical work prepared for Yucca Mountain (including the PMA) must meet applicable requirements of the procedures that implement the QARD, which implements the requirements of 10 C.F.R. Part 63 Subpart G. As explained in DOE's Initial Brief, the PMA was developed in accordance with the provisions of the Sandia National Laboratory SCI-PRO-006 procedure for model reports, which apply to a corroborative study such as the PMA.[176] Consistent with those SCI-PRO-006 provisions, the PMA made use of both qualified and

---

174 *Id.*

175 Nevada Initial Brief at 42.

176 DOE Initial Brief on Nev-Safety-171 at 5.

unqualified software and data.[177] The TSPA Report and the associated quality records for the PMA include detailed descriptions of the qualified and unqualified software and data used, and importantly, justifications for the use of the unqualified software and data in the PMA.[178] Thus, the PMA development was governed by appropriate quality controls.[179] Consequently, Nevada's argument concerning the applicability of 10 C.F.R. § 63.142(a) does not support its claim that the PMA cannot be relied upon to validate or provide confidence in the TSPA.

Under "regulatory history," Nevada cites various NRC statements about QA and data qualification from the Part 63 regulatory history and argues that any data DOE uses to support its application is subject to such data qualification requirements.[180] However, Nevada's argument ignores the statements in § 63.142(a) and in the very paragraph from which Nevada drew its first quotation from the notice of final rulemaking on Part 63, that the statements apply only to "data related to structures, systems, and components important to safety, to design and characterization of barriers important to waste isolation, and to activities related thereto…."[181] Nothing in the statements cited by Nevada addresses whether model validation activities such as the PMA must

---

177 *Id;* SCI-PRO-0006 specifically states that "Unqualified, non-exempt software may be used to corroborate model results. SCI-PRO-006 "Models," rev. 9, section 6.2.1 N, at Page 13 of 49 (LSN# DEN001585890). Similarly, SCI-PRO-004 states that direct input data must be qualified, but "input that provides additional information that is not used in the development of results or conclusions in the technical product (e.g., model validation and sensitivity studies)" is considered indirect input, and is not required to be qualified. SCI-PRO-004 "Managing Technical Product Inputs," rev. 6, sections 6.1.3 E.1 and 2, at Pages 6 and 7 of 21 (LSN# DN2002492505).

178 TSPA Report at Appendix C, which includes QA provisions in section C.2 (page C-4), software in section C.3 (page C-4), the rationale for the various submodels in section C.6 (page C-9 et seq.), and description of the input data in Tables C4-1, "TSPA-LA Model Parameters Changed or Deleted for the PMA" (page TC-4), C4-2 "Input Parameters Added for the PMA" (pages TC-13 et seq.), and C4-3. "Sources and Parameter Entry Form Numbers for the PMA-Specific Direct Inputs," (pages TC-53 et seq.). (LSN# DEN001579005).

179 Nevada also cites 10 C.F.R. § 63.142(q), concerning corrective action requirements, but does not identify any conditions adverse to quality affecting the PMA. Consequently, Nevada's argument based on § 63.142(q) is inapposite. In any event, if a condition adverse to quality is identified, DOE would be required to take appropriate corrective action. *See* 10 C.F.R. § 63.142(q). Nevada has not provided any basis for assuming that DOE would not do so, or that corrective action would entail complete rejection of the PMA.

180 Nevada Initial Brief at 43-44.

181 66 Fed. Reg. at 55,763 (Nov. 2, 2001).

use only qualified data. As explained in the NRC guidance, "data *directly relied on* to address safety or waste-isolation issues must be qualified."[182] Consequently, the statements cited by Nevada do not conflict with the use of data in the PMA.

As "case law," Nevada cites two Commission decisions concerning QA deficiencies at nuclear power plants, and concludes "[t]herefore, a performance assessment of indeterminate quality, like the PMA, should be just as unacceptable as a structure, system or component of indeterminate quality in a nuclear power plant."[183] There is no basis for claiming that the PMA is of indeterminate quality, or for equating a method for validating a model to a defective structure, system or component. The cited cases are not related to a performance assessment or an analysis of a performance assessment, such as the PMA, but instead focus on the actual design and construction of nuclear power plants.

The NRC Staff's Initial Brief cites the Commission's statements concerning the importance of: 1) qualitative requirements for data and other information; and 2) performance confirmation and QA programs.[184] The NRC Staff further notes that "the Commission stated that: 1) DOE must "test the validity" of its performance assessment models; 2) Part 63 requires DOE to provide the "technical basis" for the models used in the performance assessment; 3) the Commission does not intend to rely solely on the performance assessment; 4) Part 63 requires a QA program, which enhances confidence in the design and characterization of barriers important to waste isolation; and 5) regardless of the uncertainty in the performance assessment, Part 63 includes additional provisions to increase confidence that DOE will meet postclosure performance objectives, including requirements for performance confirmation and QA

---

182 YMRP, NUREG-1804, rev. 2, subsection 2.5.1 "Quality Assurance Program," Acceptance Criterion 3 (activities related to design control) (15(b)) (NUREG-1802 at 2.5-17) (emphasis added).

183 Nevada Initial Brief at 44-45.

184 NRC Staff Initial Brief at 48.

programs.[185] The NRC Staff states that these Commission statements are the bases for its conclusion that the PMA can only be used to validate or provide confidence in the TSPA if its data and models are qualified under DOE's QA program.[186] None of these statements shows that the Commission intended to impose any requirements and limitations on the information DOE can use to validate or provide confidence in the TSPA. In fact, NRC guidance regarding its review of DOE's performance assessment anticipated otherwise: "The staff will evaluate assertions that a given model or parameter distribution is conservative from the perspective of overall system performance (*i.e.*, the dose to the reasonably maximally exposed individual). The staff will use any available information to risk-inform its review."[187] In addition, the NRC Staff did not mention, and may not have considered, that the PMA is a post-development model validation activity, and that its outputs are not used to design structures, systems, and components important to safety, or to design or characterization of barriers important to waste isolation.

The NRC Staff does not explain its rationale for concluding that the statements it cites about the importance of the QA program should be interpreted as requiring PMA data and model qualification (presumably for general use beyond the PMA).[188] NRC guidance regarding model validation only requires that model validation activities be "planned, controlled and documented."[189] As discussed above, and in substantial detail in the License Application and

---

185 *Id.* (citing 66 Fed. Reg. at 55,747-48) (emphasis added).

186 *Id.*

187 YMRP at 2.2-3.

188 NRC Staff Initial Brief at 46-48.

189 *See* YMRP, NUREG-1804, rev. 2, 2003, subsection 2.5.1, Acceptance Criteria 3 (16), which states that "[t]he activities related to design control are acceptable provided that: (16) Model development and approaches to validation are planned, controlled, and documented. Procedures are established for model validation [NUREG–1636 (U.S. Nuclear Regulatory Commission, 1999)]." NUREG-1804 at 2.5-13 to -17. The NRC guidance

supporting documents, the PMA was one aspect of DOE's TSPA post-development validation activities and was "planned, controlled, and documented" in accordance with the applicable provisions of procedures, which permit use of unqualified data and software in certain circumstances.[190]

III. Conclusion

Therefore, 10 C.F.R. §§ 63.113, 63.114, and Part 63 Subpart G, do not prohibit use of the PMA to validate or provide confidence in the TSPA, regardless of its limited use of data and software that were not qualified under DOE's QA program.

Respectfully submitted,

Signed electronically by Donald J. Silverman
Donald J. Silverman
Counsel for the U.S. Department of Energy
Morgan, Lewis & Bockius LLP
1111 Pennsylvania Avenue, N.W.
Washington, DC 20004

James Bennett McRae
Martha S. Crosland
U.S. Department of Energy
Office of the General Counsel
1000 Independence Avenue, SW
Washington, DC 20585

Dated in Washington, DC
this 6th day of January 2010

DB1/64076383

---

discusses data qualification in the context of design verification, not with respect to model validation. *Id*. at 2.5-15 to -16.

[190] Detailed information concerning the QA measures applied during preparation of the PMA is provided in Appendix C of the TSPA-LA Model/Analysis report, MDL-WIS-000005 Rev 00 AD01 (LSN# DEN001579005).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD
Before Administrative Judges:

Thomas S. Moore, Chairman
Paul S. Ryerson
Richard E. Wardwell

In the Matter of	)	Docket No. 63-001
U.S. DEPARTMENT OF ENERGY	)	ASLBP No. 09-892-HLW-CAB04
(High-Level Waste Repository)	)	January 6, 2010

CERTIFICATE OF SERVICE

I hereby certify that copies of the **"U.S. DEPARTMENT OF ENERGY CONSOLIDATED REPLY BRIEF ON PHASE 1 LEGAL ISSUE SAFETY CONTENTIONS"** have been served on the following persons on this 6th day of January 2010 through the Nuclear Regulatory Commission's Electronic Information Exchange.

CAB 04
Atomic Safety and Licensing Board Panel
Thomas S. Moore, Chair
E-mail: tsm2@nrc.gov
Paul S. Ryerson
E-mail: psr1@nrc.gov
Richard E. Wardwell
E-mail: rew@nrc.gov

Parties Served	**E-mail Addresses**
Adams, Marta	madams@ag.nv.gov
Andersen, Robert M.	robert.andersen@akerman.com
Bailey, Annie	baileys@lcturbonet.com
Barlow, Gregory	lcda@lcturbonet.com
Baughman, Mike	bigboff@aol.com
Bauser, Michael A.	mab@nei.org
Belete, Elene	ebelete@jsslaw.com
Bell, Kevin W.	kwbell@energy.state.ca.us
Berkey, Curtis	curtis.berkey@abwwlaw.com
Beutel, Theodore	tbeutel@eurekanv.org
Bollwerk III, G. Paul	gpb@nrc.gov
Borski, Laurie	lborski@nuclearlawyer.com
Brooks, Felicia M.	fbrooks@ndnlaw.com

Bupp, Margaret	mjb5@nrc.gov
Carter, Lorraine	lcarter@captionreporters.com
Cereghino, Stephen	stephen_cereghino@ymp.gov
Choate, Zoie	zchoate@co.nye.nv.us
Colburn, Ross	rcolburn@ndnlaw.com
Cottingham, Anne	awc@nei.org
Crosland, Martha S.	Martha.Crosland@hq.doe.gov
Curran, Diane	dcurran@harmoncurran.com
Damele, Ronald	rdamele@eurekanv.org
Dinunzio, Nicholas	Nicholas.Dinunzio@hq.doe.gov
Dobie, Julie	jdobie@gklaw.com
Dreher, Michael	michael.dreher@nrc.gov
Dudley, Sherry	sdudley@co.nye.nv.us
Durbin, Susan	susan.durbin@doj.ca.gov
Eredia, Sally	seredia@ndnlaw.com
Faglioni, Kelly L.	kfaglioni@hunton.com
Fitzpatrick, Charles J.	cfitzpatrick@nuclearlawyer.com
Francis, Karin	kxf4@nrc.gov
Fraser, Matthew	mfraser@harmoncurran.com
Frishman, Steve	steve.frishman@gmail.com
Gendelman, Adam S.	Adam.Gendelman@nrc.gov
Giitter, Rebecca	rll@nrc.gov
Gilman, Joseph	jsg1@nrc.gov
Ginsberg, Ellen C.	ecg@nei.org
Golshan, K. G.	kg.golshan@nrc.gov
Gores, Jennifer A.	jgores@armstrongteasdale.com
Gutierrez, Jocelyn	Jocelyn.Gutierrez@ymp.gov
Hanna, Robert S.	rshanna@bsglaw.net
Harrington, Arthur J.	aharring@gklaw.com
Hawkens, E. Roy	erh@nrc.gov
Hearing Docket	hearingdocket@nrc.gov
Heinzen, Steven A.	sheinzen@gklaw.com
Hembacher, Brian	brian.hembacher@doj.ca.gov
Horin, William	whorin@winston.com
Houck, Darcie L.	dhouck@ndnlaw.com
Irwin, Donald P.	dirwin@hunton.com
James, Gregory L. Esq.	gljames@earthlink.net
Johnson, Abigail	eurekanrc@gmail.com
Kahn, Zachary	zxk1@nrc.gov
Klevorick, Phil	klevorick@co.clark.nv.us
Kriner, Jeffrey	jeffrey_kriner@ymp.gov
LaPlante, Erica	eal1@nrc.gov
Larimore, Patricia	plarimore@talisman-intl.com
Lawrence, John W.	jlawrence@nuclearlawyer.com
Leigh, Rovianne	rleigh@abbwlaw.com
Lembke, Alisa	alembke@inyocounty.us
Lenehan, Daniel	daniel.lenehan@nrc.gov
Lewis, Linda	linda.lewis@nrc.gov
List, Robert F.	rlist@armstrongteasdale.com

Loveland, Bryce	bloveland@jsslaw.com
Lynch, Susan	slynch1761@gmail.com
Maerten, Daniel	Daniel.Maerten@caci.com
Malsch, Martin G.	mmalsch@nuclearlawyer.com
Martin, Circe	ogcmailcenter@nrc.gov
Martinez, Melanie	wpnucwst2@mwpower.net
Mathias, Linda	yuccainfo@mineralcountynv.org
McRae, Ben	Ben.McRae@hq.doe.gov
Meharg, Stephanie	smeharg@hunton.com
Mercado, Michele	michele.mercado@doj.ca.gov
Miras-Wilson, Rachel	rwilson@winston.com
Montesi, Susan	smontesi@nuclearlawyer.com
Moore, Thomas S.	tsm2@nrc.gov
Mueller, Edwin	muellered@msn.com
Murphy, Malachy	mrmurphy@chamberscable.com
Nezhad, Cyrus	Cyrus.Nezhad@hq.doe.gov
Niegemann, Brian	bniegemann@ndnlaw.com
OCAA Mail Center	OCAAMAIL@nrc.gov
Pak, Christina	Christina.Pak@hq.doe.gov
Peebles, John M.	jpeebles@ndnlaw.com
Peterson, William	paengineer@juno.com
Pitchford, Loreen, LSN Coordinator	lpitchford@comcast.net
Pitts, Jason	jayson@idtservices.com
Poland, Douglas M.	dpoland@gklaw.com
Putzu, Frank	frank.putzu@navy.mil
Renfro, Hanna	hrenfro@gklaw.com
Repka, David A.	drepka@winston.com
Rhoan, Robert	rrhoan@ndnlaw.com
Robbins, Alan	arobbins@jsslaw.com
Roby, Debra	droby@jsslaw.com
Rosenthal, Alan S.	rsnthl@nrc.gov; axr@nrc.gov
Rotman, Matthew	matthew.rotman@nrc.gov
Ryan, Tom	Tom.Ryan@nrc.gov
Ryerson, Paul S.	psr1@nrc.gov
Schwartz, Jacqueline	jschwartz@gklaw.com
Sears, Richard	rwsears@wpcda.org
Shebelskie, Michael R.	mshebelskie@hunton.com
Silberg, Jay E.	jay.silberg@pillsburylaw.com
Silvia, Andrea L.	alc1@nrc.gov
Simkins, Connie	jcciac@co.lincoln.nv.us
Simon, Mike	wpnucast1@mwpower.net
Sisco, Carlos L.	csisco@winston.com
Sommer, Josephine	Josephine.Sommer@ymp.gov
Sullivan, Timothy E.	timothy.sullivan@doj.ca.gov
Tucker, Katherine	Katie.Tucker@nrc.gov
VanNiel, Jeffrey D.	nbrjdvn@gmail.com
Vazquez, Tameka	purpose_driven@yahoo.com
Vibert, Elizabeth A.	VibertE@co.clark.nv.us
Walsh, Timothy J.	timothy.walsh@pillsburylaw.com

Wardwell, Richard E.	rew@nrc.gov
Webb, Maria	maria.webb@pillsburylaw.com
Whipple, Bret	bretwhipple@lcturbonet.com
Williams, Scott	swilliams@abbwlaw.com
Wright, Belinda A.	bwright@hunton.com
Young, Mitzi A.	may@nrc.gov
Zabarte, Ian	mrizabarte@gmail.com
Zobler, Marian L.	mlz@nrc.gov

(*electronically signed by)Donald J. Silverman*
Donald J. Silverman