

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

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

In the Matter of

U.S. DEPARTMENT OF ENERGY

(High Level Waste Repository)

Docket No. 63-001-HLW

ASLBP No. 09-892-HLW-CAB04

December 14, 2010

MEMORANDUM AND ORDER

(Deciding Phase I Legal Issues and Denying Rule Waiver Petitions)

This proceeding concerns the United States Department of Energy's (DOE's) application (License Application) for authorization to construct a high-level nuclear waste repository in Nye County, Nevada. Before the Board are ten legal issues and, in addition, two petitions for rule waivers pursuant to 10 C.F.R. § 2.335. The Board decides the legal issues, and denies both waiver petitions.

The Board respectfully calls to the Commission's attention, however, that one of the waiver petitions (NEV-SAFETY-203) raises a potentially significant safety concern: that is, whether long-term erosion over hundreds of thousands of years might entirely eliminate the proposed repository's upper geologic barrier and expose emplacement drifts to the surface. Under current regulations, the Board may not consider this allegation unless erosion is also shown to be a safety concern in the relatively near term (that is, over the next 10,000 years).¹ Accordingly, although the petition fails to satisfy the strict requirements for a rule waiver, the Commission might wish to revisit on its own initiative the rule in question (10 C.F.R. § 63.342) if

¹ See 10 C.F.R. § 63.342(c).

it concludes that this safety concern was not adequately addressed in the original rulemaking proceeding.

I. Background

Pursuant to CAB Case Management Order #2,² this proceeding is taking place in phases. That order directed the affected parties to try to reach agreement on a proposed legal question for each legal issue contention that will be addressed in Phase I.³ The parties were able to agree on the wording of most of the eleven issues.⁴

Accordingly, on October 23, 2009, the Board issued an order that identified Phase I legal issues for briefing.⁵ The Board accepted the parties' joint statement of eight issues (1, 2, 5, 6, 7, 8, 9, and 11), and directed briefing of one disputed legal issue (10) in the form stated by Nevada.⁶

As the parties recognized, Legal Issues 3 and 4 (as proposed) were closely related to the Board's decision on the admissibility of a proffered new contention (NEV-SAFETY-202). In its order identifying Phase I legal issues for briefing, the Board stated that it intended shortly to admit NEV-SAFETY-202 (as set forth in the first sentence of the contention) solely as a legal issue contention and to defer consideration of its alternative request for a rule waiver pursuant

² CAB Case Management Order #2 (Sept. 30, 2009) (unpublished).

³ Id. at 4.

⁴ See U.S. Department of Energy, State of Nevada and Nuclear Energy Institute Joint Proposal Identifying Phase 1 Legal Issues for Briefing (Oct. 6, 2009) [hereinafter Joint Proposal Identifying Legal Issues]; U.S. Department of Energy Views on NEV-SAFETY-162 (Oct. 6, 2009); State of Nevada's Legal Issue for NEV-SAFETY-162 (Oct. 6, 2009); NRC Staff Comment on Joint Proposal Identifying Phase I Legal Issues for Briefing (Oct. 13, 2009).

⁵ CAB Order (Identifying Phase I Legal Issues for Briefing) (Oct. 23, 2009) (unpublished) [hereinafter Order Identifying Phase I Legal Issues].

⁶ Id. at 1-2.

to 10 C.F.R. § 2.335. Accordingly, the Board directed that the legal issue presented by NEV-SAFETY-202 be briefed in the same manner as all other Phase I legal issues (in effect merging that legal issue with Legal Issues 3 and 4, as proposed by the parties).⁷ Therefore, pursuant to CAB Case Management Order #2, the affected parties filed initial briefs and reply briefs on ten legal issues.⁸ The Board held oral argument on these ten legal issues on January 26 and 27, 2010.

Separately, by order dated December 9, 2009, the Board addressed the admissibility of six additional contentions that were filed subsequent to the original intervention petitions.⁹ Two of these six contentions (NEV-SAFETY-202 and -203) were filed in response to the NRC's final

⁷ Id. at 1.

⁸ State of Nevada's Opening Brief on Phase I Contention Legal Issues (Dec. 7, 2009) [hereinafter Nevada Legal Issue Brief]; NRC Staff Brief on Phase I Legal Issues (Dec. 7, 2009) [hereinafter NRC Staff Legal Issue Brief]; The Nuclear Energy Institute's Brief on Phase I Legal Issue No. 1 (Dec. 7, 2009) [hereinafter NEI Legal Issue Brief]; U.S. Department of Energy Brief on NEI-SAFETY Contention 05 (Dec. 7, 2009) [hereinafter DOE Legal Issue 1 Brief]; U.S. Department of Energy Brief on Nevada Safety Contentions 009, 010, 011, 012, 013 and 019 (Dec. 7, 2009) [DOE Legal Issue 2 Brief]; U.S. Department of Energy Brief on NEVADA-SAFETY Contention 202 and Post 10,000 Year Aspects of NEVADA-SAFETY Contentions 011 and 019 (Dec. 7, 2009) [hereinafter DOE Legal Issues 3 & 4 Brief]; U.S. Department of Energy Brief on Contention NEV-SAFETY-041 (Dec. 7, 2009) [DOE Legal Issue 5 Brief]; U.S. Department of Energy Brief on Consolidated Contentions NEV-SAFETY-146 / NEV-SAFETY-201 (Dec. 7, 2009) [hereinafter DOE Legal Issue 6 Brief]; U.S. Department of Energy Brief on NEVADA-SAFETY Contention 149 (Dec. 7, 2009) [hereinafter DOE Legal Issue 7 Brief]; U.S. Department of Energy Brief on Contention NEV-SAFETY-161 (Dec. 7, 2009) [hereinafter DOE Legal Issue 8 Brief]; U.S. Department of Energy Brief on Contention NEV-SAFETY-169 [hereinafter DOE Legal Issue 9 Brief]; U.S. Department of Energy Brief on Contention NEV-SAFETY-162 (Dec. 7, 2009) [DOE Legal Issue 10 Brief]; U.S. Department of Energy Brief on Contention NEV-SAFETY-171 (Dec. 7, 2009) [hereinafter DOE Legal Issue 11 Brief]; State of Nevada Reply Brief on Phase I Legal Issues (Jan. 6, 2010) [hereinafter Nevada Reply]; NRC Staff Reply to Initial Briefs on Phase I Legal Issues (Jan. 6, 2010) [hereinafter NRC Staff Reply]; Reply of the Nuclear Energy Institute to the Department of Energy and NRC Staff Briefs on Phase I Legal Issues (Jan. 6, 2010) [hereinafter NEI Reply]; U.S. Department of Energy Consolidated Reply Brief on Phase 1 Legal Issue Safety Contentions (Jan. 6, 2010) [hereinafter DOE Reply].

⁹ See U.S. Dep't of Energy (High-Level Waste Repository), LBP-09-29, 70 NRC __ (slip op.) (Dec. 9, 2009).

rule implementing the Environmental Protection Agency's revised dose standard after 10,000 years.¹⁰ Both contentions allege that DOE improperly excluded certain features, events, and processes (FEPs) from its post-10,000-year analysis—namely, climate change and land-surface erosion.¹¹

Although styled as a contention, NEV-SAFETY-203 is actually a petition for a rule waiver pursuant to 10 C.F.R. § 2.335.¹² In lieu of holding argument on the petition, in our December 9, 2009 order, we directed the NRC Staff to file written answers to certain questions, and afforded other parties an opportunity to respond.¹³

As presaged in our October 23, 2009 order, the Board's December 9, 2009 order admitted NEV-SAFETY-202 solely as a legal issue contention.¹⁴ Because of our resolution of that legal issue, Nevada's alternative request for a rule waiver in connection with this contention now becomes relevant. The Board concludes that this waiver request can be resolved at this time on the basis of the parties' original filings in connection with the contentions, as well as their answers and responses to the Board's questions concerning the similar issues raised by NEV-SAFETY-203.

Accordingly, ten legal issues and two waiver petitions are now ripe for decision.¹⁵ As a

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

¹¹ See State of Nevada's New Contentions Based on Final NRC Rule (May 12, 2009) at 2, 9 [hereinafter Nevada's Final NRC Rule Contentions].

¹² See Nevada's Final NRC Rule Contentions at 9.

¹³ Dep't of Energy, LBP-09-29, 70 NRC at ___ (slip op. at 13-14); See NRC Staff Response to Board Questions (Dec. 22, 2009) [hereinafter Staff Response to Board Questions]; State of Nevada's Response to NRC Staff Answers to Board Questions (Dec. 30, 2009).

¹⁴ Dep't of Energy, LBP-09-29, 70 NRC at ___ (slip op. at 5).

¹⁵ The passage of time between briefing and decision on these matters results from unusual intervening developments. On February 1, 2010—five days after argument on the legal

result of the Board's resolution of the legal issues presented, some admitted contentions should likely be dismissed, while others may survive in part insofar as they allege factual disputes that cannot be resolved as a matter of law.

The Board therefore directs the affected parties to attempt (and without waiver of any party's eventual appeal rights with respect to the Board's rulings) to stipulate to the effects of these rulings on specific admitted contentions, which stipulation shall be filed on or before January 21, 2011. Insofar as the parties cannot fully agree, each party shall state its separate differing position on any contention by a filing due on that same date.

II. Rulings on Legal Issues

A. Legal Issue 1:

(1) Whether the above regulations [10 C.F.R. §§ 20.1002, 20.1003, 20.1101, 50.40, and 63.111] require ALARA considerations at individual nuclear plant sites remote from the [Geologic Repository Operations Area] to be addressed in DOE's [License Application]; and (2) whether DOE must demonstrate that the repository not only meets applicable safety and environmental regulatory standards, but must show that it does so without any alleged unnecessary expenditures of resources.¹⁶

This issue sets forth two questions.

The first concerns the Commission's requirement that licensees must generally try to keep radiation exposures "as low as is reasonably achievable" (ALARA). Pursuant to the cited

issues—DOE filed unopposed motions for an interim suspension of discovery and for a stay of most aspects of this proceeding, which the Board granted on February 2 and February 16, 2010, respectively. See CAB Order (Granting Interim Suspension of Discovery) (Feb. 2, 2010) (unpublished); CAB Order (Granting Stay of Proceeding) (Feb. 16, 2010) (unpublished). On March 3, 2010, DOE moved to withdraw its License Application. See U.S. Department of Energy's Motion to Withdraw (Mar. 3, 2010). On June 29, 2010, the Board denied DOE's motion, and the stay expired. See U.S. Dep't of Energy (High-Level Waste Repository), LBP-10-11, 71 NRC __ (slip op.) (June 29, 2010). The next day the Commission directed the parties to brief whether the Commission should review the Board's ruling and, if so, whether it should reverse or affirm the Board. See Order of the Secretary Regarding Board Decision LBP-10-11 (June 30, 2010) at 1 (unpublished).

¹⁶ Joint Proposal Identifying Legal Issues, Attachment 1 at 1.

regulations, must DOE weigh ALARA considerations insofar as design features of the repository might lead to unnecessary radiation exposures at individual nuclear reactor plant sites that are not part of the geologic repository operations area (GROA) itself?

DOE and the NRC Staff contend that DOE's ALARA responsibilities do not extend beyond the GROA that it controls.¹⁷ NEI contends that no such limitation exists.¹⁸

The issue is one the Commission expressly directed the Board to consider¹⁹ and indicated that it "merits close consideration."²⁰ On balance, the Board agrees with DOE and the NRC Staff.

NEI invokes 10 C.F.R. Part 20 of the Commission's regulations, and asserts that section 20.1002 applies Part 20 regulations to Part 63 licensees without limitation. In turn, section 20.1101(b), requires licensees (including Part 63 licensees) to "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)."²¹

¹⁷ See DOE Reply at 7; NRC Staff Legal Issue Brief at 8.

¹⁸ NEI Legal Issue Brief at 11.

¹⁹ See U.S. Dep't of Energy (High-Level Waste Repository), CLI-09-14, 69 NRC 580, 595 (2009) ("[T]he Boards should consider whether ALARA considerations at individual plant sites are appropriately part of this proceeding.").

²⁰ See id. at 595, 600.

²¹ 10 C.F.R. § 20.1101(b). Further, section 20.1003 defines the ALARA obligation as: making every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

Pointing out that the operators of nuclear power plants have their own ALARA responsibilities under 10 C.F.R. Part 50, DOE and the NRC Staff argue that 10 C.F.R. Part 20 was not intended to require DOE to consider the possible effects of its repository design on preclosure radiation exposures beyond the borders of the repository operations area itself.²² We agree, but not merely because—as DOE argues—the limitation “is understood implicitly because it is so obvious.”²³ Rather, in the language and context of the regulation upon which NEI relies, we find support for the view that DOE need not weigh ALARA considerations outside the GROA for which it is responsible.

First, section 20.1101(b) directs licensees to “use” procedures and engineering controls to achieve ALARA. Even assuming that DOE’s repository design might compel individual power plants to “use” certain procedures or controls, DOE itself cannot “use” such procedures or controls at individual plants, as that term is ordinarily understood, because DOE does not operate individual plants. The section upon which NEI relies does not, by its terms, literally apply. In that same vein, the contention underlying Legal Issue 1 challenges an element of the repository design, and such design does not fall within the ambit of the required “procedures and engineering controls” of section 20.1101(b).²⁴

²² See NRC Staff Legal Issue Brief at 4; DOE Legal Issue 1 Brief at 2. The legal issue presented concerns the allegation that the repository’s design will directly cause preclosure impacts on doses received by workers at nuclear power plants throughout the country. The regulatory history shows that while the Commission wanted to avoid layering postclosure ALARA considerations on top of a specific postclosure performance objective that it found to be already sufficiently conservative, the Commission did not wish to prevent appropriate ALARA consideration of preclosure doses. See Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, NV, 66 Fed. Reg. 55,732, 55,751 (Nov. 2, 2001).

²³ DOE Reply at 5.

²⁴ See, e.g., The Nuclear Energy Institute’s Petition to Intervene (Dec. 19, 2008) at 31 (arguing as a basis for NEI-SAFETY-05 that “[t]his overly conservative design will result in installation of disposal control rod assemblies at nuclear power plants”); NEI Legal Issue Brief at 7 (“NEI’s

Second, section 20.1101(b) does not exist in isolation, and must be read in context. It follows section 20.1101(a)—which requires each licensee to develop a “radiation protection program” that is “commensurate with the scope and extent of licensed activities.” Moreover, both section 20.1101(a) and (c)—the provisions immediately preceding and following the section upon which NEI relies—impose record keeping, reporting, and annual review requirements that appear wholly inconsistent with a “radiation protection program” that somehow extends to numerous distant locations over which the licensee lacks control or access.

Finally, 10 C.F.R. § 63.111(a)(1) expressly says that the “geologic repository operations area must meet the requirements of Part 20.” If, as NEI argues, sections 20.1002 and 20.1101(b) independently impose far broader ALARA requirements on DOE’s design, construction, and operation of the repository, why was section 63.111(a)(1) even necessary?²⁵

contention focuses on certain repository design or operational parameters”); NEI Reply at 7 (“NEI’s issue is a design issue”) (emphasis in original). Similarly, the purpose of the inapplicable “procedures and engineer controls” in section 20.1101(b) are to ensure ALARA “occupational doses” and “doses to members of the public,” terms defined in the definition section of 10 C.F.R. § 20.1003 so as to be mutually exclusive thereby making section 20.1101(b) inapplicable here as well. In pertinent part, an “[o]ccupational dose” is a “dose received by an individual in the course of employment in which the individual’s assigned duties involve exposure to radiation” and a “[m]ember of the public” is “any individual except when that individual is receiving an occupational dose.” 10 C.F.R. § 20.1003. Therefore, in the context of a section 20.1101 radiation protection program, the most reasonable reading of the meaning of “occupational dose” is a dose received by an employer’s (here DOE’s) own employees to whom DOE assigns duties, not the employees of individual nuclear power plant employers (here NEI members) at remote sites to whom DOE does not assign duties. When the Commission promulgated 10 C.F.R. Part 63, it amended the “Scope” section of Part 20, 10 C.F.R. § 20.1002, to include Part 63, thereby extending the long-established regulatory history and precedent of Part 20 to Part 63. The Board is aware of no situation, and NEI points to none, in which the NRC has interpreted and applied the term “occupation dose” so that employer A’s section 20.1101 radiation protection program is required to achieve ALARA for employer B’s employees who are at B’s remote site and under employer B’s exclusive control.

²⁵ “[A] basic tenet of statutory construction, equally applicable to regulatory construction, [is] that [a text] should be construed so that effect is given to all of its provisions, so no part will be inoperative or superfluous, void or insignificant” Silverman v. Eastrich Multiple Investor

Thus, the Board concludes that the first question presented by Legal Issue 1 must be answered in the negative.

As to the second part of Legal Issue 1, NEI claims that DOE must demonstrate that the repository meets applicable safety and environmental standards without any unnecessary expenditure of resources.²⁶ DOE and the NRC Staff say there is no such requirement.²⁷

We agree with DOE and the NRC Staff. In reversing another board's admission of a contention previously proffered by NEI, the Commission said that NRC "regulations set a minimum standard for safety, not a maximum."²⁸ On this basis, the Commission reversed the admission of an NEI contention alleging "'excessive' conservatism" in repository design, explicitly ruling that NEI's concerns about "costs and delay" were not material.²⁹

The Commission's decision dictates our ruling here. DOE need not demonstrate that it meets applicable standards without "unnecessary expenditures."

B. Legal Issue 2:

Whether 10 C.F.R. § 63.305 requires DOE to project future levels of anthropogenic greenhouse gas emissions such as CO₂ and evaluate the impact of these gases on future climate at Yucca 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.³⁰

The legal issue as framed by the parties might be misleading. Nevada does not contend

Fund, L.P., 51 F.3d 28, 31 (3d Cir. 1995) (internal quotations omitted).

²⁶ See NEI Legal Issue Brief at 11-12.

²⁷ See DOE Legal Issue 1 Brief at 8-9; NRC Staff Legal Issue Brief at 9-10.

²⁸ Dep't of Energy, CLI-09-14, 69 NRC at 599.

²⁹ Id.

³⁰ Joint Proposal Identifying Legal Issues, Attachment 1 at 1.

that, as a matter of law, 10 C.F.R. § 63.305 requires DOE to project future levels of anthropogenic greenhouse gas emissions such as CO₂ and to evaluate the impact of such gases on future climate at Yucca Mountain in the 10,000-year performance assessment. Rather, Nevada contends that meeting the requirements of section 63.305 raises a question of fact and expert opinion.³¹

DOE contends that, as a matter of law, it is sufficient under section 63.305 for DOE to analyze the effects of anthropogenic greenhouse gas emissions on future climate based solely upon the historical geologic record.³² The NRC Staff's position, as clarified during argument, is essentially the same as Nevada's.³³

We agree with Nevada and the NRC Staff. An analysis based upon the historical geologic record is not required by the regulations, nor is it necessarily sufficient. Whether such an analysis is adequate to comply with section 63.305 is a question of fact.

The plain language of 10 C.F.R. § 63.305 does not say anything about analyzing future climate based upon the historical geologic record. It says "DOE must vary factors related to the geology, hydrology, and climate based upon cautious, but reasonable assumptions of the changes in these factors that could affect the Yucca Mountain disposal system during the period of geologic stability."³⁴

DOE acknowledges that the rule it proposes is not found in the language of section 63.305,³⁵ but claims that a safe harbor for its analysis of the historical geologic record should be

³¹ Nevada Legal Issue Brief at 4.

³² DOE Legal Issue 2 Brief at 5; Tr. at 64 (Jan. 26, 2010).

³³ Tr. at 82.

³⁴ 10 C.F.R. § 63.305(c).

³⁵ DOE contends merely that "[n]othing in the plain language of the regulation is inconsistent

read into the regulation by reason of the regulatory history.³⁶ In any circumstance, however, a safe harbor would have to be grounded upon language in the regulation itself.³⁷ Section 63.305 contains no such language.

Moreover, an important aspect of the regulatory history cuts directly against DOE's position. In 1999, the Commission proposed adoption of a version of 10 C.F.R. Part 63 that included a provision (in proposed section 63.115(a)(3)) stating "[c]limate evolution shall be consistent with the geologic record of natural climate change in the region surrounding the Yucca Mountain site."³⁸ This proposal was deleted from the final Part 63, with the explanation that "[r]equirements related to characteristics of the reference biosphere and critical group [in section 63.115] have been deleted from this section in light of the definitions and concepts necessary to estimate dose to the reasonably maximally exposed individual, now specified in subpart L [which included 10 C.F.R. § 63.305]."³⁹ Thus, the Commission considered whether it should require that projections of climate change be based upon the geologic record and ultimately decided not to do so, preferring instead the more general requirement in 10 C.F.R. § 63.305 that climate projections be based on "cautious, but reasonable assumptions."

We decline to graft upon section 63.305 language that does not appear in the regulation, and which the Commission specifically rejected. Whether it is sufficient under section 63.305 for DOE to analyze the effects of anthropogenic greenhouse gas emissions on future climate

with DOE's position." DOE Legal Issue 2 Brief at 3.

³⁶ See id. at 3-5.

³⁷ See Hydro Res., Inc. (P.O. Box 777, Crownpoint, New Mexico 87313), CLI-06-14, 63 NRC 510, 516 (2006) (finding the plain language of a regulation controlling).

³⁸ Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada, Proposed Rule, 64 Fed. Reg. 8640, 8677 (Feb. 22, 1999).

³⁹ 66 Fed. Reg. at 55,778.

based upon the historical geologic record raises a question of fact.

C. Legal Issues 3 & 4:

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.⁴⁰

As argued by the parties, the legal issue presented by this question 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 using the same methodology employed for the first 10,000 years.⁴¹ Nevada contends that the answer is yes.⁴² DOE and the NRC Staff say the answer is no.⁴³

We agree with DOE and the NRC Staff. Pursuant to section 63.342(c)(2), DOE must assess the effects of climate change during the 990,000-year period regardless of whether it necessarily must assess climate change during the initial 10,000-year period under the criteria set forth in sections 63.342(a) and (b). Section 63.342(c)(2), however, allows DOE to simplify its assessment of climate change during the 990,000-year period. Section 63.342(c)(2) states that DOE's climate change analysis for this period may be limited to the effects of increased water flow through the repository as a result of climate change. Further, section 63.342(c)(2) allows DOE to perform its analysis using a specified percolation rate.⁴⁴

⁴⁰ Order Identifying Phase I Legal Issues at 1; Nevada's Final NRC Rule Contentions at 2.

⁴¹ See Tr. at 110-11; Nevada Legal Issue Brief at 6; DOE Legal Issues 3 & 4 Brief at 2; NRC Staff Legal Issue Brief at 16.

⁴² Nevada Legal Issue Brief at 6.

⁴³ See DOE Legal Issues 3 & 4 Brief at 3-7; NRC Staff Legal Issue Brief at 16.

⁴⁴ Section 63.342(c)(2) states:

DOE must assess the effects of climate change. The climate change analysis may be limited to the effects of increased water flow through the repository as a result of climate change, and the resulting transport and release of radionuclides to the accessible environment. The nature and degree of climate change may be

Nevada contends that, if climate change in fact must be “screened in” under section 63.342(a), and analyzed during the first 10,000-year period for that reason, then section 63.342(c)(2) becomes irrelevant and the option of a simplified analysis during the subsequent 990,000-year period does not apply.⁴⁵ Instead, Nevada contends, in those circumstances DOE must project the continued effects of climate change during the 990,000-year period pursuant to the first paragraph of section 63.342(c), which contains no option for a simplified analysis using a specified percolation rate.⁴⁶

Arguably, the language of the regulation is ambiguous. By its terms, section 63.342(c)(2) is linked with the first paragraph of section 63.342(c) with the phrase “and also.” The regulation might have been clearer if the subsections were linked with a phrase such as “provided, however, that.” Nonetheless, the regulatory history shows that the Commission intended for DOE to have the option to analyze climate change during the 990,000-year period

represented by constant-in-time climate conditions. The analysis may commence at 10,000 years after disposal and shall extend through the period of geologic stability. The constant-in-time values to be used to represent climate change are to be the spatial average of the deep percolation rate within the area bounded by the repository footprint.

Id.

⁴⁵ Nevada Legal Issue Brief at 6-8.

⁴⁶ Section 63.342(c) states:

For performance assessments conducted to show compliance with §§ 63.311(a)(2) and 63.321(b)(2), DOE’s performance assessments shall project the continued effects of the features, events, and processes included in paragraph (a) of this section beyond the 10,000-year post-disposal period through the period of geologic stability. 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.

Id.

using the simplified percolation rate method, regardless of whether DOE might be required to analyze climate change by some other method during the initial 10,000-year period.

When it promulgated the final version of 10 C.F.R. § 63.342(c), the Commission expressed concern about the potential for “unbounded speculation” in projecting analyses out to one million years.⁴⁷ The Commission explained that the specified deep percolation rates for climate change “appropriately reflect the uncertainty in the area-averaged water flux through the footprint of the potential repository during the period after 10,000 years and are a reasonable basis for estimating and evaluating the long-term safety of the repository.”⁴⁸ There is no suggestion in either the proposed or final rulemaking notices that an analysis utilizing the prescribed methodology for evaluation of climate change in the post-10,000-year period would not be sufficient under the regulation.

Accordingly, DOE may elect to use the prescribed method specified in section 63.342(c)(2) to analyze the effects of climate change during the post-10,000-year period, regardless of whether it is required to analyze the effects of climate change during the initial 10,000-year period.

D. Legal Issue 5:

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.⁴⁹

Simply stated, the legal issue is whether 10 C.F.R. § 63.342(c) requires the post-10,000-

⁴⁷ 74 Fed. Reg. at 10,815.

⁴⁸ Id. at 10,820.

⁴⁹ Joint Proposal Identifying Legal Issues, Attachment 1 at 3.

year performance assessment to include the effects of erosion if there is no showing that erosion causes increases in radiological exposures or releases within the first 10,000 years.

Nevada contends the answer is yes.⁵⁰ DOE and the NRC Staff say the answer is no.⁵¹ We agree with DOE and the NRC Staff.

Section 63.342(c) requires an analysis for the post-10,000-year period of certain specified FEPs (which do not include erosion), as well as all FEPs that are “screened in” during the first 10,000 years pursuant to section 63.342(a).⁵² The key question, therefore, is whether in any circumstance erosion can be screened in under section 63.342(a) if there is no showing that erosion causes increases in radiological exposures or releases within the first 10,000 years.

That question must be answered no. Pursuant to 10 C.F.R. § 63.114, only FEPs that produce significant changes in releases or doses within the first 10,000 years after disposal must be included in performance assessments.⁵³ Section 63.342(a), in turn, requires analysis of only those FEPs that cannot be excluded on the basis of low probability of occurrence and whose exclusion would result in a significant change in the results of the performance assessment in the first 10,000-year period.

If one assumes that there is no showing that erosion causes any increases in radiological exposures or releases within the first 10,000 years, then obviously there can be no “significant” changes in releases or doses—and hence no “significant” change in performance assessment results—caused by erosion during the first 10,000 years. This is so regardless of

⁵⁰ See Nevada Legal Issue Brief 9-11.

⁵¹ See DOE Legal Issue 5 Brief at 2-4; NRC Staff Legal Issue Brief at 20.

⁵² 10 C.F.R. § 63.342(c).

⁵³ Id. § 63.114(a)(5).

whether there may be “increase[s] in infiltration and seepage rates.”⁵⁴ Under the Commission’s regulations, the relevant test is whether there are significant increases in radiological exposures or releases, not whether there might be increases in infiltration and seepage rates.

Nevada purports to find language in 10 C.F.R. § 63.102(j) to the effect that a FEP such as erosion must be considered if it is expected to be “potentially adverse to performance.”⁵⁵ This could be the case, Nevada argues, if the FEP changed intermediate-performance measures (such as infiltration and seepage rates) that might eventually be linked to radiological exposures or releases even if there is no demonstrated effect during the first 10,000 years.⁵⁶

The Board is not persuaded. Whether a FEP must be included in the performance assessment for the period after 10,000 years is governed by section 63.342, not by section 63.102(j). Section 63.102 is titled “Concepts.” By its own terms, section 63.102 merely “provides a functional overview of . . . Subpart E.”⁵⁷ As stated in the preamble to the 2001 final rule, “except for . . . [section] 63.102, ‘Concepts,’” Subpart E “contains performance objectives for the geologic repository . . . after permanent closure (postclosure) . . . , and requirements for the analyses used to demonstrate compliance with the performance objectives.”⁵⁸ Thus, the Commission has expressly recognized that, unlike the other provisions in Subpart E, section 63.102 does not set forth binding requirements.

⁵⁴ See Nevada Reply at 17.

⁵⁵ Section 63.102(j) states in relevant part: “[t]hose [FEPs] expected to materially affect compliance with § 63.113(b) or be potentially adverse to performance are included, while events . . . that are very unlikely . . . can be excluded from the analysis.” 10 C.F.R. § 63.102(j) (emphasis added).

⁵⁶ See Nevada Reply at 13-16.

⁵⁷ 10 C.F.R. § 63.102.

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

Accordingly, 10 C.F.R. § 63.342(c) does not require the post-10,000-year performance assessment to include the effects of erosion if it is assumed there is no showing that erosion causes increases in radiological exposures or releases within the first 10,000 years.

E. Legal Issue 6:

Whether, under 10 C.F.R. Part 63, DOE is required to provide and rely upon final design information in the [License Application].⁵⁹

Nevada contends that, as a matter of law, DOE is required to provide final design information in the License Application.⁶⁰ DOE and the NRC Staff contend that the specific level of detail that is sufficient at this construction authorization stage raises fact questions, not a legal question.⁶¹ Thus, they insist that the answer to the question presented must therefore be no.

The Board agrees with DOE and the NRC Staff.

By its terms, the applicable NRC regulation requires merely that the License Application be “as complete as possible in light of the information that is reasonably available at the time of docketing.”⁶² The only reference in the regulations to “final design” implies that a final design is not required.⁶³ Rather, the regulations state that, in the License Application, “[s]pecial attention must be given to those items that may significantly influence the final design.”⁶⁴ It seems doubtful that the Commission would direct DOE to specify items that “may significantly influence the final design” of the repository if the License Application were to provide a final design.

⁵⁹ Joint Proposal Identifying Legal Issues, Attachment 1 at 3.

⁶⁰ Nevada Legal Issue Brief at 14.

⁶¹ DOE Legal Issue 6 Brief at 4 n.11; NRC Staff Reply at 14.

⁶² 10 C.F.R. § 63.21(a).

⁶³ Id. § 63.21(c)(18).

⁶⁴ Id. (emphasis added).

This view is supported by the regulatory history. As the Commission explained, “part 63 provides for a multi-staged licensing process that affords the Commission the flexibility to make decisions in a logical time sequence that accounts for DOE collecting and analyzing additional information over the construction and operational phases of the repository.”⁶⁵ As to the information required at this first construction authorization stage, the Commission stated:

Clearly, the knowledge available at the time of construction authorization will be less than at the subsequent stages. However, at each stage, DOE must provide sufficient information to support that stage. DOE has stated its intent to submit, and NRC expects to receive, a reasonably complete application at the time of construction authorization to allow the Commission to make a construction authorization decision.⁶⁶

In short, the Commission intended for its regulations to “provide the necessary flexibility for making licensing decisions consistent with the amount and level of detail of information appropriate to each licensing stage.”⁶⁷ Thus, before any waste may be received, DOE must “update” its application with additional information—including, specifically, additional “design” data obtained during construction.⁶⁸ Moreover, because 10 C.F.R. Part 63 is a performance-based regulation and is not prescriptive, even within particular stages the necessary level of design detail may vary, depending on the importance to public health and safety of the structure, component, or activity being described.⁶⁹ We see no indication that the Commission intended a blanket requirement for complete “final design” information at the initial construction authorization stage.

⁶⁵ 66 Fed. Reg. at 55,738.

⁶⁶ Id. at 55,738-39.

⁶⁷ Id. at 55,739.

⁶⁸ 10 C.F.R. § 63.24(b)(1).

⁶⁹ See 66 Fed. Reg. at 55,736, 55,738-39.

Nevada infers a contrary conclusion from the regulatory history, based upon a comparison between 10 C.F.R. Part 63 and the two-step nuclear plant licensing process of 10 C.F.R. Part 50.⁷⁰ We are not persuaded. Although the Commission no longer mandates separate construction and operating license applications for nuclear power plants, it is clear that it nonetheless contemplated a multi-staged licensing scheme under 10 C.F.R. Part 63—expressly allowing (indeed requiring) DOE to submit additional design information and to update its application at later stages.⁷¹

As Nevada correctly points out,⁷² and both DOE and the NRC Staff appear to concede,⁷³ while the Board's decision on this issue will likely require dismissal of certain legal issue contentions, other factual contentions remain viable insofar as they allege that the application contains insufficient design information to permit an adequate safety review of specific structures, systems, and components.

F. Legal Issue 7:

Whether, 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 [Total System Performance Assessment] potential deviations from repository design or errors in waste emplacement.⁷⁴

As posited, the legal issue appears to have arisen from a misunderstanding based upon an erroneous statement in a supporting technical document, which was corrected before the

⁷⁰ See Nevada Legal Issue Brief at 14-20.

⁷¹ We also reject Nevada's claim that because the regulations do not explicitly refer to a "preliminary design" followed by a "final design," we should presume that the design level in the original application must be final in nature. See Nevada Legal Issue Brief at 14.

⁷² See id. at 21.

⁷³ See DOE Legal Issue 6 Brief at 4 n.11; NRC Staff Reply at 14.

⁷⁴ Joint Proposal Identifying Legal Issues, Attachment 1 at 4.

License Application was filed.⁷⁵ Nevada initially believed it was DOE's position that deviations from the repository design or errors in waste emplacement caused by human errors could be screened out and excluded from further consideration merely because DOE will have a compliant and functioning quality assurance program.⁷⁶ Based upon this understanding, Nevada argued that such deviations from the repository design or errors in waste emplacement must be screened in (or out) using the same frequency or consequence screening criteria that apply to other FEPs.⁷⁷ Neither DOE nor the NRC Staff disagrees.⁷⁸

We concur. Although coverage of a potential event by DOE's quality assurance does not operate as a matter of law to exclude consideration of a FEP, the effects of the quality assurance program can be taken into account in determining the probability and consequences of the FEP.

G. Legal Issue 8:

Whether, under NWPA § 121(b)(1)(B)⁷⁹ 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.⁸⁰

As understood by the parties, the legal question presented is not whether DOE must postulate a failure to install drip shields.⁸¹ Rather, it is whether DOE is required by the cited

⁷⁵ See DOE Legal Issue 7 Brief at 3 n.6. The erroneous statement in the initial technical document was corrected before the License Application was filed. A corrected document was placed on the Licensing Support Network over five months before the deadline for filing intervention petitions. Id.

⁷⁶ See Nevada Legal Issue Brief at 22.

⁷⁷ See id. at 24.

⁷⁸ See DOE Reply at 28; NRC Staff Reply at 15-17.

⁷⁹ Nuclear Waste Policy Act (NWPA) § 121(b)(1)(B), 42 U.S.C. § 10141(b)(1)(B) (2009).

⁸⁰ Joint Proposal Identifying Legal Issues, Attachment 1 at 4.

⁸¹ See Nevada Legal Issue Brief at 25; DOE Reply at 31; Tr. at 243 (explaining that the NRC

authorities to perform a drip shield neutralization analysis: that is, a performance analysis in which a barrier (the drip shields) is neutralized (assumed not to inhibit the movement of water or radionuclides), and a determination is made of the difference in result. Such an analysis, Nevada contends, is required to ascertain the drip shields' contribution to total system performance and thereby determine whether DOE has satisfied the multiple barrier requirements of section 121(b)(1)(B) of the NWPA⁸² and 10 C.F.R. Part 63.⁸³

DOE and the NRC Staff contend there is no regulatory requirement for DOE to assume and then to analyze the complete failure of any barrier in the absence of a finding that such a failure is within the bounds of probability or consequence that must be analyzed in the performance assessment.⁸⁴ They assert there is no legal requirement to analyze in the abstract the effects of a complete failure of drip shields.⁸⁵

We agree with DOE and the NRC Staff. The answer to the question presented is no.

First, no requirement for a quantitative evaluation of an individual barrier's capabilities appears in the relevant statutory language. Section 121(b)(1)(B) of the NWPA states merely that the NRC's licensing regulations must "provide for the use of a system of multiple barriers in the design of the repository."⁸⁶

Staff understood the legal question to be whether the NRC regulations require DOE to consider the failure of all drip shields outside the performance assessment).

⁸² 42 U.S.C. § 10141(b)(1)(B).

⁸³ See Nevada Legal Issue Brief at 25.

⁸⁴ See DOE Legal Issue 8 Brief at 2; NRC Staff Reply at 18.

⁸⁵ DOE concedes that it was required to analyze, and asserts that it did in fact analyze, complete failure of the drip shields in the context of certain circumstances (i.e., under the provisions of 10 C.F.R. § 63.342), where appropriate (i.e., for seismic and igneous), and that it included the results of those analyses in the performance assessment. See DOE Legal Issue 8 Brief at 5.

⁸⁶ 42 U.S.C. § 10141(b)(1)(B).

Second, the Commission has twice declined the opportunity to require DOE to evaluate, as a general matter, the absence or failure of all drip shields. When it initially promulgated Part 63, the Commission expressly stated that it would not “prescribe arbitrary, minimum performance standards for subsystems to build confidence in the system’s overall performance.”⁸⁷ The Commission explained that the “[q]uantitative evidence of the capability of individual barriers to contribute to waste isolation is an integral part of the performance assessment. Therefore, an additional quantitative limit [for each barrier’s capability] is not necessary to show that overall performance reflects a system of multiple barriers.”⁸⁸ Again, in the statement of considerations accompanying the 2009 revision to 10 C.F.R. Part 63, the Commission confirmed that “[t]he emphasis should not be on the isolated performance of individual barriers but rather on ensuring the repository system . . . is not wholly dependent on a single barrier” and that DOE’s proposed barrier system will be evaluated as an integrated whole “without unnecessary constraints imposed by separate, additional subsystem performance requirements.”⁸⁹

Third, in NEI v. EPA,⁹⁰ the United States Court of Appeals for the District of Columbia Circuit considered the Commission’s approach and approved it. Contrary to Nevada’s arguments, the court ruled that section 121 of the NWPA does not require that each barrier provide either wholly independent protection or a specifically quantified amount of protection:

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

⁸⁷ 66 Fed. Reg. at 55,758.

⁸⁸ Id. at 55,759.

⁸⁹ 74 Fed. Reg. at 10,826 (quoting 66 Fed. Reg. at 55,758).

⁹⁰ Nuclear Energy Inst., Inc. v. EPA, 373 F.3d 1251 (D.C. Cir. 2004).

“provid[e] for the use of a system of multiple barriers in the design of the repository.”⁹¹

Based in large measure on the importance to safety of a philosophy of defense-in-depth, Nevada argues to the contrary—contending that a quantitative evaluation of the system’s robustness requires a neutralization analysis.⁹² The Board is not persuaded. Because there is no requirement to demonstrate quantitatively the independent contribution of drip shields, DOE need not perform a barrier neutralization analysis to ascertain each individual barrier’s contribution to the repository’s multiple barrier system. Given the regulatory history, the Board will not infer a requirement that does not appear in the language of the statute or applicable regulations and, in effect, rule for Nevada on an argument that it has lost twice before the Commission and once before the Court of Appeals.

Accordingly, the answer to the legal question presented is no. Resolution of this legal question, however, does not resolve the related factual question of whether DOE has adequately demonstrated that the multibarrier protection system is not “wholly dependent on a single barrier.”⁹³

H. Legal Issue 9:

Whether 10 C.F.R. §§ 63.21(c)(7) and 63.31 allow DOE to submit in the [License Application] a description of its retrieval plans without having a full retrieval plan available for review.⁹⁴

DOE and the NRC Staff contend that the answer to the question presented is yes.⁹⁵

⁹¹ Id. at 1295 (quoting 42 U.S.C. § 10141(b)(1)(B)) (internal citations omitted).

⁹² See Nevada Legal Issue Brief at 25-32; Nevada Reply at 27-31.

⁹³ 74 Fed. Reg. at 10,826 (quoting 66 Fed. Reg. 55,758).

⁹⁴ Joint Proposal Identifying Legal Issues, Attachment 1 at 4.

⁹⁵ See DOE Legal Issue Brief 9 at 2; NRC Staff Legal Issue Brief at 36.

Nevada contends the answer is no.⁹⁶

The Board agrees with DOE and the NRC Staff.

Section 63.21(c)(7) requires that the License Application include a “description of plans for retrieval and alternate storage of the radioactive wastes, should retrieval be necessary.” The most natural reading of this requirement is that the License Application must set forth a general “description” of plans that will be developed in greater detail “should retrieval be necessary.” We do not believe, as Nevada would have it, that the requirement for a “description” of plans in the License Application implies that, when the License Application was submitted, fully developed plans must already exist.⁹⁷ Had the Commission intended to require more than a “description” of retrieval plans, it could have said so explicitly, as it did in other parts of section 63.21 with respect to other plans.⁹⁸

The Board’s reading also is supported by regulatory history. When promulgating 10 C.F.R. Part 63, the Commission expressly addressed the distinction between a plan and a description of a plan, as those terms are used in section 63.21. As originally proposed, section 63.21(b)(3) called for a “detailed plan” for providing physical protection for high-level waste.⁹⁹ In response to DOE’s concern that sufficient information might not be available at the construction authorization stage, the Commission changed the language of the rule to require only a

⁹⁶ See Nevada Legal Issue Brief at 33.

⁹⁷ See id. Nevada claims that “[t]he most natural reading of these regulations is that the plans must already exist, because plans that do not exist are indescribable.” Id. at 32.

⁹⁸ Compare, e.g., 10 C.F.R. § 63.21(c)(7) (description of retrieval plans), with id. § 63.21(c)(22)(iv) (plans for startup activities and testing), and id. § 63.21(c)(22)(v) (plans for conducting activities such as maintenance, surveillance, and periodic testing).

⁹⁹ 66 Fed. Reg. at 55,738.

“description” of such security measures.¹⁰⁰ The Commission observed that this change would be consistent with other provisions requiring only that a “description” of plans be submitted with the License Application.¹⁰¹

Previously, when it promulgated section 60.21 (from which section 63.21 was adapted), the Commission likewise displayed an understanding that a “description” of a plan means, in effect, an overview or preliminary or conceptual plan, and not a description of an essentially final plan:

A number of commenters expressed the opinion that the wording of § 60.21 did not explicitly reflect the preliminary nature of some of the information that would be available at the construction authorization stage. Some commenters believed that certain categories of information, such as emergency plans and plans for retrieval, did not seem necessary, at least in full detail, at the construction authorization stage. In view of the fact that § 60.21 must be read in conjunction with § 60.24(a), which specifies that the application shall be as complete as possible in light of information that is reasonably available at the time of docketing, no change to the proposed rule is required.¹⁰²

In other words, the Commission did not change the requirement that the License Application include a “description of plans for retrieval” because it contemplated that the “full detail” of such plans could await a later stage of the proceeding.

Finally, the Board’s interpretation of what is required by a “description” of a plan is consistent with the multi-staged licensing process that is explained in connection with Legal Issue 6.¹⁰³ As the Commission has stated, “part 63 provides for a multi-staged licensing process that affords the Commission the flexibility to make decisions in a logical time sequence

¹⁰⁰ Id. at 55,738-39.

¹⁰¹ Id.

¹⁰² Disposal of High-Level Radioactive Wastes in Geologic Repositories: Licensing Procedures, 46 Fed. Reg. 13,971, 13,974 (Feb. 25, 1981) (internal quotations omitted).

¹⁰³ See supra Part II.E.

that account for DOE collecting and analyzing additional information over the construction and operational phases of the repository.”¹⁰⁴

To be sure, as Nevada points out,¹⁰⁵ the regulatory history also shows that the Commission expected DOE’s retrieval plans to be closely scrutinized at the construction authorization stage. When promulgating Part 63, the Commission stated that “the retrieval operation would be an unusual event, and may be an involved and expensive operation” and that “[a]s such, DOE can expect that its plans and procedures in this area will receive extensive, detailed review by the NRC staff as part of any construction authorization review.”¹⁰⁶

In light of the plain language of the regulation and other parts of the regulatory history, however, this statement does not mean that, as a matter of law, we must read the requirement for a “description” of retrieval plans as requiring the existence of full, final plans at the time the License Application is submitted. As the NRC Staff points out, the exact level of information that will be sufficient for the Staff to reach the findings required at each stage of the License Application is not a question of law, but of fact.¹⁰⁷ Moreover, the level of detail necessary in a description of retrieval plans may, and probably will, vary depending on the stage of the Staff’s review. The Commission expects DOE to update its License Application to provide “sufficient information to support [the relevant review] stage.”¹⁰⁸

Accordingly, the legal question presented must be answered in the affirmative.

¹⁰⁴ 66 Fed. Reg. at 55,738.

¹⁰⁵ Nevada Legal Issue Brief at 33.

¹⁰⁶ 66 Fed. Reg. at 55,743.

¹⁰⁷ NRC Staff Reply at 21.

¹⁰⁸ 66 Fed. Reg. at 55,739.

I. Legal Issue 10:

Whether, 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.¹⁰⁹

Although perhaps awkwardly phrased,¹¹⁰ in effect the parties have briefed and argued the issue as follows: Is it impossible, as a matter of law, for the Commission to make the finding required by 10 C.F.R. § 63.31(a)(2) in light of DOE's drip shield installation plan?

Nevada says yes,¹¹¹ and DOE and the NRC Staff say no.¹¹² The Board agrees with DOE and the NRC Staff.

The issue presented really poses two separate questions. First, at the time it decides whether to authorize construction, must the Commission consider whether or not it will later be able to determine that construction of the underground facility has been "substantially completed" in accordance with 10 C.F.R. § 63.41(a)? Second, if so, does DOE's plan to install drip shields only after wastes have been emplaced mean that, as a matter of law, the Commission will not be able to make a "substantial completion" finding before issuing DOE a license to receive and possess the wastes?

Before authorizing construction of the proposed repository, the Commission must determine, pursuant to 10 C.F.R. § 63.31(a)(2), "[t]hat there is reasonable expectation that the materials can be disposed of without unreasonable risk to the health and safety of the public."

¹⁰⁹ State of Nevada's Legal Issue for NEV-SAFETY-162 (Oct. 6, 2009) at 1.

¹¹⁰ The parties were able to agree on the phrasing of most legal issues presented, but not on Legal Issue 10. The Board determined to decide Legal Issue 10 in the form proposed by Nevada. See Order Identifying Phase I Legal Issues at 2.

¹¹¹ See Nevada Legal Issue Brief at 40-41.

¹¹² See DOE Legal Issue 10 Brief at 3-4; NRC Staff Legal Issue Brief at 25.

Thereafter, pursuant to 10 C.F.R. § 63.41(a)(2), before issuing a license to receive and possess such materials at the repository, the Commission must find that construction of “[a]ny underground storage space required for initial operation” has been “substantially complete[d].”

Nevada contends that the Commission cannot possibly make the first determination because it cannot make the second.¹¹³ As a matter of law, Nevada argues, construction of “[a]ny underground storage space required for initial operation” cannot be “substantially complete” before the drip shields are installed.¹¹⁴ The Board is not persuaded.

Nevada appears to jump the gun by invoking standards that do not apply at the construction authorization stage of this multi-staged licensing process.¹¹⁵ It concedes that ordinarily it would “make no sense to be concerned about the status of construction completion at the pre-construction stage, because no construction is to be completed at this point.”¹¹⁶ Nevada claims, however, that “we know now, at the pre-construction stage, that a factual finding related to construction completion and required to be made before operation can commence cannot possibly be made.”¹¹⁷

We reject Nevada’s suggestion that we must therefore read section 63.31 so broadly as to import the substantial completion test of section 63.41 (which is an analysis required during the subsequent license to receive and possess stage) into the construction authorization test of section 63.31. We do not conclude that, as a matter of law, the required finding concerning

¹¹³ Nevada Legal Issue Brief at 36.

¹¹⁴ Id.

¹¹⁵ Section 63.41 is entitled “Standards for issuance of license” and provides that the Commission may issue a license to receive and possess upon finding that the construction of the facility has been substantially completed. 10 C.F.R. § 63.41(a).

¹¹⁶ Nevada Legal Issue Brief at 37.

¹¹⁷ Id.

construction completion cannot be made.

The question presented addresses solely the requirement in section 63.41(a)(2) for substantial completion of underground storage space “required for initial operation.”¹¹⁸ The drip shields, however, are not scheduled to be installed during the period of “initial” operation (that is, during waste emplacement), but rather during the last phase of operation (permanent closure). Because the drip shields are not required for initial operation, they are not part of the substantial completion determination. Thus, Nevada’s argument that the § 63.41(a) findings will be “impossible to make” is flawed because the finding purported to be “impossible” is not required by the regulations.

Moreover, before issuance of a license to receive and possess waste material, DOE must update its application.¹¹⁹ The Commission has not yet received such an updated application, nor has the NRC Staff reviewed one. Nevada’s reading of the regulations would require a finding pursuant to section 63.41 for an updated application that the Commission has not yet received.

As DOE acknowledges, Nevada will be able to raise factual issues concerning DOE’s ability to install the drip shields under several admitted contentions.¹²⁰ The legal question presented, however, must be answered in the negative.

¹¹⁸ Section 63.102(c) recognizes three phases of “operations”: (1) the period of emplacement; (2) any subsequent period before permanent closure during which the emplaced wastes are retrievable; and (3) permanent closure. Id.

¹¹⁹ See 10 C.F.R. § 63.24.

¹²⁰ See DOE Legal Issue 10 Brief at 6 n.14.

J. Legal Issue 11:

Whether, under 10 C.F.R. §§ 63.113, 63.114, and Part 63 Subpart G, the PMA [Performance Margins Analysis] 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.¹²¹

Nevada and the NRC Staff contend that the answer to the question posed is no.¹²²

Although DOE's briefs might be read to the contrary, during oral argument counsel for DOE clarified that it does not disagree with Nevada and the NRC Staff on the legal issue presented.¹²³ Rather, DOE contends that whether the PMA satisfies applicable quality assurance requirements is a question of fact.¹²⁴

On the legal issue presented, the Board agrees with what now appears to be the position of all parties. Under 10 C.F.R. §§ 63.113, 63.114, and Part 63 Subpart G, the PMA cannot be used to validate or provide confidence in the TSPA if its data and models are not qualified under DOE's quality assurance program.

Commission regulations require a quality assurance program "to provide adequate confidence that the geologic repository and its structures, systems, or components will perform satisfactorily in service."¹²⁵ Pursuant to 10 C.F.R. § 63.142(a), the quality assurance program must be applied to all structures, systems, and components that are important to waste isolation and to "related activities"—defined as including "analyses of samples and data." The PMA, which is a model of repository performance, clearly constitutes an analysis of data.

Analyses that "provide adequate confidence" in performance of the repository are within

¹²¹ Joint Proposal Identifying Legal Issues, Attachment 1 at 4.

¹²² See Nevada Legal Issue Brief at 45; NRC Staff Legal Issue Brief at 47.

¹²³ See Tr. at 322-23.

¹²⁴ See Tr. at 323.

¹²⁵ 10 C.F.R. § 63.141.

the domain of the quality assurance program.¹²⁶ “Adequate confidence” in the performance assessment is derived from sufficient analyses, data, and the technical basis offered to demonstrate compliance with postclosure performance objectives.¹²⁷ Thus, if the PMA is needed to establish “adequate confidence” in the TSPA, then it is subject to the quality assurance requirements of 10 C.F.R. § 63.142.

Therefore, as all parties agree, the legal question presented, must be answered in the negative.

III. Rulings on Rule Waiver Petitions

A. NEV-SAFETY-202

NEV-SAFETY-202 asserts that “climate-change processes included as FEPs in the TSPA for the first 10,000 years are neither carried forward for the next 990,000 years, as the rule requires, nor represented by NRC’s specified deep percolation rate for that subsequent period.”¹²⁸ According to Nevada, 10 C.F.R. § 63.342(c) should be construed so that climate change processes included as FEPs for the first 10,000-year period are carried forward for the post-10,000-year performance assessment using the same methodology, and not represented by the deep percolation flux that applies to climate change FEPs that are excluded for the pre-10,000-year period.¹²⁹

¹²⁶ See id.

¹²⁷ See id. § 63.113.

¹²⁸ Nevada’s Final NRC Rule Contentions at 2.

¹²⁹ Additionally, Nevada faults DOE for neglecting to include the deep percolation rates established in the NRC’s final rule, which are different from the rates set forth in the proposed rule. Id. at 2-3. Neither DOE nor the NRC Staff objects to the admissibility of NEV-SAFETY-202 to this limited extent. See U.S. Department of Energy’s Answer to State of Nevada’s New Contentions Based on Final NRC Rule (July 2, 2009) at 12; NRC Staff Answer to State of Nevada’s New Contentions Based on Final NRC Rule (June 11, 2009) at 10-12 [hereinafter NRC Staff Answer to New Contentions]. This aspect of the contention is therefore admitted.

As set forth above, however, the Board has ruled to the contrary. As to Legal Issues 3 and 4, the Board has determined that section 63.342(c)(2) does allow DOE to elect to use the deep percolation flux to analyze the effects of climate change during the post-10,000-year period, regardless of whether it is required to analyze the effects of climate change during the initial 10,000-year period. Thus, we must address the alternative request in NEV-SAFETY-202, pursuant to 10 C.F.R. § 2.335, for a waiver of section 63.342(c).¹³⁰

Under 10 C.F.R. § 2.335, if the petitioner makes a prima facie showing of the requirements for a rule waiver, the Board must certify the matter to the Commission.¹³¹ Conversely, if there is no prima facie showing, the Board “may not further consider the matter.”¹³²

A petition to waive a Commission regulation “can be granted only in unusual and compelling circumstances.”¹³³ Expanding on the literal requirements in section 2.335, the Commission has set forth a four-part test, under which a petitioner must demonstrate that: (1) the rule’s strict application “would not serve the purpose for which [it] was adopted”; (2) the petitioner has alleged “special circumstances” that were “not considered, either explicitly or by necessary implication, in the rulemaking proceeding leading to the rule sought to be waived”; (3) those circumstances are “unique” to the facility, rather than “common to a large class of facilities”; and (4) a waiver of the regulation is necessary to reach a “significant safety

¹³⁰ Nevada’s Final NRC Rule Contentions at 2.

¹³¹ 10 C.F.R. § 2.335(d).

¹³² Id. § 2.335(c).

¹³³ Pub. Serv. Co. of N.H. (Seabrook Station, Units 1 and 2), ALAB-895, 28 NRC 7, 16 (1988) (internal quotations omitted), aff’d, CLI-88-10, 28 NRC 573 (1988), reconsideration denied, CLI-89-3, 29 NRC 234 (1989).

problem.”¹³⁴ For a waiver request to be granted, all four factors must be met.¹³⁵

Here, the dispositive issue is whether Nevada has made a prima facie showing that the issues it wishes to raise concerning climate change were not previously considered by the Commission—either explicitly or by necessary implication—in the rulemaking proceeding that led to 10 C.F.R. § 63.342. Nevada does not make such a prima facie showing.

Nevada contends that, in the period beyond 10,000 years, climatic conditions at Yucca Mountain will be determined by complex, shifting interactions between: (1) isolation changes driven by changes in the orbital characteristics of the Earth, which have characteristic timescales of between 21,000 and 400,000 years; (2) natural variations in greenhouse gas concentrations in the atmosphere; (3) the slow reduction in greenhouse gas concentrations resulting from human activities; and (4) internal variability within the climate system at sub-orbital timescales.¹³⁶ According to Nevada, the effects of these complex interactions have been studied for Europe, but neither DOE nor NRC has conducted corresponding studies for Yucca Mountain.¹³⁷ Thus, Nevada contends that the specification of a range of deep percolation rates, as set forth in 10 C.F.R. § 63.342(c), fails to account for recent advances in scientific knowledge.¹³⁸

As the NRC Staff points out, however, when it promulgated section 63.342 the

¹³⁴ Dominion Nuclear Conn. Inc. (Millstone Nuclear Power Station, Units 2 and 3), CLI-05-24, 62 NRC 551, 559-60 (2005) (internal citations omitted).

¹³⁵ See id. at 560.

¹³⁶ See Nevada’s Final NRC Rule Contentions at 6-7.

¹³⁷ Id.

¹³⁸ Id. at 7.

Commission recognized that scientific progress could be expected to continue.¹³⁹ Nonetheless, the Commission stated that “the intention of the rule is to specify a reasonable basis for evaluating safety using current knowledge. Given the current approach for estimating deep percolation, it would take a major shift in scientific understanding for the deep percolation rates to change significantly.”¹⁴⁰

Moreover, in promulgating the rule, the Commission did in fact consider many of the same factors as the authors of the studies performed in Europe.¹⁴¹ Indeed, the Commission received and considered comments on the proposed rule that were similar to the concerns raised in NEV-SAFETY-202, and responded to them.¹⁴²

In these circumstances, Nevada has failed to make a prima facie showing that the matters it seeks to raise were not previously considered by the Commission, “either explicitly or by necessary implication,” when the Commission promulgated the pertinent regulation scarcely more than two years ago. Nevada’s rule waiver petition, accordingly, must be denied. As the Commission stated in its statement of considerations amending the final rule, if Nevada “believes that the specification for climate change no longer provides a reasonable basis for demonstrating compliance based on new scientific evidence, they can petition NRC to amend the rules.”¹⁴³

B. NEV-SAFETY-203

NEV-SAFETY-203 asserts that, even if exclusion of land-surface erosion were correct

¹³⁹ See 74 Fed. Reg. at 10,823; NRC Staff Answer to New Contentions at 10.

¹⁴⁰ 74 Fed. Reg. at 10,823 (emphasis added).

¹⁴¹ See NRC Staff Answer to New Contentions, Affidavit of Eugene Peters ¶ 9 (June 11, 2009).

¹⁴² See 74 Fed. Reg. at 10,818-24.

¹⁴³ Id. at 10,824; see also 10 C.F.R. § 2.802.

for the first 10,000 years, land surface erosion should not be excluded from the TSPA in the subsequent period, notwithstanding 10 C.F.R. § 63.342(c), because “topography modifications will continue to the point that topography is grossly altered.”¹⁴⁴ Within this latter period, Nevada alleges that “portions of the Paintbrush Tuff may become completely eroded, with significant affects [sic] on infiltration and seepage, and the emplacement drifts may be exposed to the earth’s surface, eliminating the upper geologic barrier entirely.”¹⁴⁵

Thus, NEV-SAFETY-203 likewise seeks a rule waiver, pursuant to section 2.335, and presents a similar key issue: Does Nevada make a prima facie showing that the facts upon which it relies were not previously considered by the Commission during the relevant rulemaking proceeding—either explicitly or by necessary implication? Again, Nevada does not make such a prima facie showing.

Nevada submits scientific evidence of a safety problem that might result from the long-term effects of erosion.¹⁴⁶ But the relevant test is not whether Nevada makes a prima facie showing of a potential safety concern, but rather whether it makes a prima facie showing that the Commission did not previously consider that concern.

Nevada relies primarily on a recent study (Stuewe) that was not itself before the Commission during the relevant rulemaking.¹⁴⁷ As the NRC Staff persuasively argues, however, the Commission considered a broad range of information relating to erosion in order to specify the deep percolation rates in section 63.342, including the types of information identified in the

¹⁴⁴ See Nevada’s Final NRC Rule Contentions at 9.

¹⁴⁵ Id.

¹⁴⁶ See id. at 10-11.

¹⁴⁷ See id. at 11-12.

Stuewe paper and underlying the Stuewe model.¹⁴⁸ In these circumstances, Nevada's rule waiver petition again must be denied because of its failure to make a prima facie showing that its concerns about long-term erosion were not previously considered by the Commission "either explicitly or by necessary implication."

Nevada's allegation that the long-term effects of erosion might entirely eliminate the proposed repository's upper geologic barrier nonetheless raises a potentially significant safety concern. Unless erosion is "screened in" as a FEP because of its effects during the first 10,000 years, section 63.342 prevents Nevada from litigating the effects of erosion during the next 990,000 years. Thus, if the Commission is not satisfied that Nevada's arguments were adequately considered during the applicable rulemaking proceeding, it might wish to reconsider this aspect of section 63.342 on its own initiative. Of course, Nevada itself is also free to petition the Commission directly for a change in the rule.¹⁴⁹

IV. Conclusion

The Phase I legal issues identified for briefing in accordance with the Board's order of October 23, 2009 are decided as set forth herein. Without waiver of any party's eventual appeal rights with respect to such rulings, the affected parties shall attempt to stipulate to the effects of the Board's rulings on specific admitted contentions, which stipulation shall be submitted on or before January 21, 2011. If the parties cannot fully agree, each party shall state its separate differing position on any contention by a filing due the same date.

As previously noted, NEV-SAFETY-202 is admitted to the limited extent that DOE has

¹⁴⁸ See NRC Staff Answer to New Contentions at 14-17; Staff Response to Board Questions at 1-4.

¹⁴⁹ See 10 C.F.R. § 2.802.

failed to include the revised percolation rates established in NRC's final rule.¹⁵⁰ The rule waiver petitions set forth in NEV-SAFETY-202 and NEV-SAFETY-203 are denied.

It is so ORDERED.

THE ATOMIC SAFETY
AND LICENSING BOARD

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Rockville, Maryland
December 14, 2010

¹⁵⁰ See supra note 129.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)
)
U.S. DEPARTMENT OF ENERGY)
)
(High-Level Waste Repository))
)

Docket No. 63-001-HLW
ASLBP No. 09-892-HLW-CAB04

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing Board **MEMORANDUM AND ORDER (Deciding Phase I Legal Issues and Denying Rule Waiver Petitions) (LBP-10-22)**, dated December 14, 2010, have been served upon the following persons by Electronic Information Exchange.

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U.S. DEPARTMENT OF ENERGY (High Level Waste Repository) Docket No. 63-001-HLW
**MEMORANDUM AND ORDER (Deciding Phase I Legal Issues and Denying Rule Waiver
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U.S. DEPARTMENT OF ENERGY (High Level Waste Repository) Docket No. 63-001-HLW
**MEMORANDUM AND ORDER (Deciding Phase I Legal Issues and Denying Rule Waiver
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U.S. DEPARTMENT OF ENERGY (High Level Waste Repository) Docket No. 63-001-HLW
**MEMORANDUM AND ORDER (Deciding Phase I Legal Issues and Denying Rule Waiver
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U.S. DEPARTMENT OF ENERGY (High Level Waste Repository) Docket No. 63-001-HLW
**MEMORANDUM AND ORDER (Deciding Phase I Legal Issues and Denying Rule Waiver
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U.S. DEPARTMENT OF ENERGY (High Level Waste Repository) Docket No. 63-001-HLW
**MEMORANDUM AND ORDER (Deciding Phase I Legal Issues and Denying Rule Waiver
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U.S. DEPARTMENT OF ENERGY (High Level Waste Repository) Docket No. 63-001-HLW
**MEMORANDUM AND ORDER (Deciding Phase I Legal Issues and Denying Rule Waiver
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**MEMORANDUM AND ORDER (Deciding Phase I Legal Issues and Denying Rule Waiver
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