

December 7, 2009

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
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U.S. DEPARTMENT OF ENERGY)	Docket No. 63-001-HLW
)	
(High-Level Waste Repository))	ASLBP No. 09-892-HLW-CAB04
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NRC STAFF BRIEF ON PHASE I LEGAL ISSUES

INTRODUCTION

On October 23, 2009, Construction Authorization Board-04 ("the Board") issued an Order directing the parties to brief legal issues associated with Phase I of the proceeding. Order (Identifying Phase I Legal Issues for Briefing), dated October 23, 2009 ("October 23 Order"). The NRC staff ("Staff") brief on the Phase I Legal Issues is set forth below.

BACKGROUND

On June 3, 2008, the U.S. Department of Energy (DOE) submitted a license application (LA) to the NRC, seeking authorization to construct a geologic repository at Yucca Mountain, Nevada, and the Commission published a notice of opportunity for a hearing on October 22, 2008. U.S. Department of Energy (High-Level Waste Repository); Notice of Hearing and Opportunity to Petition for Leave to Intervene on an Application for Authority to Construct a Geologic Repository at a Geologic Repository Operations Area at Yucca Mountain, 73 Fed.

Reg. 63,029 (Oct. 22, 2008) ("Hearing Notice"). Thirteen requests for a hearing were received.¹ On May 11, 2009, Construction Authorization Boards -01, -02, and -03 issued an Order (Identifying Participants and Admitted Contentions), LBP-09-6, 69 NRC 367 (2009). Among the admitted contentions were a number of legal issue contentions: (1) those identified as legal issue contentions by the petitioners; (2) those identified as legal issue contentions by the Board; and (3) factual contentions that also contain legal issues appropriate for review. LBP-09-6, 69 NRC at 422. The Board stated that a schedule for briefing the legal issue contentions would be established, and that "after such legal issue contentions are resolved, many remaining related factual contentions may be appropriate for summary disposition." *Id.*

In "CAB Case Management Order #2," dated September 30, 2009, at 3, the Board established that the first phase of the discovery and hearings would encompass safety and miscellaneous contentions related to Safety Evaluation Report (SER) Volumes 1 and 3; National Environmental Policy Act (NEPA) contentions, other than those related to groundwater, related to SER Volumes 1 and 3; and legal issue contentions related to SER Volumes 1 and 3. The Board also directed the parties to identify each legal contention or legal issue to be considered in Phase I of the proceeding. *Id.* at 4.

On October 6, 2009, DOE, NEI, and Nevada filed the U.S. Department of Energy, State of Nevada and Nuclear Energy Institute Joint Proposal Identifying Phase I Legal Issues for Briefing ("Joint Proposal"). The Joint Proposal identified the proposed 11 legal issues and the contentions associated with the legal issues. *Id.* These contentions are: NEI-SAFETY-005,

¹ The hearing requests filed by the Nuclear Energy Institute (NEI) and the State of Nevada included contentions that are the subject of Phase I Legal Issues. The Nuclear Energy Institute's Petition to Intervene, filed December 19, 2008 ("NEI Petition"); State of Nevada's Petition to Intervene as a Full Party, filed December 19, 2008 ("NEV Petition").

NEV-SAFETY-009, NEV-SAFETY-010, NEV-SAFETY-011, NEV-SAFETY-012, NEV-SAFETY-013, NEV-SAFETY-019, NEV-SAFETY-041, NEV-SAFETY-146, NEV-SAFETY-149, NEV-SAFETY-161, NEV-SAFETY-162, NEV-SAFETY-169, NEV-SAFETY-171, NEV-SAFETY-201, and NEV-SAFETY-202. *Id.* DOE and Nevada each filed separate pleadings addressing NEV-SAFETY-162. State of Nevada's Legal Issue for NEV-SAFETY-162, filed October 6, 2009; U.S. Department of Energy Views on NEV-SAFETY-162, filed October 6, 2009. The Staff commented on the Joint Proposal. NRC Staff Comment on Joint Proposal Identifying Phase I Legal Issues for Briefing, dated October 13, 2009. Subsequently, the Board issued an Order adopting Nevada's interpretation of the legal issue related to NEV-SAFETY-162, adopting the other legal issues as stated in the Joint Proposal, and ordering the parties to file initial briefs on December 7, 2009. October 23 Order at 1-2.

DISCUSSION

A. Legal Issue 1 (NEI-SAFETY-005)

NEI-SAFETY-005, Excessive Conservatism in the Postclosure Criticality Analysis, as admitted by LBP-09-06, Attachment A, 69 NRC at 498, states that:

The postclosure criticality analysis described in Section 2.2.1.4.1.1 of the License Application (LA) Safety Analysis Report (SAR) provides a substantial safety margin, is excessively conservative, and will unnecessarily lead to the expectation that disposal control rod assemblies be inserted in some fuel assemblies at nuclear power plants prior to shipment to disposal.

NEI Petition at 31. NEI-SAFETY-005 alleges that because the postclosure criticality analysis described in Section 2.2.1.4.1.1 of the License Application (LA) Safety Analysis Report (SAR) includes a safety margin that is so substantial and excessively conservative, it will lead to the unnecessary insertion of disposal control rod assemblies into some fuel assemblies at nuclear power plants prior to shipment for disposal. NEI Petition at 31-34. NEI alleges that the excessive conservatism is inconsistent with the principle of as low as is reasonably achievable (ALARA) because it will lead to unnecessary occupational radiation exposures, economic costs,

and environmental costs. *Id.*

The legal issues presented by this contention, as admitted by the Board, are:

(1) Whether 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 (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 must show that it does so without any alleged unnecessary expenditures of resources. October 23 Order at 1; see Joint Proposal, Attachment 1 at 1. The Staff's position on each of these questions is that 1) DOE's LA is not required to address ALARA considerations at plant sites remote from the GROA, and 2) DOE is not required to demonstrate that the repository meets applicable safety and environmental regulatory standards without any alleged unnecessary expenditures of resources.

1. Whether 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 GROA to be addressed in DOE's LA

Assuming, without conceding, that the repository design could result in an "increased occupational dose to workers," see NEI Petition at 31-32, none of the workers identified in this contention would be working at the GROA. Consequently, the Staff is of the view that DOE's license application does not have to address potential ALARA considerations with respect to these workers.

"The ALARA principle deals with optimizing the reduction of potential doses from radiation to members of the general public and workers. It is a principal component of the [Commission's] radiation protection philosophy during operations and decommissioning activities. . . ." Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada, 66 Fed. Reg. 55,732, 55,751 (Nov. 2, 2001), and must be implemented by each of the Commission's licensees. 10 C.F.R. § 20.1101. 10 C.F.R.

§ 20.1002 establishes that 10 C.F.R. Part 20 applies to facilities licensed under 10 C.F.R. Part 63.

As explained below, with respect to Yucca Mountain, DOE's license application is required to consider potential radiation exposure (1) to those workers physically located at the Yucca Mountain site, and (2) to the general public from radiation that emanates from material physically located at the GROA. See 10 C.F.R. § 63.21(c)(9)-(14). See also *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).

The Statement of Consideration accompanying the Final Part 63 indicates that the Commission limited the scope of Part 63 to workers physically located at the Yucca Mountain Repository. It does so in the context of a discussion comparing the use of "effective dose equivalent" with "deep dose equivalent" as methods for determining "total effective dose equivalent" (TEDE). 66 Fed. Reg. at 55,735. The Statement of Consideration concludes that "[f]or purposes of assessing actual doses to workers *at the Yucca Mountain repository*, however, the Commission has directed that deep-dose equivalent be used in determining TEDE. This ensures consistency with NRC's regulations for limiting doses *to occupationally exposed workers*." *Id.* (emphasis added).

This discussion indicates both the Commission's intention that under Part 63, with respect to occupational exposures, the scope of 10 C.F.R. §§ 20.1002, 20.1003, and 20.1101 is limited to protection of "workers at the Yucca Mountain repository" and the Commission's understanding that the phrase "occupationally exposed workers" is similarly limited to workers physically located at the Yucca Mountain site. Consequently, neither 10 C.F.R. § 20.1002 nor 10 C.F.R. § 20.1003 requires DOE to address ALARA considerations at individual nuclear plant sites remote from the GROA in the LA.

10 C.F.R. § 20.1101 cannot be interpreted to require DOE to address ALARA considerations at individual nuclear plant sites remote from the geologic repository operations area (GROA) in its LA. Section 20.1101 requires licensees to implement radiation protection programs and include, in these programs, provisions to report exceedances of specified ALARA dose constraints. 10 C.F.R. § 20.1101(d). Pursuant to 10 C.F.R. § 20.2203(b)(1)(iv), licensees are required to take corrective action “to ensure against recurrence.” Much of the information that must be included in these reports can only be known by the operator of the facility at which the event occurred, *e.g.*, excess doses to individuals, excess levels of radiation or concentrations of radioactive material, levels of radiation, radioactive releases exceeding EPA's generally applicable environmental radiation standards, and radioactive releases exceeding license conditions. 10 C.F.R. § 20.2203.

Because DOE would not have information about incidents occurring at individual nuclear power plants and could not address the information required, 10 C.F.R. § 20.1101 requirements should not be construed as requiring DOE to address these requirements because information regarding any corrective measures taken or planned at a power plant would have to be decided upon and taken by the plant operator and not DOE. Regulatory language must be construed to give effect to all of its provisions. *Hydro Resources, Inc.* (P.O. Box 777 Crownpoint, New Mexico 87313), CLI-04-11, 63 NRC 483, 491 (2006). If 10 C.F.R. § 20.1101 were construed as requiring DOE to submit reports required under 10 C.F.R. § 20.2203 that are based on knowledge and information not reasonably available to DOE, it would nullify the effectiveness of the reporting provisions of 10 C.F.R. § 20.2203. Consequently, 10 C.F.R. § 20.1101 should not be interpreted to require DOE to consider ALARA principles at nuclear plants remote from Yucca Mountain in its license application.

Protection of nuclear plant workers at reactor sites remote from Yucca Mountain from unnecessary occupational dose is covered by 10 C.F.R. § 50.40, and is the responsibility of the

plant owners and operators. This section requires each power plant licensee to have, *inter alia*, processes and operating procedures to provide “reasonable assurance” that an applicant will comply with applicable Commission regulations.

The regulations applicable to this proceeding, and cited in the Hearing Notice, do not include 10 C.F.R. Part 50. See 73 Fed. Reg. at 63,029. Unless otherwise specified in 10 C.F.R. Part 63, the scope of the safety matters which DOE must include in its LA, extends only to considering those activities that DOE performs “at a geologic repository operations area (GROA). . . at Yucca Mountain. . . .” See 10 C.F.R. § 63.1.

Installation of control rods into fuel assemblies would take place at the nuclear power plants where spent fuel is loaded into casks, not at the GROA. The actual installation would be accomplished by workers located at those power plants, not workers at the GROA. Therefore, NEI’s allegation that an overly conservative postclosure criticality analysis will result in the possibility of increased occupational doses to workers who install control rods is outside the scope of this proceeding and need not be addressed by DOE in its license application.

The scope of 10 C.F.R. § 63.111 extends only to the Yucca Mountain site. Section 63.102, “Concepts,” by its terms, provides a “functional overview” of subpart E of 10 C.F.R. Part 63. See 66 Fed. Reg. at 55,782. That provision explains that the regulations in subpart E, including 10 C.F.R. § 63.111, address the Commission’s authority over “a particular class of HLW facility, namely, a geologic repository operations area at Yucca Mountain.” 10 C.F.R. § 63.102(b)(1). By regulation, a geologic repository operations area is limited to the surface and subsurface areas at the Yucca Mountain site. 10 C.F.R. § 63.102(b)(2).

The Commission’s Statement of Consideration accompanying 10 C.F.R. § 63.111 also emphasizes this limitation. It states that “10 C.F.R. § 63.111 requires DOE to design *the geologic repository operations area* to comply with the exposure limits” specified in Part 63. 66 Fed. Reg. at 55,782-55,783 (emphasis added). The plain meaning of the language of this

section is that its geographic scope is limited to the immediate Yucca Mountain area. Thus, ALARA considerations related to a geological repository at Yucca Mountain are limited to radiation emanating from Yucca Mountain and do not include ALARA considerations at sites that are remote from Yucca Mountain.

The text of 10 C.F.R. § 63.111 further confirms this view. Section 63.111 is titled “Performance objectives *for the geologic repository operations area* through permanent closure,” and it includes specific and repeated references to the geologic repository operations area and the requirements it must satisfy. (Emphasis added). See, e.g., 10 C.F.R. §§ 63.111(a)(1), 63.111(b)(1), 63.111(b)(2), 63.111(d) and 63.111(e)(1) (“The geologic repository operations area must. . .”). Section 63.111(c) describes the preclosure safety analysis of the “geologic repository operations area.” It contains no language that requires DOE’s license application to address ALARA issues at reactor sites remote from Yucca Mountain.

Although 10 C.F.R. § 63.111(a)(2) mentions dose limits to individuals located beyond the boundary of the Yucca Mountain site, by its terms, it only applies to members of the public. 10 C.F.R. § 63.111(a)(2) (“for any real member of the public”). These limits do not apply to workers at nuclear plants, because 10 C.F.R. § 63.202 defines “Member of the public” as “anyone who is not a radiation worker for purposes of worker protection.”²

Consequently, based on an analysis of the applicable regulations and regulatory history, the Board should conclude that 10 C.F.R. § 63.111 does not require DOE to address ALARA considerations at individual nuclear plant sites remote from the GROA in its LA.

² 10 C.F.R. § 63.202 is the definitions section of 10 C.F.R. Part 63, subpart K, which takes precedence in the event of any conflict with 63 C.F.R. Part 63, subparts A-J. 10 C.F.R. § 63.201.

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.

NEI asserts DOE's overly conservative postclosure criticality analysis will cause "unnecessary Nuclear Waste Fund costs and increase the economic and environmental costs." NEI Petition at 31.

To the extent that NEI-SAFETY-005 properly alleges environmental costs, NEPA does not require a party to accomplish its purposes without an unnecessary expenditure of resources. NEPA requires identification of matters, such as alternative actions (or no action), the environmental impacts of the proposed action, and unavoidable adverse environmental impacts. Section 102(C) National Environmental Policy Act of 1969, 42 U.S.C. § 4332(C). The Commission's regulations require a weighing of "environmental, economic, technical and other benefits against environmental costs. . ." before a license can be granted. 10 C.F.R. § 63.31(c). This language cannot be read to require DOE to avoid unnecessary expenditure of resources. NEPA does not require selection of the least costly alternative.³ *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-06-3, 63 NRC 19, 30 (2006).

Consequently, neither the AEA nor NEPA require DOE to demonstrate that the proposed repository meets applicable safety and environmental regulatory standards without any alleged unnecessary expenditures of resources.

Economic injury is within the zone of interest protected by the Nuclear Waste Policy Act of 1982, as amended 42 U.S.C. § 10101 *et seq.* (NWPA), which applies in this proceeding.

³ By regulation, DOE's Environmental Impact Statement (EIS) will be adopted unless (1) the action the Commission proposes to take differs from what is proposed in the license application and the difference significantly affects the quality of human environment; or (2) significant and substantial new information renders the EIS inadequate. 10 C.F.R. § 51.109(c). This language also cannot be read to require DOE to consider costs.

However, NEI-SAFETY-005 does not allege a violation of the NWPA. Therefore, the NWPA cannot be invoked as a basis for requiring DOE to show that its spent fuel disposal plans meet the applicable safety and environmental regulatory standards without any alleged unnecessary expenditure of resources. *Northern States Power Company (Formerly Nuclear Management Company, LLC)* (Prairie Island Nuclear Generating Plant, Units 1 and 2), 68 NRC 905 (2008). (“Any contention that falls outside the specified scope of the proceeding must be rejected.”) *See also, Portland General Electric Co.* (Trojan Nuclear Plant), ALAB-534, 9 NRC 287, 289-90 n.6 (1979).

Even if NEI-SAFETY-005 properly alleges a violation of the NWPA, the Staff has found nothing in the NWPA, or in cases interpreting it, that would lead to the conclusion that economic costs are among the factors that DOE is required to consider. *See* NEI Reply at 85 (“Unnecessary costs resulting from excess design conservatism could clearly threaten the goal of Congress to assure construction of a repository and to assure sufficient revenue to cover the cost.”). NWPA does not specifically require DOE to limit its costs and NEI-SAFETY-005 does not identify any NWPA statutory text or cite to any cases or regulatory authority to support its allegation.

Consequently, it is the Staff’s position that there is no legal requirement for DOE to avoid an unnecessary expenditure of resources in meeting applicable safety and environmental regulatory standards.

B. Legal Issue 2 (NEV-SAFETY-009, -010, -011, -012, -013, -019)⁴

Legal Issue 2, as framed by DOE, Nevada, and NEI, and accepted by the Board, is

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.

Joint Proposal, Attachment 1 at 1; October 23 Order at 1.

The regulations specifically require DOE to address climate change during the initial 10,000-year period. 10 C.F.R. § 63.305; Implementation of a Dose Standard After 10,000 Years, 74 Fed. Reg. 10,811, 10,829 (Mar. 13, 2009) (to be codified at 10 C.F.R. § 63.305(c)).

There is no requirement in the rule to project future greenhouse gas emissions. *See id.*

⁴ NEV-SAFETY-09, "Increasing CO₂ Levels on Future Climate Projections," asserts that the climate states adopted by DOE for the next 10,000 years cannot be justified because they apply current meteorological data to predict future climates and fail to acknowledge that atmospheric CO₂ concentrations are increasing. NEV Petition at 92; LBP-09-6, Attachment A, 69 NRC at 470. NEV-SAFETY-10, "Consideration of Forcing Functions on Future Climate Projections," alleges that DOE's conclusions regarding long-term climate projections over the next 10,000 years are inaccurate and incomplete because basic aspects of climate forcing are ignored. NEV Petition at 97; LBP-09-6, Attachment A, 69 NRC at 470. NEV-SAFETY-11, "Human-Induced Climate Changes on Prediction of the Next Glacial Period," contends that precipitation in excess of DOE's prediction could occur at Yucca Mountain because DOE fails to accurately calculate the characteristics of the trend in climate or the timing of the next glacial period because human-induced climate changes will delay the onset of the next glacial period. NEV Petition at 102; LBP-09-6, Attachment A, 69 NRC at 471. NEV-SAFETY-12, "Projections of Future Wetter Climate Conditions," alleges that the Analogue Meteorological Stations used for the Yucca Mountain climate forecast for the next 10,000 years fail to account for the significantly greater summer monsoon rainfall amounts that could occur because of global warming. NEV Petition at 107; LBP-09-6, Attachment A, 69 NRC at 471. NEV-SAFETY-13, "Future Climate Projections Need to Include Extreme Precipitation Events," asserts that the climate forecast at Yucca Mountain for the next 10,000 years fails to accurately account for the more frequent intense rainfall or for the large storm-related rainfall events that may occur because of global warming. NEV Petition at 113; LBP-09-6, Attachment A, 69 NRC at 471. NEV-SAFETY-19, "Future Infiltration Projections Need to Include Reduced Vegetation Cover," contends that DOE's prediction of vegetation cover at Yucca Mountain fails to account accurately for the possible impact of reduced vegetation cover that could result in increased rates of infiltration. NEV Petition at 216; LBP-09-6, Attachment A, 69 NRC at 471.

10 C.F.R. Part 63 focuses on repository performance,⁵ and accordingly, § 63.305 focuses on how climate will affect repository performance. Section 63.305 does not prescribe factors relevant to climate change that must be addressed; rather, it gives DOE the flexibility to directly include factors or to address those factors through performance-based arguments. In promulgating 10 C.F.R. Part 63, the NRC intended to establish a risk-informed, performance-based regulatory scheme that would provide flexibility for DOE to determine how to meet the established performance criteria. 66 Fed. Reg. at 55,736-37. The rule requires DOE to vary factors related to climate based on reasonable assumptions for the performance assessment such that total dose is not underestimated. See 74 Fed. Reg. at 10,829 (to be codified at 10 C.F.R. § 63.305(c)).

In the Statement of Consideration for the final Part 63, the Commission noted that it “has extensively investigated relevant research on future climate change in the vicinity of Yucca Mountain and has summarized the available information in an Issue Resolution Status Report,” which discusses anthropogenic impacts. 66 Fed. Reg. at 55,757 (citing *Issue Resolution Status Report Key Technical Issue: Unsaturated and Saturated Flow Under Isothermal Conditions*, Rev. 2, Vol. 1 (June 1999) (LSN # NRC000018250) (IRSR)). This IRSR directly addresses the treatment of anthropogenic greenhouse gas emissions and concludes that

predictions about the manner and degree to which human activities would affect climate in the distant future will remain highly uncertain. Anthropogenic effects could significantly influence world climates during the next several thousand years. However, realistically, there are limits on how long greenhouse warming can last. After fossil fuels are depleted the natural carbon sinks will gradually remove excess amounts of CO₂. Therefore, the staff’s current view is that there is no reason to presume that anthropogenic effects will be of sufficient magnitude and duration to indefinitely postpone a new glacial cycle. More importantly, with

⁵ Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada, 66 Fed. Reg. 55,732, 55,736-37 (Nov. 2, 2001).

respect to a safety analysis of YM, it would not be conservative to presume that present-day conditions will persist for 10kyr [10,000 years] or longer. Instead, the presumption that cooler and wetter conditions will return promotes analyses that are more challenging to repository performance.

IRSR at 17-18. The report then notes, for a HLW repository, “it is adequate to forecast and bound future hydrologic conditions by studying conditions during past pluvial climates.” *Id.* at 18 (citation omitted). This IRSR examines the potential impact of anthropogenic greenhouse gas emissions on repository performance and concludes that they might delay a return to pluvial conditions (higher precipitation and lower temperatures), but such a delay, if it were to be included in the performance assessment, would merely postpone the potential dose due to pluvial conditions. *Id.* at 17-19. Thus, the Staff considered the assumption that a return to pluvial conditions would occur in a relatively short period of time (several thousands of years) to be both a pragmatic and conservative approach for the analysis of repository performance. *Id.*

The Staff has continued to follow the literature and science of predicting future climates, including both the potential effects of anthropogenic influences on global climate conditions and linkages between global climate and local climate in the Yucca Mountain Region. This continued tracking of climate research and the effects of elevated greenhouse gases is reflected in the Statement of Consideration for the final 10 C.F.R. Part 63 regulation (74 Fed. Reg. at 10,820-23) and ongoing staff reports (e.g. Stothoff, S. and G. Walter, “Long-Term-Average Infiltration at Yucca Mountain, Nevada: Million-Year Estimates,” San Antonio, Texas: CNWRA (2007) (LSN # NRC000029364) *cited in* 74 Fed. Reg. at 10,820-23; Walter, G., “Analysis of Factors Contributing to Uncertainty in Estimating Future Climates at Yucca Mountain.” San Antonio, Texas: CNWRA (2005) (LSN # NRC000028317). Information in these documents supports the Staff’s continued intent, as reflected in the rule, for a flexible and pragmatic approach for addressing the speculative area of climate prediction.

In addition, one of the acceptance criteria in the Yucca Mountain Review Plan for review

of the climate and infiltration model abstraction is that “[p]rojections of future climate change are based on evaluation of paleoclimate information over the past 500,000 years.” NUREG-1804, Rev. 2, *Yucca Mountain Review Plan: Final Report*, at 2.2-61, Acceptance Criterion 1(7) (July 2003). The climate change reports, Yucca Mountain Review Plan, and the Statements of Consideration indicate that the NRC had considered anthropogenic impacts to climate and determined that future climate should be based upon information from the historical geologic record.

The proposed 10 C.F.R. Part 63 contained a section on characteristics of the reference biosphere and critical group. Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada, 64 Fed. Reg. 8640, 8677 (proposed Feb. 22, 1999). The proposed § 63.115(a)(3) stated that “[c]limate evolution shall be consistent with the geologic record of natural climate change in the region surrounding the Yucca Mountain site.” *Id.* While this language is not found in the final Part 63, no significant change was intended by its removal, and therefore, the final rule does not preclude DOE from relying on the geologic record. The final § 63.305, “Required characteristics of the reference biosphere,” is in Subpart L, “Postclosure Public Health and Environmental Standards.” Because section 801(b)(1) of the Energy Policy Act of 1992, 42 U.S.C. § 10141 note, directs the Commission to modify its technical requirements and criteria to be consistent with EPA’s final standards, the Commission adopted EPA’s 40 C.F.R. Part 197, Subpart B as its 10 C.F.R. Part 63, Subpart L with the precise wording of the EPA standards in most cases. 66 Fed. Reg. at 55,733. The Commission stated that it fully supports EPA’s specification of characteristics of the reference biosphere and has included one additional requirement that is consistent with the EPA’s standards—biosphere pathways must be consistent with arid and semi-arid conditions. *Id.* In promulgating the final rule, the Commission did not change its position on using the historical geologic record to project future climate. *See id.*

In summary, the rules do not direct DOE to project future levels of anthropogenic greenhouse gas emissions and evaluate the impact of these gases on future climate at Yucca Mountain in the 10,000-year performance assessment. Section 63.305 allows DOE to address the effects of anthropogenic greenhouse gas emissions on repository performance by using climate data in the historical geologic record. Because Part 63 generally gives DOE flexibility as to how to meet performance-based requirements and because the NRC did not view anthropogenic greenhouse gas emissions as impacting the performance assessment in a non-conservative manner when it promulgated Part 63, § 63.305 should not be interpreted as requiring DOE to follow a specific methodology.

C. Legal Issue 3 and 4 (NEV-SAFETY-011 and -019)⁶

DOE, Nevada, and NEI agreed that “[i]f NEV-SAFETY-202 is admitted, the legal issue, involving 10 C.F.R. § 63.342(c), associated with the post 10,000 year period will be briefed in the context of [NEV-SAFETY-202]”⁷ rather than NEV-SAFETY-011 or NEV-SAFETY-019. Joint Proposal, Attachment 1 at 2-3. The Board intends to admit NEV-SAFETY-202 solely as a legal issue contention, as stated in the first sentence of the contention. October 23 Order at 1.

⁶ NEV-SAFETY-11, “Human-Induced Climate Changes on Prediction of the Next Glacial Period,” contends that precipitation in excess of DOE’s prediction could occur at Yucca Mountain because DOE fails to accurately calculate the characteristics of the trend in climate or the timing of the next glacial period because human-induced climate changes will delay the onset of the next glacial period. NEV Petition at 102; LBP-09-6, Attachment A, 69 NRC at 471. NEV-SAFETY-19, “Future Infiltration Projections Need to Include Reduced Vegetation Cover,” asserts that DOE’s prediction of vegetation cover at Yucca Mountain fails to account accurately for the possible impact of reduced vegetation cover that could result in increased rates of infiltration. NEV Petition at 216; LBP-09-6, Attachment A, 69 NRC at 471.

⁷ NEV-SAFETY-202, “Continuation of Climate Change FEPs,” alleges 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.” State of Nevada’s New Contentions Based on Final NRC Rule, dated May 12, 2009, at 2.

Accordingly, the Staff interprets Legal Issues 3 and 4 to be as follows:

Does § 63.342(c) require climate-change processes included as FEPs in the TSPA for the first 10,000 years to be carried forward for the post 10,000-year period?

As discussed more fully below, § 63.342(c) does *not* require climate-change processes included as FEPs in the TSPA for the first 10,000 years to be carried forward for the post 10,000-year period.

Section 63.342 provides the manner in which climate change should be addressed in the post 10,000-year period, and it does not require DOE to carry its FEP analysis for climate change for the first 10,000-year period through the subsequent 990,000-year period. The rule allows DOE to limit its analysis of climate change to the effects of increased water flow through the repository, which can be represented by using a constant-in-time value deep percolation rate based on a truncated lognormal distribution with an arithmetic mean of 41 mm/year and a standard deviation of 33 mm/year, resulting in deep percolation rates between 10 and 100 mm/year. 74 Fed. Reg. at 10,829-30 (to be codified at 10 C.F.R § 63.342(c)(2)).

When EPA proposed the standards for the period after 10,000 years, EPA intended to constrain the performance assessment by limiting the climate change analysis to a specific effect:

To address climate change, we required DOE to focus on the effects of increased water flow through the repository, which is the climatic effect with the most influence on release and transport of radionuclides. We determined that such a focus would provide the basis for a reasonable test of the disposal system, and that climate change beyond 10,000 years could be represented by constant conditions reflecting precipitation levels that differ from current conditions, which eliminates unresolvable speculation regarding the timing, magnitude, and duration of climatic cycles over this time frame. We also directed that NRC establish the exact nature of future climate characteristics to be used in performance assessments.

Environmental Protection Agency, Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada, 73 Fed. Reg. 61,256, 61,261 (Oct. 15, 2008). EPA

explained that its approach addresses a “fundamental uncertainty regarding long-term climate change.” *Id.* at 61,285. EPA then stated that predicting the timing and extent of climate change into the far future with high confidence “will remain an unrealistic goal” and “the understanding of past climate fluctuations and their potential effects on the Yucca Mountain hydrologic system is valuable information and should be applied to define the climate-related parameter values,” which NRC will propose and DOE will use. *Id.*

In adopting the final rule, the NRC intended to make its rules consistent with the EPA’s standards for a geologic repository at Yucca Mountain because section 801(b)(1) the Energy Policy Act of 1992, 42 U.S.C. § 10141 note, mandates that NRC’s final rule be consistent with the radiation protection standards issued by EPA at 40 CFR Part 197. 74 Fed. Reg. at 10,811, 10,813. EPA intended to limit the climate change analysis in the post 10,000-year period, as did the NRC. See *id.* at 10,813 (“EPA’s rule requires DOE to assess the effects of climate change in the period after 10,000 years. This assessment is limited to the effects of increased water flow through the repository.”). Section 63.342(c)(2) establishes the specific manner in which DOE may represent climate change in its performance assessment.

Section 63.342 is titled “Limits on performance assessments.” Section 63.342(c) first directs DOE to project the continued effects of the FEPs included in the 10,000 year performance assessment through the period of geologic stability. 10 C.F.R. § 63.342(c). After this directive, the regulation sets forth additional considerations preceded by the phrase “and also.” These additional considerations were intended to be constraints on the general direction to carry forward FEPs from the 10,000 year performance assessment. In explaining the final rule, the Commission stated

The FEPs selected for use in the performance assessment for the first 10,000 years should also be used for projecting repository performance after 10,000 years. NRC adopts EPA’s *additional constraints* for the inclusion of seismic activity, igneous activity, *climate change*, and general corrosion in the performance assessment for the period of time after 10,000 years.

74 Fed. Reg. at 10,813 (emphasis added). Thus, the “and also” in § 63.342(c) does not signify that DOE must carry forward all climate change related FEPs as well as use the analysis described in § 63.342(c)(2). Rather, the “and also” 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).

While EPA and NRC require DOE to consider climate change in the period after 10,000 years, both agencies limited this requirement to the effects of increased water flow through the repository. See 10 C.F.R. § 63.342(c)(2); 40 C.F.R. § 197.36(c)(2); 74 Fed. Reg. at 10,813. If the agencies intended to only provide a limitation on how net infiltration would be calculated, they could have easily used that phrase instead of “climate change.” However, both agencies refer to how the “climate change” analysis may be limited. The meaning of one subsection of a regulation must be considered in the context of the section as a whole, and a reviewing body must not read one section in such a way as to render words in another section of the regulation redundant or contradictory. *Hydro Resources, Inc.* (P.O. Box 777 Crownpoint, New Mexico 87313), CLI-04-11, 63 NRC 483, 491 (2006). Rather, the language must be construed to give effect to all provisions. *Id.* If DOE was required to carry forward climate change FEPs from the initial 10,000-year period in addition to using the rule’s specified net infiltration rate, the regulation would impose a redundant requirement, as the net infiltration rate was intended to account for all climate change effects.

In developing 10 C.F.R. § 63.342, the NRC considered various processes and effects related to climate change and concluded that the climate change analysis could reasonably be limited to the effects of increased water flow through the repository. See 74 Fed. Reg. at 10,818-20, 10,829. The deep percolation values specified by the rule incorporate processes and effects related to climate change, such as net infiltration (*id.* at 10,819), anthropogenic

influences (*id.*), including an increase in the number and intensity of storm events (*id.*), natural climate change (*id.* at 10,818), and temporal variability in climate conditions (*id.* at 10,818-19). 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.

In summary, both the language of § 63.342 and its regulatory history indicate that the climate change analysis in the post 10,000-year period may be limited to the effects of increased water flow through the repository, which may be represented by the deep percolation rates specified in the rule. The rule does not require DOE to carry forward any climate change FEPs that were included in the initial 10,000-year period to the next 990,000 years.

D. Legal Issue 5 (NEV-SAFETY-041)

The admitted contention related to this legal issue, NEV-SAFETY-041, “Erosion FEP Screening,” reads:

DOE's exclusion of land-surface erosion (FEP 1.2.07.01.0A), as reflected in SAR Subsections 2.2.1.1 and 2.2.1.2 and similar subsections, is incorrect because modeling studies and actual observations demonstrate that erosion will significantly affect infiltration and seepage fluxes at Yucca Mountain within the first 10,000 years after closure and will progressively and grossly modify the topography of the mountain within one million years.

Nevada Petition at 238; LBP-09-6, Attachment A, 69 NRC at 471. The legal issue raised by this contention, as adopted by the Board in its October 23 Order 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.

October 23 Order at 1; see *also* Joint Proposal, Attachment 1, at 3.

Section 63.342(c) does not require the post-10,000 year performance assessment to include the continued effects of erosion because the erosion FEP will have no significant effect on radiological exposures or releases during the first 10,000 year period and thus does not meet the standards of 10 C.F.R. § 63.342(a) for inclusion in the post-10,000 year performance assessment, and because erosion is not one of the FEPs required by 10 C.F.R. § 63.342(c) to be carried forward through the period of geologic stability. Moreover, the Commission's Statement of Consideration in promulgating the rule indicate that 10 C.F.R. § 63.342 is intended to preclude consideration of FEPs that are not identified through § 63.342(a) or enumerated in § 63.342(c). See 74 Fed. Reg. at 10,817. Finally, inclusion of this FEP in the post-10,000 year performance assessment contravenes NRC regulations because its inclusion would require the use of percolation rates different than those required by Environmental Protection Agency regulations at 40 C.F.R. Part 197, as adopted by the Commission at 10 C.F.R. § 63.342(c)(2).

The language and regulatory history of Part 63 show that an application for a construction authorization is not required to consider those FEPs in its post-10,000 year performance assessment that are not included in the first 10,000-year assessment, or required by rule. Section 63.342(a) provides that "DOE's performance assessments need not evaluate the impacts resulting from any [FEPs] . . . if the results of the performance assessments would not be changed significantly in the initial 10,000-year period after disposal." 10 C.F.R. § 63.342(a). For the post-10,000 year period, § 63.342(c) states that DOE must include in its performance assessments the effects of seismic and igneous activity, climate change, and general corrosion of engineered barriers, even if those FEPs are not included in the § 63.342(a) analysis.

In promulgating these regulations, the Commission stated that “only those FEPs that are screened into the performance assessments for the first 10,000 years after repository closure and the four FEPs specifically identified for inclusion, i.e., seismicity, igneous activity, climate change, and general corrosion,” should be considered in the post-10,000 year performance assessment. 74 Fed. Reg. at 10,817. The Commission continued, “[b]ased on the requirements at § 63.342, [other FEPs] . . . would only be included in the performance assessment after 10,000 years if they were also included in the performance assessment for the first 10,000 years (i.e., could not be screened out of the performance assessment for the first 10,000 years).” *Id.* Thus, because the legal issue raised by NEV-SAFETY-41 assumes that “there is no showing that erosion causes increases in radiological exposures or releases within the first 10,000-years” (and therefore should not be a part of the 10,000 year performance assessment), and because erosion is not an enumerated consideration under § 63.342(c), there is no requirement to consider erosion in the post-10,000 year performance assessment. Therefore, legal issue NEV-SAFETY-41 must be answered in the negative because Commission regulations, as clarified by the Statement of Consideration in promulgating the final rule adopting the EPA post-10,000 year dose limit, exclude consideration of FEP 1.2.07.01.0A in the post-10,000 year performance assessment.

This legal issue must also be answered in the negative because to do otherwise would, in effect, compel use of a higher rate of repository percolation than is specified by the Commission in 10 C.F.R. § 63.342(c)(2).⁸ As noted in the Staff’s answer to proposed

⁸ Section 63.342(c)(2) provides: “The analysis may commence at 10,000 years after disposal and shall extend through the period of geologic stability. The constant-in-time deep percolation rates to be used to represent climate change shall be based on a lognormal distribution with an arithmetic mean of 41 mm/year (1.6 in./year) and a standard deviation of 33 mm/year (1.3in./year). The lognormal distribution is to be truncated so that the deep percolation rates vary between 10 and 100 mm/year (0.39 and 3.9 (continued. . .))

contention NEV-SAFETY-203,⁹ the purpose of this regulation is to provide a reasonable approach for considering FEPs for repository performance over the one million year period.¹⁰

The affidavit attached to the Staff's answer also notes that:

the NRC was aware of the process of erosion and certainly the observational information cited by Nevada (e.g., debris flows in 1984 and 2003) when the regulations were proposed and finalized, and did not consider it necessary to include erosion as a process with significance that called for special treatment such as that specified in the EPA standards and adopted in NRC regulations at 10 C.F.R. Part 63.342(c) for other processes such as general corrosion.

Affidavit of Brittain Hill, Philip Justus, and Timothy McCartin at ¶ 17.

On October 15, 2008, EPA issued its "Public Health and Environmental Radiation Protection Standards for Yucca Mountain for the post-10,000 Year Period." See 73 Fed. Reg. 61,256 (Oct. 15, 2008) (final rulemaking for 40 C.F.R. Part 197). This rule limits DOE's analysis of climate change during the post-10,000 year period "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." 40 C.F.R. § 197.36(c)(2). The NRC, in accordance with Section 801(b) of the Energy Policy Act of 1992, 42 U.S.C. § 10141 note, must promulgate a final rule regarding radiation protection standards for the post-10,000 year period that is consistent with the EPA's regulations in 40 C.F.R. Part 197. The Commission promulgated its final rule adopting the EPA standard in March 2009. See 74 Fed. Reg. at

(. . .continued)

in./year)."

⁹ NRC Staff Answer to State of Nevada's New Contentions Based on Final NRC Rule," dated June 11, 2009.

¹⁰ See *id.*, Attachment 2, Affidavit of Brittain Hill, Philip Justus, and Timothy McCartin at ¶¶ 17, 18 (citing Environmental Protection Agency, Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV, 70 Fed. Reg. 49,014, 49,048 (proposed Aug. 22, 2005).

10,817. To now require use of percolation rates different than those set by EPA and adopted by the Commission contravenes statutory and regulatory requirements, and therefore, Nevada's claim that erosion must be included in the post-10,000 year performance assessment is incorrect.

Therefore, legal issue NEV-SAFETY-41 must be answered in the negative: DOE is not required to consider FEP 1.2.07.01.0A, concerning erosion, in its post-10,000 year performance assessment because this FEP was screened out for the first 10,000 year performance assessment, because its inclusion is not required by regulation, and because its inclusion would require use of percolation rates different than those set by regulation.¹¹

E. Legal Issue 6 (NEV-SAFETY-146, -201)

Legal Issue 6 states: "Whether, under 10 C.F.R. Part 63, DOE is required to provide and rely upon final design information in the [License Application]." Joint Proposal, Attachment 1 at 3. This legal issue relates to two identical contentions, NEV-SAFETY-146, "Reliance on Preliminary or Conceptual Design Information," and NEV-SAFETY-201, "Reliance on Preliminary or Conceptual Design Information." NEV Petition at 770, 1039; LBP-09-6, Attachment A, 69 NRC at 495, 497. Both contentions argue that a construction authorization "cannot be granted because [the license application] relies on preliminary or conceptual design information for both pre-closure and post-closure aspects." *Id.* Part 63 does not require DOE to provide and rely upon final design information in its application for a construction authorization.

The standard for issuance of a construction authorization is whether:

¹¹ Because the legal-issue for contention NEV-SAFETY-41 is answered in the negative, the remaining contention issue should also be rejected. The basis of contention NEV-SAFETY-41 is DOE's failure to consider FEP 1.02.07.01.0A concerning erosion in the post-10,000 year performance assessment. Because this FEP does not need to be considered in the post-10,000 year performance assessment, the contention is immaterial to the Commission's licensing decision, and should be dismissed. See 10 C.F.R. § 2.309(f)(1)(iv).

there is reasonable assurance that the types and amounts of radioactive materials described in the application can be received and possessed in a geologic repository operations area of the design proposed without unreasonable risk to the health and safety of the public; and [whether] there is reasonable expectation that the materials can be disposed of without unreasonable risk to the health and safety of the public.

10 C.F.R. § 63.31(a)(1)-(2). In reaching these determinations, the Staff must consider whether the information provided in the license application, including information regarding the design of the geologic repository operations area (GROA) and repository, complies with the requirements and performance objectives of Part 63. 10 C.F.R. § 63.31(a)(3). However, nothing in § 63.31 requires that the information provided in the license application be final design information.

The assertion that any incomplete or preliminary information in the license application mandates denial of a construction authorization is not supported by the text of the regulations or the regulatory history for Part 63. Part 63 is a performance-based, risk-informed regulation designed to focus the applicant's and the reviewers' attention on the most safety-significant activities. See 66 Fed. Reg. at 55,732. In addition, Part 63 provides for a multi-staged licensing process encompassing four separate regulatory decisions over a period of approximately 100 years: (1) construction authorization; (2) license to receive and possess; (3) permanent closure; and (4) license termination. *Id.* at 55,738.

Due to the long time period over which the repository will be constructed and operated, Part 63 is designed to "provide the necessary flexibility for making licensing decisions consistent with the amount and level of detail of information appropriate to each licensing stage." 66 Fed. Reg. at 55,739. At each stage of the licensing process, "DOE must provide sufficient information to support that stage." *Id.* This means that the level of detail for the information provided at each licensing stage may vary; for example, "the knowledge available at the time of construction authorization will be less than at subsequent stages." *Id.* at 55,738.

A multi-stage licensing process for a high-level waste repository has been contemplated

since before Part 63 was implemented. 10 C.F.R. Part 60, which establishes the procedures for licensing a geologic repository other than one sited, constructed, and operated at Yucca Mountain, Nevada, also contemplates a procedure that follows the four distinct stages of site characterization, construction authorization, an application for a license to receive and possess waste and operate the repository, and an application to decommission the repository. Disposal of High-Level Radioactive Wastes in Geologic Repositories; Proposed Licensing Procedures, 44 Fed. Reg. 70,408, 70,411-12 (Dec. 6, 1979). Formal adjudicatory proceedings were contemplated at all stages but the site characterization stage. *Id.* at 70,411. At the license to receive and possess stage of the proceeding, the findings made by the NRC would build upon those made at the previous construction authorization stage. *Id.* at 70,412. It was recognized that new information might exist at the time of issuing a license to receive and possess because, pursuant to 10 C.F.R. § 63.24, at the construction authorization stage, DOE is required to provide an application that is "as complete as possible in light of information that is reasonably available at the time of docketing." Disposal of High-Level Radioactive Wastes in Geologic Repositories: Licensing Procedures, 46 Fed. Reg. 13,971, 13,974 (Feb. 25, 1981). Because more information would be available at the updated license application stage than at the construction authorization stage, Part 60 specifically reserves several categories of information to be considered when reviewing the updated license application. *Id.*; 10 C.F.R. § 60.24(b).

When Part 63 was implemented, the new rule "retained the licensing phases as described at part 60." 66 Fed. Reg. 55,737. Part 63, like Part 60, reserves certain topics to be considered at the license to receive and possess stage of the licensing process.¹² 10 C.F.R.

¹² In addition to the updated application, during construction, the applicant must also provide (continued. . .)

§ 63.24(b). This information includes whether the construction of structures, systems, and components conforms to information included in support of the construction authorization; results of research programs to confirm the adequacy of the information in prior versions of the license application; additional information, *including design information*, obtained during construction; and any "other information bearing on the Commission's issuance of a license that was not available at the time a construction authorization was issued." *Id.* Thus, the decision to issue a construction authorization is not the final decision that the NRC will make with regard to the license application.

Due to the use of a two-step licensing process prior to the commencement of repository operations, Parts 60 and 63 more closely resemble reactor licensing under 10 C.F.R. Part 50 than the newer reactor licensing regulations in 10 C.F.R. Part 52. Like Parts 60 and 63, Part 50 contemplates a two-step licensing process: a construction permit followed by an operating license. 10 C.F.R. § 50.34. At the construction permit stage, an applicant is required to submit a Preliminary Safety Analysis Report¹³ including an "analysis and evaluation of the major structures, systems and components of the facility which bear significantly on acceptability of the site," and preliminary design and procedural information. § 50.34(a). Later, at the operating license application stage, an applicant must submit a Final Safety Analysis Report (FSAR), which must include, among other information, a description and analysis of the structures,

(. . .continued)

periodic reports detailing new information gathered during construction, including information requiring a change in facility design. 10 C.F.R. § 63.32(b). These reports are in addition to the requirement that the applicant notify the NRC before making changes to a design element that is subject to a condition in the construction authorization. 10 C.F.R. § 63.32(c).

¹³ Although Part 50 requires a *preliminary* SAR for construction authorization to be followed by a *final* SAR for licensing, and Part 63 requires an SAR at construction authorization to be followed by an SAR update for a license to receive and possess, the overall regulatory schemes are similar.

systems and components of the facility "sufficient to permit understanding of the system designs and their relationship to safety evaluations." § 50.34(b). In contrast, a combined operating license (COL) issued under 10 C.F.R. Part 52 is a one-step licensing process; construction does not begin until after the operating license is issued. As such, when an application for a COL is first filed, it must be accompanied by a FSAR similar to that required by 10 C.F.R. § 50.34(b). 10 C.F.R. § 52.79. This report must provide "a level of information sufficient to enable to the Commission to reach a final conclusion on *all safety matters that must be resolved by the Commission* before issuance of a combined license." *Id.* (emphasis added). The contrast between the regulations in Parts 50 and 52 demonstrate that the amount of information required to be included in a license application varies depending on whether the facility is to be licensed in a single-stage or multi-stage process. Where a facility, such as the proposed repository at Yucca Mountain, will be subject to a multi-stage licensing review, detailed final design information is not required at earlier stages for all topics in the license application.

In addition, because Part 63 is a performance-based regulation and is not prescriptive, the amount of design detail included at a particular stage of the licensing process may vary, depending on the importance to public health and safety of the structure, system, component or activity being described. Letter from Dale E. Klein, Chairman, U.S. Nuclear Regulatory Commission, to Senator Barbara Boxer, dated March 11, 2008. As evident in the regulatory history of Parts 60 and 63, risk-informed, performance-based regulation of nuclear waste began in the 1970s, and the NRC's commitment to risk-informed, performance-based regulation was broadened in 1995. See Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities; Final Policy Statement, 60 Fed. Reg. 42,622, 42,623 (Aug. 16, 1995). In risk-informed, performance-based regulation, the focus is on the "risk triplet": (1) what can go wrong; (2) how likely is it; and (3) what are the consequences? Staff Requirements – SECY-98-144 – White Paper on Risk-Informed and Performance-Based Regulation, dated March 1, 1999,

(ADAMS ML003753601) ("SRM"), Attachment at 1. These risk insights, together with

engineering analysis and judgment including the principle of defense-in-depth and the incorporation of safety margins, and performance history are used, to (1) focus attention on the most important activities, (2) establish objective criteria for evaluating performance, (3) develop measurable or calculable parameters for monitoring system and licensee performance, (4) provide flexibility to determine how to meet the established performance criteria in a way that will encourage and reward improved outcomes, and (5) focus on the results as the primary basis for regulatory decision-making.

Id. Different licensed activities may carry different levels of risk. For this reason, under risk-informed, performance based regulation, the depth of the review carried out by the Staff, and the level of design detail needed to support that review, will vary depending on the level of risk inherent in the activity. See Yucca Mountain Review Plan, NUREG-1804, Revision 2, Final Report, 68 Fed. Reg. 45,086-87 (July 31, 2003).

This concept is illustrated by the licensing framework for Yucca Mountain. For example, in determining the requirements for the Preclosure Safety Analysis (PCSA), the Commission determined that it would identify the topics that need to be addressed in the PCSA, but would not prescribe the methodology to be used in DOE's analysis or the depth of DOE's analysis. 66 Fed. Reg. at 55,743. This approach was designed "to ensure DOE's analysis is complete [while giving] DOE flexibility to determine the level of detail needed to address each topic properly [and] latitude to adjust the technical rigor of its evaluation of any particular topic in a manner that is consistent with the topic's importance to safety." *Id.*

As the Staff indicated in guidance issued on the Yucca Mountain Review Plan with respect to the PCSA, Availability of Final Interim Staff Guidance Document, 72 Fed. Reg. 13,534 (March 22, 2007); "Interim Staff Guidance HLWRS-ISG-02, Preclosure Safety Analysis – Level of Information and Reliability Information," dated March 8, 2007 (ADAMS ML070260204) (LSN # DN2002390922) ("ISG-02"), to support the PCSA, general information regarding the repository should be provided in "sufficient detail to allow the staff to understand the preclosure

facilities and operations, including their size, location, arrangements, purpose, and potential hazards." ISG-02 at 2. However, information regarding the design and analysis of structures, systems, and components important to safety must be provided in greater detail. *Id.* This is consistent with the concept of risk-informed, performance-based regulation. Similarly, the Staff developed a risk insights report that analyzed potential risks associated with the repository and evaluated the significance of the risks based on the potential "(1) effect on the integrity of waste packages; (2) effect on the release of radionuclides from the waste form and waste package; and (3) effect on the transport of radionuclides through the geosphere and biosphere." "Risk Insights Baseline Report," April 2004 (ADAMS ML040560162) (LSN# NRC000028334), at ix. The Report is designed to allow the Staff to "focus resources on issues commensurate with their importance to risk [and to] take into account the quantitative risk insights, together with uncertainties and sensitivities, engineering judgment, and other relevant factors" during the Staff's licensing review. *Id.* at 6. Although more detailed information may be required for risk significant activities, neither the regulations nor the applicable guidance support an assertion that *all* design information included in the license application at the construction authorization stage must be detailed final design information.

Nevada has argued in the past that inclusion of preliminary or incomplete design information is inconsistent with Part 63. See State of Nevada's Petition to Reject DOE's Yucca Mountain License Application as Unauthorized and Substantially Incomplete, dated June 5, 2008, at 10 ("June 5 Petition"). Nevada's arguments are purportedly based on the regulatory history of Part 63. *Id.* at 10-15. However, in addition to ignoring the Commission's more recent statements in connection with the publication of the final rule in 2001 and other recent statements by the Commission, Nevada's argument misreads the cited regulatory history.

Nevada relies on the regulatory history of Part 60 to argue that the Commission intended to require the submission of final design information. June 5 Petition at 13. Prior to the

development of Part 60, Commission issued a statement of policy regarding licensing procedures for a geologic repository. Licensing Procedures for Geologic Repositories for High-Level Radioactive Wastes: Proposed General Statement of Policy, 43 Fed. Reg. 53,869 (Nov. 17, 1978). The Commission outlined a four stage licensing process: (1) site selection, which encompassed surface site characterization; (2) repository development, which included construction of the main repository shaft and associated site characterization activities and construction of surface and underground structures; (3) licensing after construction and prior to receipt of radioactive material; and (4) repository closure. *Id.* at 53,871. In developing Part 60, however, the Commission was concerned that allowing only surface exploration of the chosen site prior to issuance of a construction authorization would not allow for the development of sufficient information regarding the site to support a construction authorization. 44 Fed. Reg. 70,410. Therefore, while the Commission retained the concept of a four-stage licensing process, the scope of the first stage was revised: site characterization would include both surface exploration and sub-surface excavation and borings. *Id.* at 70,411. Nevada cites this change as evidence that the Commission abandoned the concept of a multi-stage licensing process and implemented a requirement for submission of final design information for construction authorization. June 5 Petition at 13-14. This argument is based on a misreading of the regulatory history.

Part 63 is designed to provide "the Commission the flexibility to make decisions in a logical time sequence that accounts for DOE collecting and analyzing information over the construction and operational phases of the repository," 66 Fed Reg. at 55,738, and is designed to focus Commission resources on the most risk significant portions of the license application, *id.* at 55,732. To meet these goals, consistent with the multi-stage and progressive nature of the licensing scheme under Part 63, the regulations permit an applicant to submit new and additional information resulting from construction and design activities in the updated license

application required at the license to receive and possess stage. For these reasons, the position that any preliminary or incomplete design information in the license application must by default lead to the denial of a construction authorization is not legally supported.

F. Legal Issue 7 (NEV-SAFETY-149)

NEV-SAFETY-149, "Deviations in Design and Waste Emplacement," asserts:

In SAR Subsection 2.2.1.2 at 2.2-17, DOE excludes deviations from repository design or errors in HLW emplacement from events considered in the TSPA (FEP 1.1.03.01.0A) on purely legal grounds that are unexplained and erroneous.

NEV Petition at 783; LBP-09-6, Attachment A, 69 NRC at 495. In the Board's October 23, 2009 Order, the legal issue identified for this contention is:

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, potential deviations from repository design or errors in waste emplacement.

October 23 Order at 1; see *also* Joint Proposal, Attachment 1 at 4.

For the reasons set forth below, this legal issue should be answered in the affirmative:

DOE may rely upon its quality assurance program and procedures as a basis for excluding FEP 1.1.03.01.0A.¹⁴

In its petition to intervene, Nevada claimed that DOE erroneously excluded this FEP on unexplained legal grounds. NEV Petition at 783. In its answer, DOE stated that it "identified this error in Condition Report 12015 and corrected it in Scientific Analysis/Calculation Error Resolution Document ANL-WIS-MD-000027 ERD 01, dated May 23, 2008. See LSN#DEN001595379," changing the reason for FEP exclusion to low consequence. Answer of

¹⁴ The Staff notes that whether or not this exclusion is found to comply with NRC regulations or other requirements has not been determined (i.e., no SER has been issued). That determination is not at issue here.

the US Department of Energy to the State of Nevada's Petition to Intervene, dated January 16, 2009, at 1381-82. In its reply to DOE's answer, Nevada stated that it "can be forgiven for placing no reliance on the statement '[e]xcluded low consequence' when the document cited to support this conclusion says excluded on the basis of 'regulation,'" State of Nevada's Reply to DOE's Answer to Nevada's Petition to Intervene as a Full Party, dated February 24, 2009, ("Nevada DOE Reply") at 653, concluding that "[n]othing in [the corrective DOE document's] entirely qualitative discussion about how great DOE's QA [quality assurance] program will be implemented even remotely supports the proposition that errors in repository design and errors in waste emplacement will occur at a frequency of less than one chance in 10,000 in 10,000 years, or one in one-hundred million per year." Nevada DOE Reply at 654.

Section 63.142 sets out the Commission's requirements for DOE's quality assurance program. Section 63.142(b) requires DOE to establish and execute a quality assurance program that must "[v]erify[] that activities important to waste isolation and important to safety functions have been correctly performed by checking, auditing, and inspection of structures, systems, and components." 10 C.F.R. § 63.142(b)(ii). DOE's reliance on this program is the subject of this legal issue.

Section 63.114 sets out Commission regulations concerning DOE's TSPA. Sections 63.114(a)(4)-(a)(6) require DOE to consider those FEPs that have at least one chance in 10,000 of occurring over 10,000 years, to "[p]rovide the technical basis for either inclusion or exclusion of specific [FEPs] in the performance assessment," to evaluate in detail those FEPS whose omission would significantly change exposure to the RMEI, and to "[p]rovide the technical basis for either inclusion or exclusion of degradation, deterioration, or alteration processes of engineered barriers in the performance assessment" Section 63.114 does not exclude categories of information as technical bases in support of a FEP screening conclusion. Nevada's statement that the DOE document in support of its screening decision on FEP

1.1.03.01.0A is insufficient, Nevada DOE Reply at 654, concerns the merits of DOE's conclusion, addressing whether DOE has adequately supported its FEP screening decision, not whether DOE's quality assurance program may be relied upon in support of that decision. Further, the Commission's regulations provide DOE with flexibility for showings demonstrating compliance with risk-informed, performance-based requirements.

In developing Part 63, the Commission stated that it "sought to establish a coherent body of risk-informed, performance-based criteria for Yucca Mountain that is compatible with the Commission's overall philosophy of risk-informed, performance-based regulation. . . . Stated succinctly, risk-informed, performance-based regulation is an approach in which risk insights, engineering analysis and judgment (e.g., defense in depth), and performance history are used to: . . . (4) provide flexibility to determine how to meet the established performance criteria in a way that will encourage and reward improved outcomes" 66 Fed. Reg. 55, 732 (citation omitted; emphasis added)(Nov. 2, 2001).

Therefore, because Commission regulations nowhere proscribe DOE's reliance upon its quality assurance program for use as support for a FEP screening decision, and because the Commission intended to give DOE flexibility in meeting risk-informed, performance based regulatory requirements, DOE's quality assurance program could constitute an appropriate technical basis for excluding FEP 1.1.03.01.0A. Whether that reliance is adequate is a determination that will be made in the SER.

G. Legal Issue 8 (NEV-SAFETY-161)

NEV-SAFETY-161, "Critical Role of the Drip Shield," alleges that the "LA violates the requirements that there be 'multiple barriers,' because its safety depends dispositively upon a single element of the engineered barrier system – the drip shield." NEV Petition at 857; LBP-09-6, Attachment A, 69 NRC at 495.

The legal issues presented by this contention, as admitted by the Board are whether,

under NWSA § 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. October 23 Order at 1; see Joint Proposal, Attachment 1 at 4. It is the Staff's view that these statutory and regulatory provisions do not require DOE to evaluate the absence or failure of all drip shields.

Nevada asserts that there may be many reasons why the drip shield is either not installed, not installed properly, or subject to widespread failure and claims that without the drip shield, the expected annual dose may be ten times the regulatory requirement in violation of the "multiple barrier" requirement of 42 U.S.C. § 10141(b)(1)(B) and 10 C.F.R. §§ 63.113(a)-(d) and 63.115(a)-(c). NEV Petition at 857-860.

The Commission answered the question of whether or not DOE is required to separately evaluate the absence or failure of all drip shields in two public rulemaking proceedings. See 66 Fed. Reg. at 55,759; 74 Fed. Reg. at 10,826. In both of these, the Commission declined the opportunity to require DOE to do so. The Commission first considered this issue in 2001 when it adopted a final rule which included 10 C.F.R. Part 63. See 66 Fed. Reg. at 55,759. Instead the Commission adopted a single quantitative performance goal. *Id.* The Commission stated that its rule did not place quantitative limits on individual barriers. *Id.* This approach focuses on overall system performance and not a "barrier-by-barrier" performance assessment. Under this approach, the absence or failure of any one element of the engineered barrier system, considered in isolation from the other elements of the system is not controlling. Overall system performance, treated as an integrated whole, determines compliance or noncompliance with applicable safety standards. *Id.*

The D.C. Circuit considered this approach and found it legally acceptable. *Nuclear Energy Institute, Inc. v. Environmental Protection Agency*, 373 F.3d 1251 (D.C. Cir. 2004). In *NEI v. EPA*, the D.C. Circuit held that NWSA § 121(b)(1)(B), 42 U.S.C. § 10141(b)(1)(B), requires multiple barriers and does not specifically require any individual barrier to provide

protection independently of the other barriers. *Id.* at 1295. The Court found that NWPA § 121 required the Commission to adopt technical requirements and criteria providing for a system of *multiple* barriers, but that it did not require that each barrier type provide a quantified amount of protection or independent protection. *Id.* The court found that the “NRC, in implementing this requirement in the manner discussed above, acted reasonably and permissibly.” *Id.* The Court concluded that the Commission’s interpretation of section 121 was the result of a “permissible construction.” *Id.* at 1294-95 (citing *Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837, 843 (1984)).

The D.C. Circuit also held that 10 C.F.R. § 63.113 requires the repository to include both natural barriers and an engineered barrier system, and also provide that the engineered barriers, “working in combination with natural barriers,” meet the required performance standards. *Id.* at 1295 (citing 10 C.F.R. § 63.113(a)-(d)).

Finally, the court held that compliance with 10 C.F.R. § 63.113, also requires DOE to identify design features of both engineered barriers and natural features considered important to waste isolation and to describe their waste isolation capabilities. *Id.* (citing § 63.115(a)-(c)). The Court found that, by its silence, NWPA § 121 gave the Commission the flexibility to determine the best way to specify the use of a multiple barrier system. *Id.*

In the Statement of Consideration accompanying the 2009 revision to 10 C.F.R. Part 63, the Commission affirmed 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.” 74 Fed Reg. at 10,826. As the Commission also noted, DOE’s proposed barrier system will be evaluated as an integrated whole, and “the staff may specify potential license conditions, as needed, to provide a reasonable expectation that relevant performance objectives will be met.” *Id.*

In addition, Nevada’s position contravenes the express language of 10 C.F.R. § 63.115,

"Requirements for multiple barriers." Section 63.115 explicitly sets out Commission requirements to satisfy 10 C.F.R. § 63.113(a), the provision that requires multiple barriers. DOE must (1) identify the design features of the EBS and the natural features of the area geology that are important to waste isolation; (2) describe the capability of the barriers identified above to isolate waste; and (3) provide the technical basis for that description. Because 10 C.F.R. § 63.115 does not require DOE to consider the absence or failure of all drip shields, the Board should answer this legal issue in the negative.

The Board should conclude that an analysis of the relevant court precedent and regulatory history shows that neither NWSA § 121(b)(1)(B) nor 10 C.F.R. §§ 63.113 (a) through (d) nor 63.115(a) through (c) require DOE to evaluate the absence or failure of all drip shields.

H. Legal Issue 9 (NEV-SAFETY-169)

NEV-SAFETY-169, "Deferred Retrieval Plans," alleges that the License Application (LA) "cannot be granted because it includes only a conceptual discussion of retrieval plans and no actual retrieval plans are included or referenced." NEV Petition at 912; LBP-09-6, Attachment A, 69 NRC at 496.

The legal issue presented by this contention as admitted by the Board is whether 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.

It is the Staff's view that DOE is allowed to submit the LA without a full retrieval plan because submission of a final plan is not necessary for the Commission to reach a finding of "reasonable assurance" that the project can proceed safely, as required by 10 C.F.R. § 63.31. Regulations in Part 63 allow the Staff to impose conditions on the construction authorization and the license to receive and possess, if granted, to assure that adequate plans will be available before the repository becomes operational. See, e.g., 10 C.F.R. §§ 63.32(a) and 63.42. Moreover, the plain language and the underlying purpose of 10 C.F.R. §§ 63.21(c)(7) and 63.31

do not require DOE to submit a full, final plan for retrieval of waste packages during the construction authorization phase of the licensing. See 66 Fed. Reg. at 55,738-39.

NEV-SAFETY-169 asserts that DOE's proposed retrieval plan provides only limited information describing retrieval concepts. The contention also asserts that the SAR states that specific retrieval plans are to be developed in detail "should the need for retrieval be identified." NEV Petition at 912. Nevada also claims that DOE's approach violates 10 C.F.R. § 63.21(c)(7) because there is no possibility that adequate consideration of retrieval will take place before wastes are emplaced. NEV Petition at 912.

The Staff's position is that the construction authorization application must include an overview of a retrieval plan 10 C.F.R. §§ 63.21(c)(7). However, the Staff does not believe that 10 C.F.R. §§ 63.31 requires a final retrieval plan at this stage of the proceeding. Nevada's assertion that any incomplete or preliminary information in the license application mandates denial of a construction authorization is not supported by the text of the regulations or the regulatory history for Part 63. There is no requirement in § 63.31 that the information provided in the license application be final design information. Rather, Part 63 provides for a multi-staged licensing process encompassing four separate regulatory decisions over a period of approximately 100 years: (1) construction authorization; (2) license to receive and possess; (3) permanent closure; and (4) license termination. See 66 Fed. Reg. at 55,738.

Due to the long time period over which the repository will be constructed and operated, Part 63 is designed to "provide the necessary flexibility for making licensing decisions consistent with the amount and level of detail of information appropriate to each licensing stage." 66 Fed. Reg. at 55,739. Thus, the level of detail for the information that DOE must provide in support of each licensing stage may vary, *id.*, and "the knowledge available at the time of construction authorization will be less than at subsequent stages," *id.* at 55,738.

A multi-stage licensing process for a high-level waste repository has been contemplated

since before Part 63 was implemented. Part 60, which contains requirements for licensing a geologic repository other than one sited at Yucca Mountain, recognizes that new information might exist at the time of issuing a license to receive and possess and requires an application or an update that is "as complete as possible in light of information that is reasonably available at the time of docketing." The Statements of Consideration also note that the findings made by the NRC would build upon those made at the previous construction authorization stage. 44 Fed. Reg. at 70,412; *see also* 46 Fed. Reg. at 13,974.

Part 63 "retain[s] the licensing phases as described at part 60," 66 Fed. Reg. at 55,737, and requires certain topics to be revisited at the license to receive and possess stage, including, *inter alia*, results of research programs to confirm the adequacy of the information in prior versions of the license application; additional information, including design information, obtained during construction; and any "other information bearing on the Commission's issuance of a license that was not available at the time a construction authorization was issued." *Id.* Thus, the decision to issue a construction authorization is not the final decision that the NRC will make with regard to the license application and does not require final plans in all parts of DOE's application.

Parts 60 and 63 more closely resemble reactor licensing under 10 C.F.R. Part 50 than the newer reactor licensing regulations in 10 C.F.R. Part 52.¹⁵ The contrast between Parts 50 and 52 demonstrates that the amount of information required in a license application varies depending on whether the facility is to be licensed in a single-stage or multi-stage process.

¹⁵ Compare 10 C.F.R. § 50.34 (mandating a two-step licensing process where Preliminary Safety Analysis Report includes preliminary design and procedural information, while Final Safety Analysis Report must include more detailed information) with 10 C.F.R. § 52.79 (requiring Final Safety Analysis Report before construction may begin, including "information sufficient to . . . reach a final conclusion on *all safety matters that must be resolved by the Commission* before issuance of a combined license." (emphasis added)).

Where a facility, such as the proposed repository at Yucca Mountain, will be subject to a multi-stage licensing review, final detailed design information is not required at earlier stages.

Part 63 is designed to provide "the Commission the flexibility to make decisions in a logical time sequence that accounts for DOE collecting and analyzing information over the construction and operational phases of the repository," 66 Fed Reg. at 55,738, and is designed to focus Commission resources on the most safety-significant portions of the license application, *id.* at 55,732. To meet these goals, reason dictates that the applicant may file an application that includes less detailed or less final information at the construction authorization stage for topics that are less risk significant, and the regulations do not forbid this practice. For these reasons, the position that any preliminary or incomplete design information in the license application must by default lead to the denial of a construction authorization is not legally supported.

In considering the Final Rule, the Commission addressed the suggestion by commenters that DOE be required to provide "an actual demonstration that [DOE's retrieval] plans were feasible." 66 Fed. Reg. at 55,743. The Commission stated,

[NRC] does not envision that DOE will need to build full-scale prototypes of its retrieval systems to demonstrate that its retrieval plans are practicable at the time of construction authorization. Rather, DOE needs to design (and build) the repository in such a way that the retrieval option is not rendered impractical or impossible.

Id.

Interpreting § 63.21(c)(7) to require the same level of detail in the retrieval plans as is required by § 63.21(c)(1) (site description), among others, contravenes established rules of construction. For instance, the meaning of one subsection must be considered in the context of the section as a whole, and a reviewing body must not read one section in such a way as to render words in another section of the regulation superfluous. Rather, the language must be construed to give effect to all provisions. *Hydro Resources, Inc.* (P.O. Box 777 Crownpoint,

New Mexico 87313), CLI-04-11, 63 NRC 483, 491 (2006). Since other subsections within § 63.21 include very specific and detailed delineations of the information that must be included in the LA, the Board should conclude that such detail was not intended in 10 C.F.R.

§ 63.21(c)(7), where retrieval is addressed in a mere two lines and which requires merely a “description” of the retrieval plans. To read § 63.21(c)(7) otherwise would render the detailed requirements elsewhere in Section 63.21(c) superfluous and would be contrary to accepted rules of construction recognized by the Commission and the federal courts.

It is properly within the purview of the Commission to allow flexibility at the construction authorization phase while demanding more detailed information and applying more rigid standards prior to issuing a license to operate.¹⁶ The need for flexibility in nuclear licensing is an established concept, explicitly endorsed by the U.S. Supreme Court, which held that nuclear technology “[is] fast-developing and fast-changing. What is up to date now may not, [and] probably will not, be as acceptable tomorrow. Problems which seem insuperable now may be solved tomorrow, perhaps in the very process of construction itself.” *Power Reactor Development Co. v. International Union of Elec., Radio and Mach. Workers, AFL-CIO*, 367 U.S. 396, 408 (1961).

The issues examined by the Supreme Court in *Power Reactor Development* are particularly analogous to the issues raised by NEV-SAFETY-169. The question before the Court was whether the Atomic Energy Commission (AEC), in issuing a permit for the construction of a nuclear facility, was required to make the same operational safety finding that would be required before the AEC could issue an operating license. *Id.* at 398. The Court

¹⁶ See Disposal of High-Level Radioactive Wastes in Geologic Repositories Technical Criteria, 48 Fed. Reg. 28,194, 28,204 (June 21, 1983); *Cf.* 10 CFR §§ 50.35(a) and 50.40(a).

evaluated a licensing process similar to the process in the instant case, and determined that the AEC had acted appropriately by granting a construction permit based on the available information but requiring that safety concerns be revisited before an operating license would be issued.

Like the licensing process in *Power Reactor Development*, the construction authorization phase is only the first step in the licensing process for the proposed geological repository at Yucca Mountain. Like the applicant in *Power Reactor Development*, who could not provide certain details until after construction had been completed, DOE may not be able to provide a full retrieval plan because details necessary for such a plan may not yet be known. For example, a full and accurate retrieval plan may require DOE to address emergency response from local fire and medical services, but not all those services may be available at present. In *Power Reactor Development*, the Court was asked whether an initial finding that a project may safely proceed, pending a later finding that there is “reasonable assurance” that the project will be safe, is appropriate when information will be more complete at the later stage. The Court answered that question in the affirmative, determining that the AEC was correct in deferring an operational safety determination until construction had been completed. The Board should make a similar finding here.

Allowing such flexibility is both logical and fair. On the other hand, it would be illogical to hold that “reasonable assurance” requires information that cannot be acquired until after the repository has been constructed, because such a requirement would be impossible to meet.

The plain language and the underlying purpose of 10 C.F.R. §§ 63.21(c)(7) and 63.31 do not suggest that DOE must submit a full, final plan for retrieval of waste packages during the CA phase of the licensing. Thus, DOE need not have a full description of its retrieval plans for issuance of a CA.

Therefore, it is the Staff’s position that the construction authorization can be granted

even though the license application includes only a conceptual discussion of retrieval plans and no actual retrieval plans are included or referenced.

I. Legal Issue 10 (NEV-SAFETY-162)

Contention NEV-SAFETY-162, "Drip Shield Installation Schedule," reads:

From SAR Subsections 1.1.3.1 and 1.1.3.2, and related subsections, it is clear that DOE plans to install the drip shields about one-hundred years from now, after all of the wastes are emplaced in the tunnels and just prior to repository closure, but this cannot be justified as safe because if installation of the drip shields proves to be defective or impossible it will be too late to assure safety by alternative means.

Petition at 861 (admitted by LBP-09-6, Attachment A, 69 NRC at 495). On October 6, 2009, Nevada and DOE filed differing views on the legal issue for briefing raised by NEV-SAFETY-162. In its October 23 Order, the Board adopted Nevada's proposed language for the legal issue raised by this contention:

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 preoperational 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.

October 23 Order at 2; see *also* October 6, 2009 "State of Nevada's Legal Issue for NEV-SAFETY-162."

For the reasons below, this question must be answered in the negative; that it is not impossible for the Commission to make its findings pursuant to 10 C.F.R. § 63.31(a)(2) in light of DOE's drip shield installation plan. This is because Nevada's § 63.41 concerns regarding drip shield installation are not properly raised in this construction authorization proceeding, and because a "substantial completion" finding pursuant to 10 C.F.R. § 63.41 is not required for issuance of a construction authorization.

As a basis for the application of this requirement to this construction authorization proceeding, Nevada claims:

Putting the regulations together, NRC must find prior to issuance of the construction authorization that there is a 'reasonable expectation' that, before emplacement of wastes, it will be able to find that the drip shields have been constructed in compliance with § 63.113(b). While under 10 C.F.R. § 63.101 (a)(2) 'reasonable expectation' allows for some uncertainty, an impossibility is not a 'reasonable expectation' in any rational sense, and as noted above, the 'has been constructed' finding will be impossible to make under DOE's drip shield installation plan.

Nevada DOE Reply at 695. As discussed below, this interpretation of 10 C.F.R. § 63.113(b) is incorrect, as "putting the regulations together" does not lead to the conclusion claimed by Nevada.

Section 63.31(a)(2) provides that the Commission may issue a construction authorization if, among other things, "there is a reasonable expectation that the materials can be disposed of without unreasonable risk to the health and safety of the public." It contains no references to the licensing findings that the Commission must make pursuant to 10 C.F.R. § 63.41 to issue a license to receive and possess (LRP) source, special nuclear, or byproduct material. Rather, Section 63.31(a)(2) concerns only a reasonable expectation that the material can be disposed of without unreasonable risk to the health and safety of the public. There is no provision in 10 C.F.R. § 63.31 that bars issuance of a construction authorization because the planned repository might fail to satisfy regulatory requirements for issuance of a LRP.

Subsection (a)(3) specifies how the Commission makes the findings required for a licensing decision on an application for a construction authorization. The Commission must consider whether:

- (i) DOE has described the proposed geologic repository as specified at § 63.21;
- (ii) The site and design comply with the performance objectives and requirements contained in subpart E of this part;
- (iii) DOE's quality assurance program complies with the requirements of subpart G of this part;
- (iv) DOE's personnel training program complies with the criteria contained in

subpart H of this part;
(v) DOE's emergency plan complies with the criteria contained in subpart I of this part; and
(vi) DOE's proposed operating procedures to protect health and to minimize danger to life or property are adequate.

10 C.F.R. § 63.31(a)(3). Sections 63.31(a)(2) and (a)(3) do not require the Commission to consider whether construction of a repository is “substantially complete” as required by § 63.41 for issuance of a construction authorization.

Section 63.41, the provision that Nevada would like to apply to this construction authorization proceeding, sets forth the Commission requirements for the issuance of a LRP. The section entitled “Standards for issuance of a license” provides that a license to receive and possess may be issued by the Commission on finding that the construction of the facility has been substantially completed. 10 C.F.R. § 63.41(a). Subsections 63.41(a)(1) and (2) further specify that for prior to issuance of a LRP, construction must be “substantially complete” for surface and underground facilities required for initial operations. It does not set forth a “substantially complete” finding for issuance of a construction authorization under 10 C.F.R. § 63.31. Moreover, Nevada’s construction of NRC regulations is incorrect in light of Commission rules of regulatory construction.

Rules of regulatory construction prohibit a reading of a regulation that eliminates the purpose of a part of the text. *Hydro Resources, Inc.* (P.O. Box 777 Crownpoint, New Mexico 87313), CLI-04-11, 63 NRC 483, 491 (2006). It is well-settled that, in considering the whole text of a regulation, a reviewing body must not read one section to render words in another section of the regulation redundant or contradictory, but rather must construe the language to give effect to all provisions. *Id.* If answered in the affirmative, Nevada’s statement of the legal issue raised in NEV-SAFETY-162 would read out provisions of 10 C.F.R. § 63.41(a), as Nevada’s construction reads § 63.31(a)(2) to require the Commission to determine now, during the construction authorization licensing proceeding, the likelihood of a finding pursuant to 10 C.F.R.

§ 63.41(a) that the facility as proposed will be “substantially completed.”

This regulatory construction is incorrect because it imputes requirements under § 63.31 during the construction authorization phase that are inconsistent with the regulation. Under Nevada’s construction of 63.31(a), the Commission can only make a reasonable expectation finding pursuant to § 63.31(a)(2) for construction authorization issuance if it can make an affirmative finding that construction of the repository would be substantially complete for issuance of a LRP.¹⁷ Nevada’s construction of § 63.31(a)(2) requires the Commission to look into the future to predict whether, if a construction authorization were issued and the facility constructed, whether the preoperational finding required under 10 C.F.R. § 63.41(a), a decision not before the Commission at this juncture, can be made.

Nevada claims that “NRC must find prior to issuance of the construction authorization . . . that the drip shields have been constructed in compliance with § 63.113(b).” Nevada DOE Reply at 695. By contrast, section 63.113(b) requires the engineered barrier system (EBS) to be “*designed* so that, working in combination with natural barriers,” exposure to the RMEI is within specified limits, and that “[c]ompliance with this paragraph must be demonstrated through a performance assessment that meets the requirements specified in [other regulations].” 10 C.F.R. § 63.113(b) (emphasis added). Thus, in the construction authorization proceeding, the pertinent finding is not whether the facility “has been constructed” to meet Commission requirements, but rather, whether the facility “has been designed” to conform with Commission performance objectives and Part 63 Subpart E requirements. Therefore, Nevada’s reading, requiring § 63.41 findings to be satisfied at the construction authorization stage, is not supported by the text of these regulations.

¹⁷ The Staff notes that, to date, DOE has not submitted an application for a LRP.

In analyzing the language of any law, it must be assumed that the law was written to convey its full and intended meaning. In particular, where a law includes particular language in one section but omits it in another, it is to be presumed that the exclusion was intentional and purposeful. *Duncan v. Walker*, 533 U.S. 167, 173 (2001). Put another way, courts must presume that a statute or regulation¹⁸ “[says] what it means and means . . . what it says.” *Barnhart v. Sigmon Coal Co., Inc.*, 534 U.S. 438, 461-462 (2002). Nothing that the Commission has said in its Statements of Consideration or regulations suggests that the NRC must make findings at the construction authorization stage regarding LRP requirements in 10 C.F.R. § 63.41. Section 63.31(a)(2) cannot be read to require the Commission to consider Nevada’s speculation on the impossibility of the issuance of a license not at issue in this proceeding; a license for which the Commission has not received an application. Therefore, the Board should answer this legal issue in the negative, concluding that the Commission should not consider the alleged impossibility of a preoperational finding in 10 C.F.R. § 63.41 for a LRP in making its construction authorization licensing decision.

J. Legal Issue 11 (NEV-SAFETY-171)

NEV-SAFETY-171, “PMA and QA,” alleges that the PMA cannot be used to validate or provide confidence in the TSPA and to demonstrate net conservatisms or margins in the TSPA, “because it relies on data and models that are not qualified pursuant to DOE’s quality assurance program.” NEV Petition at 919; LBP-09-6, Attachment A, 69 NRC at 496.

The legal issue presented by this contention, as admitted by the Board is whether, under 10 C.F.R. §§ 63.113, 63.114, and Part 63 Subpart G, the PMA can be used to validate or

¹⁸ See *Pacific Gas & Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 & 2) , ALAB-644, 13 NRC 903, 990 (1981) (Rules of statutory construction should also be applied to administrative regulations.).

provide confidence in the TSPA, if its data and models are not qualified under DOE's quality assurance program. October 23 Order at 1; see Joint Proposal, Attachment 1 at 4.

Without prejudice to the Staff's understanding that the PMA was not used to demonstrate net conservatisms or margins in the TSPA, see NRC Staff Answer to Intervention Petitions, dated February 9, 2009 ("NRC Staff Answer") at 928, it is the Staff's position that, 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, because it relies on data and models that have not been qualified under DOE's quality assurance program.

Nevada asserts that the PMA cannot be used to validate the TSPA and to demonstrate net conservatisms or margins in the TSPA, because the PMA relies on data and models that are not qualified pursuant to DOE's quality assurance program. NEV Petition at 919-921.

Under 10 C.F.R. § 63.21(c)(9) through (c)(14) matters identified in 10 C.F.R. § 63.113 must be included in the SAR. 10 C.F.R. § 63.21(c)(15) requires the SAR to explain the measures by which DOE supports the models it uses to provide the information required in 10 C.F.R. § 63.21(c)(9) through (14). Section 63.114(g) similarly requires that any performance assessment DOE uses to demonstrate compliance with 10 C.F.R. § 63.113 must provide the "technical basis for models used in the performance assessment." Subpart G of Part 63, specifically 10 C.F.R. § 63.142(a) requires the SAR to describe the quality assurance program applicable to "tests and experiments, scientific studies. . . performance conformation (and) permanent closure." See *also* 10 C.F.R. § 63.21(c)(20).¹⁹

¹⁹ 10 C.F.R. § 63.21(c)(20) provides the Safety Analysis Report must include: "[a] description of the quality assurance program to be applied to the structures, systems, and components important to safety and to the engineered and natural barriers important to waste isolation. The description of the quality assurance program must include a discussion of how the applicable requirements of Sec. 63.142 will be satisfied."

In the Staff's view, the Statement of Consideration accompanying the 2001 rule indicates that any data and models offered to validate or provide confidence in the TSPA must be subject to DOE's QA program.

There the Commission noted that 10 C.F.R. Part 63 includes, among other things, qualitative requirements for data and other information, and performance confirmation and QA programs. The Commission strongly emphasized that it would rely on the performance assessment as well as DOE's compliance with these other requirements in making a decision. 66 Fed. Reg. at 55,746.

For example, 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 quality assurance programs. 66 Fed. Reg. at 55,747-55,748.

Consequently, it is the Staff's position that under 10 C.F.R. §§ 63.113, 63.114, and Part 63 Subpart G, the PMA can only be used to validate or provide confidence in the TSPA if its data and models are qualified under DOE's quality assurance program.

CONCLUSION

For the foregoing reasons, the Board should adopt the Staff's interpretation of the Phase I Legal Issues.

Respectfully submitted,

/Signed (electronically) by/

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Dated at Rockville, Maryland
this 7th day of December, 2009

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the "NRC BRIEF ON PHASE I LEGAL ISSUES" in the above-captioned proceeding have been served on the following persons this 7th day of December, 2009, by Electronic Information Exchange.

CAB 04

Thomas S. Moore, Chairman
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