

February 24, 2009

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:

U.S. Department of Energy
(High Level Waste Repository)

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Docket No. 63-001

REPLY OF THE NUCLEAR ENERGY INSTITUTE TO THE
ANSWERS TO ITS PETITION TO INTERVENE BY THE DEPARTMENT OF ENERGY,
THE NRC STAFF, AND THE STATE OF NEVADA

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Attachments

Attachment 1: Supplemental Affidavit of Rodney McCullum in Support of NEI's Standing

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- Attachment 3: Supplemental Affidavit of Brian Gutherman in Support of Proposed Contention NEI-SAFETY-03
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REPLY OF THE NUCLEAR ENERGY INSTITUTE TO THE
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I. INTRODUCTION

In accordance with 10 C.F.R. § 2.309(h), and the schedule established by the Order of the Presiding Officer dated January 15, 2009, the Nuclear Energy Institute (“NEI”) herein replies to the Answer of the Department of Energy (“DOE”) to NEI’s Petition to Intervene, dated January 16, 2009 (“DOE Answer”), the NRC Staff Answer to NEI’s Petition to Intervene, dated February 9, 2009 (“NRC Staff Answer”), and the State of Nevada’s Answer to NEI’s Petition to Intervene, dated February 9, 2009 (“Nevada Answer”) (collectively, “Answers”).¹ The Answers were filed in response to NEI’s Petition to Intervene filed on December 19, 2008 (“NEI Petition”), in connection with this proceeding on DOE’s License Application (“Application” or “LA”) for authorization to construct a geologic repository for the disposal of used nuclear fuel and other high level nuclear waste at the Yucca Mountain site.

Contrary to the arguments in the Answers, NEI maintains that: (1) NEI does have legal standing as of right to intervene in this matter under 10 C.F.R. § 2.309 and in accordance with judicial concepts of standing; (2) even if it did not, NEI should be granted discretionary standing to intervene; (3) NEI has offered admissible contentions within the scope of this proceeding; and (4) NEI should be admitted as a party to *support* DOE’s Application. Accordingly, NEI’s Petition to Intervene should be granted.

¹ On February 13, 2009, NEI filed a “Motion to Strike Nevada’s Answer to [NEI’s] Petition to Intervene” because, under the NRC’s regulations, the State is not permitted to file any answer to NEI’s intervention petition. However, as of this filing, no action has been taken on NEI’s Motion. Accordingly, NEI replies to Nevada’s Answer to ensure that the claims raised therein do not go unaddressed by NEI in the event that the Motion is denied.

II. STANDING

A. Legal Standing as of Right

1. *NEI's Interests*

As acknowledged by DOE and NRC Staff, NEI asserted its standing to participate as of right in this proceeding based upon the “safety, security, environmental, operational, and financial interests [of its members] in the timely licensing of the Yucca Mountain waste repository.” *See* DOE Answer at 16 and NRC Staff Answer at 22, citing NEI Petition at 3. NEI included in its petition the affidavit of Rodney J. McCullum, the NEI Director of the Yucca Mountain Project, detailing these various interests, along with affidavits of five of its member companies authorizing NEI to represent their interests. NEI Petition, Attachments 1-6. The Answers proceed to define NEI’s interests narrowly and attempt to dismiss those interests as a basis for standing as of right. The Answers overreach, however, in their attempt to exclude the organization (NEI) that represents the most direct beneficiaries of the Yucca Mountain project, and whose members would be directly harmed by failures to timely license the project and/or by elements of the currently proposed design.

Mr. McCullum’s affidavit points out the many direct injuries that would result from a failure to license the proposed facility, a delay in licensing of the facility, or a license that does not clarify the licensing basis with respect to aspects of the proposed design and facility operation. These injuries include:

- The need for additional and continuing on-site storage of used nuclear fuel, at substantial cost to nuclear power plant licensees and former licensees. NEI Petition, Attachment 1 at ¶¶ 11-15.
- Occupational radiation exposures associated with continuing onsite storage of used nuclear fuel. *Id.* at ¶ 16.
- Operational and security impacts associated with continuing onsite storage of used nuclear fuel at reactor sites. *Id.* at ¶¶ 14, 16.

- Environmental impacts associated with the delay in decommissioning of sites after permanent cessation of plant operation, due to the continuing presence of used nuclear fuel contrary to the intent of Congress. *Id.* at ¶ 16.
- Economic impacts due to unnecessary expenditures from the Nuclear Waste Fund, due to continuing delay in the Yucca Mountain project and elements of the proposed design. *Id.* at ¶¶ 18, 26.
- Occupational radiation exposures at reactor sites due to elements of the proposed design and proposed procedures for handling spent nuclear fuel, such as use of transportation, aging and disposal canisters. *Id.* at ¶¶ 20-21.
- Occupational radiation exposures to workers at the Yucca Mountain project due to elements of the proposed design. *Id.* at ¶¶ 19-20. As also noted by Mr. McCullum, NEI members include unions that are likely to be involved in the construction and operation of the Yucca Mountain repository. *Id.* at ¶ 2.

These injuries are also discussed throughout the affidavits provided by NEI's members and expert consultants in support of NEI's proposed contentions.

Each of these potential injuries meets judicial concepts of standing under Article III of the Constitution, as well as judicial concepts of prudential standing (the "zone of interest" test). Each is therefore sufficient to establish NEI's standing to participate. In particular, in accordance with case law cited in the NEI Petition as well as the Answers, the asserted injuries are: (1) particularized injuries to NEI members; (2) are traceable to NRC action in this proceeding (*e.g.*, denial of the license, a grant of the license with adverse conditions, grant of the license without conditions mitigating adverse impacts); and (3) are likely to be redressed by a favorable decision (*e.g.*, grant of the license, grant of the license with appropriate conditions, clarification or limitations with respect to the licensing basis). *See, e.g., Bennett v. Spear*, 520 U.S. 154, 167 (1997) (citing *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560-61 (1992)); *Quivira Mining Co.* (Ambrosia Lake Facility, Grants, New Mexico), CLI-98-11, 48 NRC 1, 5-6

(1998). In addition, as discussed further below in response to the Answers, all of these interests are also within the “zones of interest” established by the Atomic Energy Act (“AEA”), the National Environmental Policy Act (“NEPA”), and/or the Nuclear Waste Policy Act (“NWPA”).

At the threshold, DOE, NRC Staff and Nevada ignore that NEI has previously participated in Yucca Mountain licensing matters as a full party at the NRC — in connection with the pre-application phase of the proceeding. None of the Answers attempt to explain why NEI’s participation was not contested in the past or how that past participation squares with the present position. Moreover, as discussed in the NEI Petition (at 5-6), NEI has participated as a full-party intervenor in Yucca Mountain related litigation in federal courts. In particular, in a federal appellate case involving the proposed repository, in which NEI’s standing was contested, the Court of Appeals specifically determined that NEI had standing based on potential injuries that satisfy Article III injury-in-fact requirements and that are within the “zone of interest” created by the Energy Policy Act of 1992 (“EnPA”) and the NWPA. *See Nuclear Energy Inst. Inc. v. EPA*, 373 F.3d 1251, 1278-79 (D.C. Cir. 2004). The attempts to distinguish that case are unavailing, as discussed below.

The Answers ultimately attempt to characterize all of NEI’s members’ interests — which include radiological exposures, operational and security impacts, and environmental impacts that are cognizable under the AEA and NEPA, as well as economic interests that are directly cognizable under the NWPA — too narrowly. Furthermore, they ignore the role that NEI can play to facilitate and expedite the licensing of the project. As stated in the NEI Petition (at 6), NEI generally supports issuance of a license for the Yucca Mountain project and seeks to participate — not only with respect to its own proposed contentions — but also on certain other matters raised by other parties that oppose the project or aspects of the project. To the extent

NEI argues injuries based on conservatism in the LA, NEI intends to demonstrate that eliminating conservatism in one area may provide greater margin in another related area, thereby *expediting licensing*. This is particularly true of contentions related to the Total System Performance Assessment (“TSPA”), as discussed below.² The attempts of DOE, NRC Staff and Nevada to diminish NEI’s interests would deprive the NRC of substantial expertise and an important perspective on the licensing of the Yucca Mountain project.³

2. *DOE Answer to NEI’s Standing*

a. *NEI’s “Economic” Injuries Do Establish Standing in this Matter*

DOE’s primary argument is based on its characterization of NEI’s interests as the economic harm to its members. DOE argues that “economic interests fall outside the zone of interests protected by the statutes at issue in this proceeding.” DOE Answer at 17. This overly broad argument ignores the operational, radiological safety, physical security, and environmental interests that are included in NEI’s basis for legal standing; focuses entirely on the AEA and NEPA, and conspicuously ignores the “zone of interest” created by the NWPA; and grossly over-simplifies the issue of whether economic interests are cognizable in this proceeding.

i. *Injuries Under the AEA and NEPA*

First, DOE correctly cites *Pac. Gas and Elec. Co.* (Diablo Canyon Power Plant, Units 1 and 2), CLI-02-16, 55 NRC 317, 336 (2002), for the proposition that “the AEA and NEPA zones of interests do *not* include purely economic injuries unlinked to radiological or

² NEI notes that the State of Nevada, to name one potential party, has proposed contentions that relate directly to some of the areas of interest reflected in NEI’s proposed contentions. These include matters impacting the TSPA, such as volcanism and drip shields.

³ Excluding NEI would also be contrary to the Licensing Board precedent, previously cited by NEI, in *Private Fuel Storage, L.L.C.*, (Independent Spent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 172 (1998). None of the Answers distinguish that precedent.

environmental harm . . .” DOE Answer at 17. However, DOE overlooks the aspect of that holding (included in the very phrase quoted) that excludes economic harm only when that harm is not directly related to environmental or radiological harm. Here, most of the injuries listed by NEI do have economic impacts. And those economic impacts are directly related to radiological or environmental harms. Continued storage of high level waste at power reactor sites or independent spent fuel storage installations regulated by the NRC in fact involves radiological safety, security, and environmental matters. NEI’s asserted interests related to continued storage of spent fuel therefore are well within the NRC’s “zones of interests” under the AEA and NEPA. Likewise, radiological injuries to NEI’s member unions at the project site, and NEI members at reactor sites, are well within the zones of interests under the AEA and NEPA.

The Supreme Court noted in *Ass’n of Data Processing Serv. Orgs. Inc. v. Camp*, that “[t]he first question [in establishing standing] is whether the plaintiff alleges that the challenged action has caused him injury, in fact, *economic or otherwise*.” 397 U.S. 150, 151 (1970) (emphasis added). Indeed, at some level any safety or property interest could be considered an economic injury, but the economic nature of the injury cannot foreclose standing. For example, the Commission has recognized that “injury-in-fact” cognizable under the AEA can be established by an economic interest in a plant itself. *Gulf States Utilities Co.* (River Bend Station, Unit 1), CLI-94-10, 40 NRC 43, 48 (1994) (the Commission agreed with the Licensing Board that a claim of possible injury to an interest of the minority owner in a plant “is far different from claims of disgruntled ratepayers or taxpayers whose claims of rising rates or taxes have been rejected [by NRC] as a basis for standing in our proceedings”).⁴ Similarly, a party’s

⁴ See also *North Atlantic Energy Serv. Corp.* (Seabrook Station, Unit 1), CLI-99-27, 50 NRC 257, 262-63 (1999) (“the AEA protects not only human health and safety from radiologically caused injury but also the owner’s property interests in their facility”

interest can be primarily economic and still fall within the NEPA zone of interests if the economic injuries are “causally related to an act within NEPA’s embrace.” *Ranchers Cattlemen Action Legal Fund United Stockgrowers of America v. Dep’t of Agric.*, 415 F.3d 1078, 1103 (9th Cir. 2005) (citation omitted); *see also Friends of the Boundary Waters Wilderness v. Dombeck*, 164 F.3d 1115, 1126-27 (8th Cir. 1999) (finding plaintiffs had standing because the EIS did not consider impact on local economies).⁵ Here, NEI’s members’ interests — which are measurable in economic terms — are nonetheless sufficiently linked to radiological, safety and environmental matters to meet the test for prudential standing under the AEA and NEPA.

ii. Injuries Under the NWPA

Even more fundamentally, DOE ignores the zone of interests created by the NWPA. In 2004, the Court of Appeals for the D.C. Circuit in *Nuclear Energy Institute* found that NEI had standing in Yucca Mountain litigation. The Court of Appeals recognized that NEI’s members bear the primary cost for funding the Yucca Mountain facility through the Nuclear Waste Fund and will be adversely affected by further delay of “the date on which the Energy Department will take stored waste off NEI members’ hands.” *Nuclear Energy Inst. Inc.*, 373 F.3d at 1278. The Court of Appeals separately addressed Article III standing (“injury-in-fact”) and prudential standing (“zone of interest”). The Court reasoned “[a]s to [Article III]

(citing *North Atlantic Energy Serv. Corp.* (Seabrook Station, Unit 1), CLI-99-6, 49 NRC 201, 216)).

⁵ There are many NRC cases concluding that broad-based economic interests are beyond the scope of the “zones of interests” created by the AEA and NEPA. These cases generally involve ratepayer interests or taxpayer interests. These interests are clearly unlinked to radiological safety or environmental impacts, are not caused by the NRC licensing action, nor are they within the “zones of interests” sought to be protected by the AEA or NEPA. *See, e.g., Portland Gen. Elec. Co.* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610, 613-14 (1976); *Tennessee Valley Authority* (Watts Bar Nuclear Plant, Units 1 and 2), ALAB-413, 5 NRC 1418, 1421 (1977). These cases are therefore easily distinguishable from the present circumstances.

injury-in-fact, we have no doubt that delaying the opening of the Yucca Mountain repository would inflict concrete harm on NEI members, for as NEI's affidavit explains, NEI members expend substantial sums to operate their own storage facilities." *Id.* at 1279. With respect to prudential standing, over the objection of the Environmental Protection Agency the Court of Appeals found it "obvious that Congress intended Section 801(a) [of EnPA] to facilitate construction of a permanent nuclear waste repository — the very interest that NEI advances here." *Id.* at 1280. The Court of Appeals referenced the Congressional intent "evinced in the NWPA and later in EnPA." *Id.* Accordingly, in the context of the NWPA, DOE's characterization of NEI's interests as "economic" becomes completely irrelevant. Case law on "economic" matters developed in reactor licensing cases with respect to the AEA and NEPA does not bar participation by NEI under the NWPA.

In *Nuclear Energy Institute*, the DC Circuit stated that the test for prudential standing is "not meant to be especially demanding. Indeed, a petitioner is outside the statute's zone of interest only if [the petitioner's] interests are so marginally related to or inconsistent with the purposes implicit in the statute that it cannot reasonably be assumed that Congress intended to permit the suit." *Nuclear Energy Inst. Inc.*, 373 F. 3d at 1279-1280 (citing *Nat'l Petrochemical & Refiners Ass'n v. EPA*, 287 F.3d 1130, 1147 (D.C. Cir. 2002)). NEI's interests are patently consistent with the purpose of the NWPA. While the present NRC proceeding does not involve the promulgation of radiation standards for Yucca Mountain under Section 801 of EnPA, it does involve a licensing action under the NWPA. The Court of Appeals characterized the scope of the zone of interests more broadly than radiation standards — that is, according to the Court *both* the NWPA and Section 801 of EnPA (which actually amended the NWPA and the AEA) "evince" the intent of Congress to facilitate a permanent repository for nuclear waste. *Id.*

at 1280. Indeed, Congress's intent to fund and construct a repository can be found in numerous provisions of the NWPA, including Section 111(b)(2) (the purpose of the subtitle is "to establish the Federal repository, and a definite Federal policy, for the disposal of [high level] waste and spent fuel") and Section 302 (establishing the Nuclear Waste Fund to provide sufficient revenue to offset the costs of the repository). In this regard, the NWPA is clearly about more than the radiological safety and environmental adequacy of the high level waste repository. The NWPA provides a process to site and license the repository, defines the responsibilities with respect to spent fuel, and establishes a process to fund and facilitate actual disposal of high level waste by DOE. NEI's members are clearly affected by all of these interests.⁶

DOE attempts to distinguish the precedent by citing *Envirocare of Utah, Inc. v. NRC*, 194 F.3d 72 (D.C. Cir. 1999). In *Envirocare*, the DC Circuit upheld the NRC's determination in that case that competitors asserting economic injury do not demonstrate the type of interest necessary to show standing under the AEA. The NRC had found: "Our understanding of the [AEA] requires us to insist that a competitor's pecuniary aim of imposing additional regulatory restrictions or burdens on fellow market participants does not fall within those 'interests' that trigger a right to a hearing and intervention." *Id.* at 75 (citing *Int'l Uranium Corp.*, 48 N.R.C. 261, 264 (1998)). The Court of Appeals found this to be a permissible construction of the AEA, stating that "excluding competitors who allege only economic injury from the class of persons entitled to intervene in licensing proceedings is consistent with the

⁶ See also *Ala. Power Co. v. Dep't of Energy*, 307 F.3d 1300, 1309-10 (11th Cir. 2002) (finding that utilities that were not parties to a DOE settlement of claims related to nuclear waste obligations have standing to challenge any expenditures out of the Nuclear Waste Fund given "the zero-sum nature of the fund"); cf. *Roedler v. Dep't of Energy*, 255 F.3d 1347, 1352-53 (Fed. Cir. 2001) (finding that rate paying customers do not have standing to challenge DOE for breach of contract concerning failure to dispose of utilities' used fuel).

Atomic Energy Act.” *Id.* at 77. However, NEI in this proceeding is not seeking to impose additional burdens on a competitor or to gain commercial advantage. Rather, in this licensing proceeding, that is specifically contemplated by the NWPAs, NEI is seeking to represent the interests of an entire industry with respect to DOE’s satisfaction of its obligations under the NWPAs to provide safe and secure disposal of spent nuclear fuel. *Envirocare* says absolutely nothing about standing under NWPAs or the standing of NEI in this proceeding.

b. Radiological Injuries at Yucca Mountain Site Do Establish Standing

DOE’s next argument is that the *radiological* injuries identified in the affidavit of Mr. McCullum that will occur at the repository site are insufficient to establish standing. DOE argues that “[s]imply put, this basis for standing is insufficient because it does not demonstrate injury-in-fact to NEI’s members.” DOE Answer at 22. DOE argues that NEI’s affidavits are insufficient because they do not establish injuries to NEI members at the site.⁷

This argument at least recognizes the radiological nature of the injuries identified by NEI. However, the argument erroneously characterizes the scope of NEI’s members. As noted in the McCullum Affidavit, NEI’s members include unions and other organizations and members likely to be involved in the construction and operation of Yucca Mountain. NEI Petition, Attachment 1 at ¶ 2. Accordingly, NEI does have standing to intervene based on the interests of these members. Moreover, to further identify NEI’s union members, NEI has attached an additional affidavit from Mr. McCullum.⁸ Supplemental McCullum Affidavit, Attachment 1.⁹

⁷ This DOE argument is mooted by the first issue discussed above. Apart from any injuries to members at the repository site, NEI’s interest is established by the interests of other members under the AEA, NEPA, and the NWPAs.

⁸ Historically, the Commission has been generous in permitting petitioners the opportunity to cure procedural defects in petitions to intervene because “the participation of

c. *Radiological Injuries at Reactor Sites Do Establish Standing*

DOE's final argument again recognizes the *radiological* and *environmental* nature of many of the asserted injuries to NEI's members who own or operate power reactors or NRC-licensed facilities for nuclear fuel storage. DOE, however, makes the unprecedented argument that injuries outside the Geologic Repository Operations Area ("GROA") are "outside the scope of this proceeding and therefore not a basis for standing." DOE Answer at 23. Suffice it to say, this argument is contrary to decades of NRC precedent on standing to participate in NRC proceedings.

For power reactors, the NRC has long recognized a presumption of standing for persons who live within a 50-mile radius of a proposed reactor site. *See, e.g., Virginia Electric & Power Co.* (North Anna Power Station, Units 1 and 2), ALAB-146, 6 AEC 631, 633-34 (1973); *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), LBP-98-33, 48 NRC 381, 385 n.1 (1998). The presumption is based on the prospect of *offsite* radiological or environmental injury *due to* routine operations or an accident at the power reactor. Such an injury would be traceable to the licensing action and redressible in the proceeding. There is nothing in the NRC case law to suggest that injuries outside the operations area of a proposed power reactor (or fuel storage facility) are outside the scope of the proceeding and insufficient to confer standing.¹⁰ Moreover, DOE cites no judicial precedent that would geographically limit

intervenors in licensing proceeding can furnish valuable assistance to the adjudicatory process." *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), LBP-91-7, 33 NRC 179, 195 (1991), *citing Virginia Elec. and Power Co.* (North Anna Power Station, Units 1 and 2), ALAB-146, 6 AEC 631 (1973).

⁹ Mr. McCullum's supplemental affidavit also identifies NEI's employee resident in Nevada, who has direct responsibilities with respect to the repository.

¹⁰ The 50 mile presumption directly refutes DOE's argument. The 50 mile presumption, it should be noted, is also not a *limitation*. It merely recognizes that at 50 miles offsite

the scope of the “injury in fact” test for standing. Contrary to DOE’s position, and consistent with the case law, as long as an alleged injury is *caused* by the proposed action and *redressible* in the proceeding, that injury would be sufficient to establish standing. In the present case there is a direct link of causation from the NRC licensing action at issue (or inaction, as the case may be) and the radiological, security, operational, environmental, and economic injuries to NEI’s offsite members. And those injuries assuredly could be redressed by prompt issuance of the license, to name just one possible outcome that NEI would support.

DOE cites one case for its novel proposition: *Shieldalloy Metallurgical Corps.* (Cambridge, Ohio Facility), CLI-99-12, 49 NRC 347 (1999). This case, however, addresses a very different issue from the issue of the scope of radiological injuries that could confer standing in the present proceeding. This case involved a petitioner contesting a source material license, claiming standing based on economic interests associated with radiological material located on their own nearby property (the petitioner sought to move that material to the applicant’s property). The Commission found the pleading attempting to establish this alleged economic injury to be “woefully deficient” on the facts, the claim of economic injury to be outside the scope of the proceeding, and the claims of causation and redressibility to be inadequate. *Id.* at 35. *Shieldalloy* presents a far different factual context than the present one, and is clearly inadequate to establish the sweeping precedent that DOE advocates. That is, *Shieldalloy* does not stand for the broad proposition that injury outside the geographical boundary of the GROA is outside of the scope of this proceeding. Unlike the facts in *Shieldalloy*, NEI has provided a detailed explanation in its pleading demonstrating how NEI’s members will be directly affected by whether, when, and how DOE receives used fuel at Yucca Mountain. Further, the petitioners

injury can be assumed; it says nothing regarding injury-in-fact and causation beyond 50 miles.

in *Shieldalloy* had no contractual agreement for the removal of slag from their property, compared to NEI members who, in fact, under a standard contract with DOE, must make Nuclear Waste Fund contributions in exchange for DOE's contractual commitment to take spent fuel for disposal.

At bottom, NEI has established particularized injuries that will be suffered by its members from an adverse licensing decision, from a delay in reaching a favorable decision, or even from a favorable decision (depending upon the nature of the decision). Those injuries are redressible in this proceeding and within the zones of interests created by the AEA, NEPA, and — importantly — the NWPA. Some of these injuries will occur within the GROA, others will occur offsite. However, wherever they occur, these injuries are sufficient to establish NEI's standing to participate as of right in this proceeding.

3. *NRC Staff Answer to NEI's Standing*

a. *"Economic" Injuries Establish Standing Under the NWPA*

With respect to NEI's interests under the NWPA, NRC Staff — like DOE — narrowly characterizes those interests as "economic." NRC Staff Response, at 23. The Staff argues that this claim "fails to support standing under the 'zone of interests' of the governing statutes, the AEA *and the NWPA.*" *Id.* (emphasis added). The Staff, however, then cites only cases related to the AEA to argue that NEI's "economic" interests are outside the zones of interests that would confer standing. *Id.* As detailed above, NEI's interests — economic or otherwise — are in fact well within the zones of interests created by the AEA, NEPA, *and the NWPA.*

NRC Staff next dismisses NEI's interest in "cost-effective and timely licensing of the repository" as outside the scope of "those sections of the NWPA that are pertinent to this

proceeding.” *Id.* at 23-24. This argument reduces the NWPA to a goal of protection of the public health and safety and the environment. *Id.* This clearly looks at the NWPA far too narrowly. As a result, the NRC Staff loses sight of the big picture. As discussed above, the clear goal of the NWPA is to define responsibilities for spent nuclear fuel storage and disposal, to site a high level waste repository, to provide for the timely licensing of the repository, and to provide a funding mechanism for that repository. The NWPA is more than just another health and safety statute, akin to the AEA. NEI’s interests (and those of its members) are clearly aligned with the Congressional purposes in enacting the NWPA.

NRC Staff, like DOE, attempts to distinguish *Nuclear Energy Institute*. NRC Staff recognizes that the Court of Appeals found that NEI had standing to challenge EPA’s groundwater standards for Yucca Mountain promulgated under Section 801(a) of the EnPA (which, as noted earlier, amended and supplemented the NWPA and the AEA with respect to repository matters). NRC Staff reads the case to say that the Court of Appeals did not endorse NEI’s standing under the NWPA. *Id.* This argument attempts a remarkably fine distinction. In fact, as noted above in connection with the DOE Answer, the Court of Appeals specifically defined the relevant “zone of interest” based on the intent of Congress manifest in *both* the NWPA and the EnPA. *Nuclear Energy Inst. Inc.*, 373 F.3d at 1280.

NRC Staff also argues that the “zone of interest” must flow from “the particular provision of law” upon which the petitioner relies, citing *Bennett v. Spear*, 520 U.S. at 175-76. NRC Answer at 24. NRC Staff, without support, would then narrow the provisions of law available to define the “zone of interest” to Section 114(a)(2)(d) of the NWPA.¹¹ *Id.* The Staff

¹¹ It appears that the NRC Staff citation may be in error, and that the intended reference is Section 114(d) of the NWPA (42 U.S.C. § 10134(d) (2007)). Section 114(d) of the

does not square this approach with clear precedent that the zone of interest test is “not meant to be especially demanding.” *Nat’l Petrochemical & Refiners Ass’n v. EPA*, 287 F.3d 1130, 1147 (D.C. Cir. 2002). Nor is this reading consistent with the actual decision in *Nuclear Energy Institute*, in which the Court of Appeals found the relevant zone of interest to be reflected more broadly in the NWPA and EnPA, not just in a single provision of either statute. The Court of Appeals wrote that “Congress’s purposes in enacting the *overall* statutory scheme are relevant *only* insofar as they may help reveal the purpose in enacting the particular provision [at issue].” *Nuclear Energy Inst. Inc.*, 373 F.3d at 1280 (citing *Grand Council of the Crees v. FERC*, 198 F.3d 950, 956 (DC Cir. 2000) (emphasis in original)). The Court of Appeals then took exactly this approach to determine that the purpose of Section 801(a) of the EnPA is broader than had been characterized by EPA. The Court of Appeals rejected precisely the argument NRC Staff attempts here — that the statute was intended only to safeguard public health and safety. *Id.* The present NRC licensing proceeding was initiated under Section 114(d) of the NWPA, and licensing a repository (which NEI supports) is certainly part of the purpose of NWPA Section 114(d), as well as many other provisions of the NWPA as referenced above. NEI’s interest is squarely within the “zone of interests” created by Congress in enacting the NWPA.

b. Radiological Injuries at Yucca Mountain and Reactor Sites Establish Standing

NRC Staff also argues that the radiological injuries identified in the affidavit of Mr. McCullum are insufficient to establish standing because “NEI has not shown that the workers authorize NEI to represent them here.” NRC Staff Answer at 25. As discussed in reply to DOE, the NRC Staff’s argument erroneously characterizes the scope of NEI’s membership.

NWPA provides for the Commission to consider an application for construction authorization.

As noted in the original McCullum affidavit (NEI Petition, Attachment 1 at ¶ 2), and amplified in the attached Supplemental McCullum Affidavit, NEI's members include unions and other organizations likely to be involved in the construction and operation of Yucca Mountain. And, as previously demonstrated, NEI is authorized to represent its members in this proceeding.¹² NEI also has members who are likely to be exposed to unnecessary occupational exposures at power reactor sites due to certain aspects of the repository design. Contrary to NRC Staff's position, there is a direct link of causation between the NRC licensing action at issue and the radiological, security, operational, environmental, and economic injuries to NEI's onsite and offsite members.

4. *Nevada Answer to NEI's Standing*

Nevada also broadly characterizes NEI's interests as "purely economic." Nevada Answer at 8. Nevada finds these "economic" interests to be beyond the scope of the AEA and NEPA. Nevada Answer at 9. NEI has addressed these AEA and NEPA arguments in its reply above to DOE and the NRC Staff. NEI's members' interests are described in detail in the affidavits of Mr. McCullum and the members' representatives. NEI Petition, Attachments 1-6; Supplemental McCullum Affidavit, Attachment 1. While certainly measurable in economic terms, those interests include radiological, operational safety, security, and environmental matters — all well within the scope of the AEA and NEPA.

Nevada also contests NEI's standing under the NWPA, arguing that the "zone of interest" test is limited to "the statute that is the basis (or one of the bases) for petitioner's challenge on the merits," and that "none of NEI's nine contentions alleges any violation of the NWPA." Nevada Answer at 9 (citing *Air Courier Conference of America v. American Postal*

¹² NEI also maintains an office in Nevada and has an employee who spends time at the repository site. Supplemental McCullum Affidavit, Attachment 1 at ¶ 6.

Workers Union, 498 U.S. 517, 524, 529 (1991)). However, Nevada reads the Court’s analysis in the case that it cites too narrowly, to focus on “violations.” In fact, the Court’s analysis focused on the *relationship* of the statute the petitioners relied upon for their claim on the merits to the separate statute relied on for their standing. *Air Courier Conference of America*, 498 U.S. at 529. Here, there is only one statute in the analysis — the NWPA. And, there is a clear relationship between the licensing provisions of the NWPA that are the genesis of this proceeding and the broader purpose of the NWPA manifest throughout that statute. Further, as already discussed, in *Nuclear Energy Institute* the Court of Appeals found the zone of interests to be based upon the intent of Congress in the statute — not limited by either a single provision of the statute or NEI’s litigating posture in the case.

At bottom, to the extent NEI supports a license, its interests are aligned with the purpose of the NWPA; to the extent NEI would demonstrate additional margin to licensing, its interests are aligned with the NWPA and aligned against those who claim otherwise; and to the extent NEI would demonstrate undue expenditures from the NWPA, its interests are aligned with the goals of the NWPA. Nevada’s approach, like that of DOE and the NRC Staff, is a narrow, mechanistic approach to the “zone of interests” test based on crabbed semantics. The reality is that NEI’s members’ interests are clearly cognizable under the NWPA.

B. Discretionary Standing

As discussed in the NEI Petition (at 7-8), an alternative basis for standing to participate is discretionary standing available pursuant to 10 C.F.R. § 2.309(e) and longstanding NRC precedent. *See, e.g., Portland Gen. Elec. Co.*, 4 NRC at 616. DOE, NRC Staff and Nevada contest NEI’s participation based on discretionary standing. The DOE Answer correctly notes that discretionary intervention is an “extraordinary procedure,” citing the final rulemaking

for Section 2.309(e), 69 Fed. Reg. 2182, 2201 (January 14, 2004), and *Andrew Siemaszko*, CLI-06-06, 63 NRC 708, 716-717 (2006) (stating that only eight petitions have ever been granted, without reversal, during the thirty years the six factor test [now codified in the regulations] has been applied). However, consistent with the regulation and precedent, NEI believes that — if even necessary — this *is* the extraordinary case in which discretionary intervention should be granted. Indeed, denying NEI’s participation in this, of all NRC proceedings, would nullify the NRC’s rule providing for discretionary intervention. NEI believes that discretionary standing could never be more appropriate.

As discussed in the NEI Petition, there are three factors which, if established, weigh in favor of granting standing: (1) the extent to which the petitioner’s participation may reasonably be expected to assist in developing a sound record; (2) the nature and extent of the petitioner’s property, financial, or other interest in the proceeding; (3) the possible effect of any order which may be entered in the proceeding on the petitioner’s interest. Factors weighing against standing include: (1) the availability of other means whereby petitioner’s interest will be protected; (2) the extent to which the petitioner’s interest will be represented by existing parties; and (3) the extent to which petitioner’s participation will inappropriately broaden or delay the proceeding. *See also Matter of Tennessee Valley Authority* (Sequoyah Nuclear Plant, Units 1 and 2; Watts Bar Nuclear Plant, Unit 1), LBP-02-14, 56 NRC 15, 28 (2002) (citing *Portland Gen. Elec. Co.*, 4 NRC 610). NEI addressed each of these factors in its petition.

Most importantly, NEI stated that it would assist in the development of a sound record on those matters where it would participate. NEI stated that it would provide expert support “drawn from NEI staff, the staffs of its members’ organizations, and NEI contractors

who are leading international experts on repository safety and independent of the Yucca Mountain project.” NEI Petition, at 7.

DOE, in effect, argues that there are no specific contributions, experts, or qualifications identified by NEI. DOE Answer at 25. This argument again reflects a remarkably narrow reading of the petition. In fact, NEI is the only entity participating or seeking to participate in this licensing proceeding whose members routinely manage and handle the commercial spent nuclear fuel that is the primary item of interest in the matter. Moreover, NEI has shown substantial additional expertise on important issues in this proceeding.

With respect to its own proposed contentions alone, NEI’s petition includes nine detailed expert affidavits sponsored by eleven different experts, with a statement of professional qualifications for each expert, and each expressing a viewpoint not otherwise presented in the proceeding. These experts are widely known as leaders in the field, and have been specifically recognized as such throughout industry, and by numerous technical and scientific review bodies including NRC Staff, the Advisory Committee on Nuclear Waste (“ACNW”), the Nuclear Waste Technical Review Board, and international repository authorities. This is precisely a showing of expertise and areas for contributions to the record as contemplated by the Commission in the regulation and in the *Siemaszko* case.

NRC Staff similarly argues that NEI has not demonstrated that only its experts would be able to properly raise its concerns. NRC Staff Answer at 27. Even if it were a requirement, however, only NEI here has offered expertise on the conservatism of the LA and the safety margin that it will provide, as well as experts from the nuclear industry presenting unique views on the implications of elements of the design. NEI in particular has offered unique perspectives on the post-closure safety analysis, the TSPA. NEI has proposed focused

contentions on TSPA matters and will support those contentions with the post-closure performance model developed by the Electric Power Research Institute (“EPRI”). The ACNW has previously recognized the EPRI work in this area — particularly on igneous activity — and recommended that NRC Staff and DOE consider the EPRI analyses and reassess apparent conservatisms.¹³ Additional detail on EPRI’s model, and the value that it will bring with respect to the issues in this proceeding, is provided in the attached affidavit of Matthew W. Kozak and Michael Apted responding to arguments made by Nevada in the context of several issues (NEI Petition, Attachment 13; *see* ¶¶ 8 -17).

The positions of DOE, NRC Staff, and Nevada also do not reflect that NEI’s overarching goal is to support the licensing of the project. To do that, NEI will seek to participate on certain contentions offered by other parties — contentions that were not available at the time NEI filed its petition to intervene. As reflected in its petition, NEI has an extensive membership, providing a deep source of expertise to call upon as necessary and appropriate. NEI’s membership includes virtually all NRC licensees, and nowhere is there a greater source of expertise on relevant matters. There should be no requirement that NEI, at this early stage, identify all of its areas in which it will participate, provide an expert witness list, and demonstrate qualifications for all of its potential witnesses. Based on the record already available to it, the Licensing Board can readily conclude that NEI has an extraordinary ability to assist in developing a sound record on NEI’s contentions as well as the contentions of other petitioners.

¹³ *See, e.g.*, ACNW Letter to Chairman Diaz, “Working Group on the Evaluation of Igneous Activity and its Consequences for a Geologic Repository at Yucca Mountain, Nevada,” dated November 3, 2004 (LSN # NEN000000374).

The Nevada Answer focuses on the presumption that NEI's concerns related to excessive conservatisms in DOE's design somehow translate into an attempt by NEI to make the repository less safe. In truth, NEI raises these concerns in an attempt to reduce the occupational exposures and environmental impacts associated with DOE's current design — in other words, to make the repository *more* safe. None of NEI's contentions assert that the repository should not meet NRC requirements for protection of health and safety and the environment, and Nevada's argument is simplistic and unpersuasive.

With respect to factors to be weighed against the participation of NEI, the Answers embellish on the potential for NEI's participation to broaden or delay the proceeding. DOE Answer at 26, 28; NRC Staff Answer at 28; Nevada Answer at 27. DOE asserts that NEI seeks to introduce “novel and vague” theories outside the scope of the proceeding. DOE Answer at 28. However, introducing novel or even vague theories at this stage is not a bar to participation by any party. “Novel” theories — if they even exist — could merely reflect NEI's unique perspective. And NEI's theories, that are in fact summarized in a well-supported intervention petition and that are anything but “vague,” in any event can and will be developed further through the adjudicatory process.

NRC Staff argues that litigating NEI's contentions would inappropriately broaden the proceeding simply because NEI and DOE both support construction authorization. NRC Staff Answer at 28. Whether an intervenor generally opposes or supports the subject at issue in a licensing proceeding is irrelevant to this factor for discretionary standing. Furthermore, it should be clear that NEI does not intend to, and will not, unduly broaden or delay this proceeding. NEI seeks to generally support DOE by: (1) demonstrating conservatism or margin in various analyses, which could expedite licensing (and which would also support removing conservatism

from the ultimate licensing basis of the project and reducing project costs); (2) demonstrating focused areas where occupational exposures at reactor sites and the repository site can be reduced, consistent with the ALARA principles; (3) demonstrating focused areas where environmental impacts can be reduced either in fact or in the environmental impact statements. These matters are clearly within the scope of this proceeding. Given the wide scope of contentions already filed by other parties, NEI's participation will not unduly broaden the issues or delay the process, and may in fact shorten the process. And, NEI believes it will provide a unique practical perspective with respect to various issues in the proceeding and with respect to proper use of the Nuclear Waste Fund.¹⁴

Nevada suggests that NEI "proposes to introduce an entirely new EPRI performance assessment into the proceeding" and that this would introduce "scores of experts in hundreds of scientific disciplines." Nevada Answer at 27. This, quite simply, is an overstatement to the point of distortion. NEI, like any party, should be expected, and required, to present its case in a focused and efficient manner. TSPA matters are likely to be raised and litigated by other parties, regardless of NEI's participation. Indeed, Nevada itself has challenged DOE's TSPA on several grounds. Consistent with the goals of the discretionary intervention regulation, no party other than NEI is prepared to offer the EPRI model — which will enhance the record far more than it will broaden the issues and delay the proceeding. Nevada's arguments are again addressed in the attached affidavits from Dr. Matthew Kozak and Dr. Michael Apted. Kozak and Apted Affidavit, Attachment 2. The EPRI model will demonstrate that conservatism in the DOE TSPA will offset any grounds for challenge offered by Nevada.

¹⁴ It should also be noted that the timetable for this proceeding is established by statute and does not vary based on the number of participants in the proceeding.

As discussed more specifically below in the context of several of NEI's contentions, Nevada is attempting to turn virtue into vice.

With respect to the remaining factors of Section 2.309(e)(1), the arguments opposing NEI's intervention are also unpersuasive. Addressing Section 2.309(e)(1)(ii), the Answers claim that NEI's interests do not favor participation. DOE acknowledges the truth of NEI's assertion that "[u]sed fuel storage and disposal are important operational, safety, and financial issues for nuclear operators and former operators." DOE Answer at 26. DOE attempts, however, to dismiss those interests as having a nexus to this proceeding that is "too vague and broad." *Id.* This characterization does not square with the six separate affidavits that NEI filed in support of standing. Those affidavits explain the interests, quantify the impacts, and clearly establish the nexus to the licensing of the proposed repository and therefore to this proceeding.

Addressing Section 2.309(e)(1)(iii), the Answers argue again that impacts on NEI's members are outside the scope of the proceeding. DOE Answer at 27; NRC Staff Answer at 27-28; Nevada Answer at 26. However, as addressed previously, NEI's interests could not be more directly related to the scope of the proceeding. NEI has an interest congruent with the AEA and NEPA, and perhaps most importantly, an interest congruent with the purpose of the NWPA. NEI intends to participate to directly address relevant issues of its own as well as those of other parties.

Addressing the factors of Section 2.309(e)(2)(i) and 2.309(e)(2)(ii), DOE asserts that NEI's interests that are within the scope of the proceeding (implicitly negating DOE's discussion of the factor above, by acknowledging that there are at least some such interests) coincide with DOE and can be represented by DOE. DOE Answer at 27. NRC Staff also asserts that NEI's interests will be represented by DOE. NRC Staff Answer at 28. NEI understands that

DOE does seek a license and will prosecute its application to the best of its ability. However, DOE's and NEI's members' interests are not aligned on all matters (as reflected in the NEI Petition and DOE Answer), and therefore NEI's members will *not* be represented by DOE. Also, contrary to Nevada's assertion, Nevada Answer at 27, NEI has no other outlet for pursuing its contentions within DOE. NEI brings a unique ability to represent its own interests with vigor, through experienced counsel, and with a practical perspective and ample technical support. There is no other party that will represent the interests of NEI's members as completely and fully as NEI.

At bottom, NEI's request to participate on a discretionary basis — if even necessary — should be granted.

III. CONTENTIONS

A. NEI-SAFETY-01

Spent Nuclear Fuel Direct Disposal in Dual Purpose Canisters

Contention:

The License Application (“LA”) fails to permit direct disposal of dual purpose canisters (“DPCs”) containing commercial spent nuclear fuel and is therefore inconsistent with “as low as is reasonably achievable” (“ALARA”) principles, unnecessarily generates additional low-level radioactive waste (“LLRW”), and wastes limited resources.

DOE, NRC Staff, and Nevada all oppose admission of this contention. The arguments, however, suffer from the recurring problem that these parties view the scope of this proceeding relative to NEI’s participation too narrowly. Contrary to the arguments of all three, the issue of direct disposal of commercial spent nuclear fuel (“SNF”) in dual-purpose canisters (“DPCs”) is squarely within the scope of this proceeding. None of the objections to NEI-SAFETY-01 has merit and the contention should be admitted for hearing.

Contention [10 C.F.R. § 2.309 (f)(1)(i)]: No reply necessary.

Basis [10 C.F.R. § 2.309 (f)(ii)]: No reply necessary.

Scope of Proceeding [10 C.F.R. § 2.309 (f)(iii)]: This contention raises the issue that the failure of the LA to permit direct disposal of DPCs already loaded with commercial SNF is not consistent with ALARA principles because it will result in unnecessarily increased radiological dose, increased LLRW, increased resource use, and increased cost. NEI Petition at 9. DOE claims that the issue is outside the scope of this proceeding because it concerns activities and impacts at reactor sites regulated by Part 50, which are outside the Geologic Repository Operations Area (“GROA”). DOE Answer at 63-64. NRC Staff claims that the issue is outside the scope of this proceeding because it concerns activities and impacts at reactor sites regulated by Part 50, whereas this proceeding concerns whether the LA should be granted or denied for the proposed Yucca Mountain repository. NRC Staff Answer at 120. Nevada claims that the issue

is outside the scope of this proceeding because it does not “address what is proposed in the application, but what might be proposed in the future.” Nevada Answer at 11. None of these claims has merit.

Contention NEI-SAFETY-01 clearly disputes DOE’s proposal to unload SNF from DPCs and reload that SNF into Transportation, Aging, and Disposal (“TAD”) canisters “whether that unloading and reloading occur at Yucca Mountain or at reactor sites.” NEI Petition at 9. DOE’s and NRC Staff’s objections to this contention on scope grounds relate only to that portion of the contention dealing with activities and impacts outside the GROA. Thus, with respect to any and all aspects of this contention concerning activities and impacts inside the GROA, both DOE and the NRC Staff concede that these aspects are within the scope of this proceeding and should be the basis for admitting the contention at least on these limited grounds.

Further, DOE and the NRC Staff are simply wrong to claim that activities or impacts outside the GROA fall outside the scope of this proceeding, and Nevada is simply wrong to claim NEI-SAFETY-01 concerns only “future plans or changes in the application.” Nevada Answer at 11. As cited in NEI’s petition, multiple sections of the LA address DOE’s proposed plans to transfer commercial SNF from DPCs to TADs canisters at reactor sites. *See, e.g.*, SAR Section 1.5 (“commercial SNF will mostly be received in [TAD] canisters from utility sites”); SAR Section 1.5.1.1 (“The majority of commercial SNF assemblies will be shipped to the repository in TAD canisters Commercial SNF assemblies that cannot be placed into TAD canisters at utility sites can be handled and shipped to the repository”); SAR Section 1.5.1.1.2.1.3 (“The TAD canister is loaded with commercial SNF and sealed at utilities (e.g., reactors) or the repository.”). *See also* FSEIS Section 4.1.14.3.2 at page 4-100 (“*Under the Proposed Action*, about 90 percent of the commercial spent nuclear fuel would travel to the

repository in TAD canisters; generator sites would load and seal these canisters” (emphasis added)).

Moreover, the design of facilities within the GROA itself is directly linked to DOE’s proposal to unload SNF from DPCs and reload that SNF into TADs (either at reactor sites or at the repository) prior to disposal. For example, FSEIS Section 4.1.14.3.2 explicitly states “[t]his analysis includes TAD canisters as repository components because they are an *element of the repository design* and the commercial nuclear facilities would *have* to use them as appropriate” (emphases added). In addition, the proposed Wet Handling Facility will be the location where “[c]ommercial SNF is transferred underwater in a pool from transportation casks and dual-purpose canisters into TAD canisters” and is designed “for opening dual purpose canisters prior to unloading.” GI Section 1.2.1.1 at page 1-5. Among other activities, the receipt of “commercial SNF in TAD canisters” will occur at the Canister Receipt and Closure Facilities. *Id.* at page 1-6. The design of these facilities, and perhaps the very need for these facilities, is directly linked to DOE’s proposal to unload SNF from DPCs and reload that SNF into TADs, whether at the repository or at reactor sites. NEI seeks to challenge these proposed plans, which are explicitly accounted for in the LA and therefore fall squarely within the scope of the proceeding. *Shieldalloy Metallurgical Corp.* (Cambridge, Ohio Facility), CLI-99-12, 49 N.R.C. 347, 355 (1999).¹⁵

¹⁵ DOE relies on the *Shieldalloy* case to claim that potential injuries at sites outside of the GROA are governed by other NRC licenses and regulations and are therefore outside the scope of this proceeding and not a basis for standing. DOE Answer at 22-23. But *Shieldalloy* in fact supports NEI’s position that the activities and impacts described by NEI which are outside the GROA are within this proceeding’s scope because those activities and impacts are accounted for in the LA. In *Shieldalloy*, the opposite was true – activities unaccounted for in the license amendment application were ruled outside the scope of the proceeding. There, the Commission ruled that petitioner’s interests fell outside the scope of the proceeding because the license amendment application dealt *only*

DOE's other arguments to the contrary have no merit. For support, DOE relies on a partial quotation from the Statement of Considerations of a decade-old proposed rule regarding the Yucca Mountain repository to claim that NRC's licensing authority is geographically limited to Yucca Mountain, and does not concern the handling of SNF at reactor sites. DOE Answer at 63 (citing 64 Fed. Reg. 8,640, 8,655 (Feb. 22, 1999)). A review of the full quotation cited reveals that the Commission was merely distinguishing the scope of proposed 10 C.F.R. Part 63 from the scope of 10 C.F.R. Part 60:

Section 63.1 *Purpose and scope*. This section defines the purpose and scope of Part 63 to be limited to the licensing of DOE to receive and possess source, special nuclear, and byproduct material at a geologic repository operations area sited, constructed, or operated at Yucca Mountain, Nevada. It states that generic regulations at Part 60 of this title do not apply, and cannot be the subject of any litigation in any licensing proceeding for the Yucca Mountain site.

64 Fed. Reg. at 8,655. The juxtaposition is clear: Part 63 shall apply to the licensing of a high-level waste repository at Yucca Mountain, Nevada, whereas Part 60 – which also concerns the licensing of a high-level waste repository, but is not specific to any geographic location – shall not apply to Yucca Mountain. DOE's argument that the Commission would proscribe consideration in this hearing of activities and impacts outside the GROA by burying a statement of its intent in the Statement of Considerations of a proposed rulemaking is baseless.¹⁶

with the movement of *on-site* radioactive material, whereas the petitioners sought to have off-site radioactive material moved to an on-site location. *Shieldalloy*, CLI-99-12, 49 N.R.C. at 353, 355. Because the off-site slag was “unaccounted for in the license amendment request,” the Commission ruled the petitioner's interest outside the scope of the proceeding. *Id.* at 355. To the contrary here, DOE's requirement that SNF be unloaded from DPCs and reloaded into TADs *is* accounted for in the LA and is therefore within the scope of this proceeding.

¹⁶ Indeed, as discussed, *supra*, the NRC has long granted standing to persons living within a 50-mile radius of a proposed reactor. By analogy, contentions dealing with offsite consequences, such as the radiation doses imposed by DOE's programmatic decision, should similarly be admissible.

DOE also counters NEI-SAFETY-01 with a claim that NRC is not obliged to make any findings under Part 50 regarding radiological health and safety issues at the reactor sites, and therefore no litigation is required on these issues. DOE Answer at 63-64. DOE's arguments here miss the point. DOE is seeking authorization from the Commission to construct a high-level waste repository. The Commission will grant the construction authorization if it determines that the proposed design poses no "unreasonable risk to the health and safety of the public" when considering, among other things, the adequacy of "DOE's proposed operating procedures to protect health and to minimize danger to life or property." *See* 10 C.F.R. § 63.31. Here, NEI contends that DOE's proposed repository design and operating procedures will inevitably cause activities and impacts at the repository and reactors sites that can be avoided if DOE changes the proposed approach. NEI does not claim that the Commission must make any findings under Part 50 to issue the construction authorization.

DOE also claims that the issues of unnecessary LLRW, resource use, and cost are outside the proceeding's scope. DOE Answer at 64. The NRC Staff argues that ALARA considerations at reactor sites are not relevant to this construction authorization proceeding and that the contention should therefore not be admitted. NRC Staff Answer at 120. Neither position has merit. It is inevitable that DOE's proposal to unload and discard DPCs, and to require utilities to use TADs for the SNF unloaded from DPCs will result in a LLRW stream, increased resource use, and costs. DOE's arguments here inappropriately attempt to divorce LLRW and increased resource use and cost from the ALARA considerations NEI raises in this contention. DOE is seeking authorization from the Commission to construct a high-level waste repository. The Commission will grant the construction authorization if it determines that the proposed design poses no "unreasonable risk to the health and safety of the public" when considering,

among other things, the adequacy of “DOE’s proposed operating procedures to protect health and to minimize danger to life or property.” *See* 10 C.F.R. § 63.31. Contrary to the NRC Staff’s position, ALARA “*requires* a licensee to carry out its activity in a manner calculated to minimize radiation exposures as much ‘as is practical consistent with the purpose for which the licensed activity is undertaken.’” *Yankee Atomic Electric Co.* (Yankee Nuclear Power Station), CLI-96-7, 43 N.R.C. 235, 251 n.10 (1996) (citing 10 C.F.R. § 20.1003) (emphasis added).

Moreover, with respect to the development of the proposed repository, the Commission explicitly stated:

The ALARA principle deals with optimizing the reduction of potential doses from radiation to members of the general public and workers Application of ALARA during operations *compels* the consideration of the benefits of further reduction in potential doses to present-day populations and workers relative to impacts to present-day populations (e.g., increased cost to reduce potential doses further).

Final Rule, Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, NV, 66 Fed. Reg. 55,732, 55,751 (Nov. 2, 2001) (emphasis added). The plain meaning of the Commission’s references to “the general public and workers” and “present-day populations and workers,” 66 Fed. Reg. 55,751, includes all populations and workers, including those at reactor sites. Had the Commission wanted to limit its consideration only to populations near, and workers at, the repository, it would have so stated. And in any case, this contention addresses the violation of ALARA principles regarding transfers of SNF from DPCs to TADs at the repository as well as reactor sites.

DOE also objects to the contention because it contends that the NRC must accept important details of its proposed design without question. In other words, while the NRC can consider impacts of DOE’s proposal, the NRC must accept the proposal, and may not challenge

“the extent to which DOE can use TADs” or “specify how much commercial SNF DOE can accept in TADs.” DOE Answer at 58-61, 65.

The Board should reject DOE’s crabbed view of the NRC’s authority. Under DOE’s view, this contention could be proven true, but NRC could do nothing about it (other than perhaps deny the entire application). This is not the case. Commission precedent is replete with instances where the Commission has issued an authorization or license subject to condition. Should the Commission find reason to object to any portion of the LA as inconsistent with ALARA principles, such as the failure to permit direct disposal of DPCs, the Commission is not limited to rejecting the construction authorization. It may alternatively approve the application, but subject it to conditions. *Entergy Nuclear Vermont Yankee, L.L.C., & Entergy Nuclear Operations* (Vermont Yankee Nuclear Power Station), CLI-06-8, 63 N.R.C. 235, 238 (2006) (“If the Board determines after full adjudication that the license amendment should not have been granted, [the license] may be revoked (or conditioned)).” Indeed, it is standard practice for the Commission to issue licenses subject to conditions. *See, e.g., Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-00-13, 52 N.R.C. 23, 29 (2000) (holding that a license condition may be used to support a finding of reasonable financial assurance); *Curators of The University of Missouri*, CLI-95-1, 41 N.R.C. 71, 87 (1995) (upholding a decision to condition the grant of two license amendments on fire safety conditions).

Because ALARA “requires a licensee to carry out its activity in a manner calculated to minimize radiation exposures as much as is practical consistent with the purpose for which the licensed activity is undertaken,” *Yankee*, CLI-96-7, 43 N.R.C. at 251 n.10 (citing 10 C.F.R. § 20.1003) (emphasis added), the Commission can and should require DOE to carry out its activities in a manner calculated to minimize radiation exposure as low as reasonably

achievable. DOE's argument that the NRC must accept DOE's proposal without question flies in the face of Commission regulations and longstanding precedent.

Materiality [10 C.F.R. § 2.309(f)(iv)]: DOE and the State challenge the materiality of the issues raised in this contention only to the extent they claim that the issues are outside the scope of this proceeding. DOE Answer at 65; Nevada Answer at 12. As demonstrated above, the issues raised herein are within the scope of this proceeding, and are accordingly material to the findings NRC must make.

The NRC Staff claims that how to package SNF for disposal in the repository is a design decision affecting post-closure repository performance which (in its view) is not subject to ALARA considerations. NRC Staff Answer at 121. The NRC Staff's claim has no merit.

The issue raised in this contention is that the LA should permit disposal of commercial SNF in DPCs because under DOE's proposed plan, all of the commercial SNF that has been and will be loaded into DPCs will have to be unloaded from those DPCs and repackaged into TADs. The unloading and reloading processes will expose both reactor and repository site workers to radiological dose; the discarded DPCs will be unnecessary LLRW; and the unloading and reloading processes will result in increased resource use and costs. NEI Petition at 9; *see also* NEI Petition Attachment 7 at ¶¶ 49-54. The contention and affidavit explain that DOE should avoid these adverse impacts by directly disposing of commercial SNF in DPCs, and that "DPCs can be directly disposed while meeting the requirements of 10 C.F.R. Part 63." NEI Petition at 9. NEI explains further that DPC direct disposal would result in no significant effects on pre-closure (NEI Petition Attachment 7 at ¶¶ 56-59) or post-closure requirements (*id.* at ¶¶ 60-70).

The NRC Staff claims that this contention is inadmissible because the Commission has prohibited the application of ALARA principles “to postclosure requirements,” and (according to the NRC Staff) “the decision regarding how to package [SNF] for disposal in the repository is a design decision affecting postclosure repository performance.” NRC Staff Answer at 121 (citing 66 Fed. Reg. 55,732, 55,751 & 55,762) & 122. Thus, according to the NRC Staff, it need not make a finding whether disposal of commercial SNF in TADs as opposed to DPCs is ALARA. *Id.* at 122. The NRC Staff, however, misinterprets the Commission’s statements on applying ALARA principles to this proceeding, and misunderstands how this contention seeks to apply those principles.

In promulgating Part 63, the Commission stated its position that, while

it is appropriate to explicitly require the application of the ALARA principle to the operational and decommissioning phases of the repository, the application of ALARA to achievement of the long-term performance objective is not appropriate.

66 Fed. Reg. at 55,751. This is because “deep geologic disposal, by its very nature, was ALARA,” and “it would be problematic to evaluate compliance with the application of ALARA principles in the postclosure phase of the repository.” *Id.* Rather, application of the EPA’s dose limit would “ensure that public health and safety and the environment are protected” in the long term. *Id.* Contention NEI-SAFETY-01 is entirely consistent with the Commission’s position. The contention does not seek to apply ALARA principles to the long-term performance objective and does not evaluate compliance with ALARA principles in the post-closure phase. Nor does it seek to use ALARA here as a tool to reduce short term exposures at the expense of potential long-term exposures. These are the types of ALARA principle applications the Commission sought to prohibit. Instead, the contention is addressing the application of ALARA to the operational and decommissioning phases of the repository. Under NEI-SAFETY-01, all of the

unnecessary increased dose, increased LLRW, and increased costs that NEI contends will occur under DOE's proposed action will occur during the "present day" operations phase of the repository. Long-term repository performance is not a consideration, other than to show that all such requirements will be met with direct disposal of DPCs.

Other Commission statements made in connection with the promulgation of Part 63 demonstrate that contention NEI-SAFETY-01 raises exactly the type of ALARA considerations that the Commission would find appropriate. In that rulemaking, the Commission stated that,

Application of ALARA during operations *compels* the consideration of the benefits of further reduction in potential doses to present-day populations and workers relative to impacts to present-day populations (e.g., increased cost to reduce potential doses further).

66 Fed. Reg. at 55,751 (emphasis added). Here, NEI contends that direct disposal of DPCs will totally avoid the radiological doses that would be incurred to certain "present-day populations and workers," *i.e.*, 822 person-rem to reactor and/or repository site workers. NEI-SAFETY-01 Affidavit at ¶ 53. In addition, there would be no "increased cost to reduce potential doses further" but rather substantial cost savings – approximately \$650,000 for every TAD that would not have to be procured. *Id.* at ¶ 55. Thus, contrary to the NRC Staff's claims, contention NEI-SAFETY-01 is precisely the type of ALARA contention contemplated by the Commission and is, accordingly, material to the findings NRC must make.

Facts, Opinions, and References [10 C.F.R. § 2.309 (f)(v)]: DOE and the State oppose admission of this contention on the claim that NEI has failed to support the contention with adequate facts or expert opinion. DOE Answer at 65-67; Nevada Answer at 12-15. The Staff has no objection on this basis. NRC Staff Answer at 120.

A. DOE claims regarding burnup credit have no merit

DOE opposes admission of this contention because, according to DOE, direct disposal of DPCs is not possible since DPCs have not been demonstrated to have sufficient criticality controls. In DOE's view, current NRC Staff guidance requires physical measurements to confirm burnup credit, which have not been performed. DOE Answer at 65-67. DOE's position is without merit for multiple reasons.

First, DOE's objections here would demand that NEI prove its contention at the pleading stage, which neither the Commission's regulations nor precedent require. *Private Fuel Storage, LLC* (Independent Spent Fuel Storage Installation), CLI-04-22, 60 N.R.C. 125, 139 (2004). Whether or not the contention is true is left to litigation on the merits, not this admissibility stage of the proceeding. *Washington Public Power Supply System* (WPPSS Nuclear Project No. 2), ALAB-722, 17 N.R.C. 546, 551 n.5 (1983). See also Final Rule, Changes to Adjudicatory Process, 69 Fed. Reg. 2,182, 2,191 (Jan. 14, 2004); *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 335 (1999) (the contention pleading rule is not a "fortress" to deny intervention); *Entergy Nuclear Generation Company* (Pilgrim Nuclear Power Station), LBP-06-23, 64 N.R.C. 257, 308 (2006). All that is required at the contention admissibility stage is "some sort of minimal basis indicating the potential validity of the contention," Final Rule, Rules of Practice for Domestic Licensing Proceedings--Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,170 (Aug. 11, 1989), showing that a genuine dispute exists and indicating that further inquiry is appropriate. *Yankee Nuclear Power Station*, CLI-96-7, 43 N.R.C. at 249. In other words, NEI need not provide factual support sufficient to withstand a summary disposition motion or to prove its entire case in the first instance. 54 Fed. Reg. at 33,171. NEI has more than met the contention admissibility

standard here. Indeed, DOE's resort to addressing the merits of the contention in its opposition to NEI's intervention petition "serves to reinforce [NEI's] insistence that a genuine dispute exists with respect to the substance of the contention in issue." *Shieldalloy Metallurgical Corp.* (Licensing Amendment Request for Decommissioning of the Newfield, New Jersey Facility), LBP-07-5, 65 N.R.C. 341, 362 n.33 (2007).

Second, even if it were permissible to consider the merits of a contention at this stage of the proceeding (which it is not), DOE's arguments miss the mark. DOE mischaracterizes NEI's position by claiming that NEI admitted that current NRC guidance regarding burnup credit precluded direct disposal of DPCs. Rather, the affidavit submitted in support of NEI-SAFETY-01 clearly stated that, according to a DOE draft report,

there were *no fundamental obstacles to direct DPC disposal*, while identifying some elements of DOE's planned practices that might need modification to accommodate DPC disposal, and identifying administrative regulatory obstacles to implementation regarding burnup credit.

NEI Petition Attachment 7 at ¶ 61 (emphasis added). Thus, it is NEI's position that there are no "fundamental obstacles" to the direct disposal of DPCs, including the current state of NRC guidance. Indeed, NRC Staff guidance imposes no regulatory requirements. *Curators of the University of Missouri* (TRUMP-S Project), CLI-95-1, 41 NRC 71, 98 (1995).

Furthermore, DOE's arguments here stand in direct contrast to its own position with respect to the SNF it intends to load into TAD canisters. In its Answer, DOE asserts that DPC criticality concerns could be addressed only if burnup credit is taken, but that that burnup credit cannot be taken for DPCs because no "physical measurements have been taken of the fuel that currently is in DPCs." DOE Answer at 66. Yet DOE takes a diametrically contrary position taken by DOE in the LA. With respect to its own criticality analyses for loading spent fuel into TADs, DOE takes burnup credit without physical measurements. In discussing the

considerations for loading waste packages, the LA states that “[w]aste packages are loaded with commercial SNF assemblies that satisfy the minimum burnup requirements specified by the criticality loading curves” using “the burnup value assigned by the originating nuclear utility.” SAR section 2.2.1.4.1.1.4.1 at pages 2.2-42 to 2.2-43. DOE concedes that “[i]t is well-known that the axial burnup profile is important to the determination of the reactivity of a commercial SNF.” *Id.* at page 2.2-43. Nonetheless, “*the actual burnup profile is not measured.*” *Id.* (emphasis added). Rather, DOE intends to assign “conservative profiles” “to all SNF assemblies in the waste package analysis,” thus ensuring that “*there are no requirements for physical measurement of the axial burnup profile.*” *Id.* (emphasis added). In addition, this section states: “[t]he conservative approaches used to develop and apply the criticality loading curve are sufficiently robust that the utility assigned burnup is an adequate source of burnup values, and *additional means of verification of assigned burnup through physical measurements are not needed.*” *Id.* (emphasis added).

As these statements clearly indicate, DOE has taken credit for burnup without utilizing physical measurements, a position with which NEI is in complete agreement.¹⁷ DOE cannot now claim that NEI’s contention is deficient because NEI might follow the same method for taking burnup credit that DOE follows in the LA.

DOE also claims that this contention is inadmissible because it relies on Electric Power Research Institute (“EPRI”) Report No. 1018051, “Feasibility of Direct Disposal of Dual-Purpose Canisters in a High-Level Waste Repository,” but failed to provide an LSN citation for

¹⁷ See, e.g., Transcript, July 18, 2007 Advisory Committee on Nuclear Waste and Materials Meeting, *available at* LSN Accession No. NEN000000417 at p. 80 (“measurement of fuel assemblies prior to loading in our view is definitely not necessary” (Mr. Everett Redmond, NEI)).

the report or attach it to its intervention petition. DOE Answer at 66 n.23. The LSN citation was in fact provided by NEI. *See* NEI Petition Attachment 7 at p. 27 (the reference for EPRI Report No. 1018051 (referred to as “EPRI 2008” in the affidavit) includes “LSN Accession No. NEN000000722”). This document is subject to copyright and therefore could not be attached to NEI’s intervention petition. *U.S. Dep’t of Energy* (High-Level Waste Repository: Pre-Application Matters, Advisory PAPO Board), LBP-08-10, 67 N.R.C. ___, slip op. at 8 (June 20, 2008). Furthermore, there is a process in place for proceeding participants to request copyright documents from other participants where the document “is not otherwise reasonably available to the requester.” *U.S. Dep’t of Energy* (High-Level Waste Repository: Pre-Application Matters), Revised Second Case Management Order (Pre-License Application Phase Document Discovery and Dispute Resolution) (July 6, 2007) at 10 (the requirements of which apply to this proceeding. *See* CAB Case Management Order #1 (Jan. 29, 2009) at 2). Most EPRI reports, including No. 1018051, are available to the public on EPRI’s website, <http://www.epri.com>. Furthermore, as of this filing, DOE has not requested any copyright documents from NEI. DOE cannot complain that NEI failed to comply with the copyright document requirements when DOE has failed both (1) to demonstrate that the document at issue is not otherwise reasonably available to it; and (2) to avail itself of the process established to request such documents.

B. Nevada’s claims regarding EPRI’s TSPA and the Commission’s ALARA considerations have no merit.

Nevada opposes admission of this contention because (1) NEI has failed to modify DOE’s Total System Performance Assessment (“TSPA”) to account for direct disposal of DPCs; and (2) the contention is contrary to NRC ALARA case law precedent and failed to present a cost benefit analysis. Nevada Answer at 12-15. Neither of Nevada’s claims has merit.

Nevada's objection that NEI failed to "tak[e] DOE's TSPA and modify[] it to include DPC's," Nevada Answer at 12, essentially demands that NEI prove its contention at the contention admissibility stage, which, as previously discussed, neither the Commission's regulations nor precedent require. *Private Fuel Storage*, CLI-04-22, 60 N.R.C. at 139. All that is required at this stage is "some sort of minimal basis indicating the potential validity of the contention," 54 Fed. Reg. at 33,170, showing that a genuine dispute exists and indicating that further inquiry is appropriate. *Yankee Nuclear Power Station*, CLI-96-7, 43 N.R.C. at 249. NEI has more than met that standard here. Indeed, Nevada's resort to addressing the merits of the contention in its opposition to NEI's intervention petition "serves to reinforce [NEI's] insistence that a genuine dispute exists with respect to the substance of the contention in issue." *Shieldalloy Metallurgical Corp.*, LBP-07-5, 65 N.R.C. at 362 n.33.

Even if it were permissible to consider the merits of a contention at this stage of the proceeding (which it is not), Nevada's claims about EPRI's TSPA are completely off the mark and completely fail to recognize the acknowledged value of EPRI's TSPA.. As detailed in the attached Affidavit from Drs. Kozak and Apted,¹⁸ EPRI has developed an independent TSPA consistent with the NRC's regulations and which incorporates diverse physical, chemical, geologic, and biologic process models to evaluate how the system of multiple barriers at Yucca Mountain are expected to perform. Kozak & Apted Affidavit at ¶¶ 8-9. The State, however, complains that this contention's reliance on EPRI's TSPA makes the contention "breathtaking in technical scope and complexity, and its proponents and opponents would be required to defend or oppose a total system performance assessment different from the one in the LA, engaging

¹⁸ Affidavit of Drs. Matthew Kozak and Michael Apted in Support of NEI's Reply to Nevada's Answer to NEI's Petition to Intervene ("Kozak & Apted Affidavit"), set forth at Attachment 2.

scores of experts and involving hundreds of scientific disciplines, and requiring vast litigation resources and time.” Nevada Answer at 13. The State is seeking to turn a virtue into a vice. Under the State’s view, no one should take a second or third look at DOE’s analyses and find areas for improvement because (according to the State) it would be too hard to do so. That is not the standard by which this licensing proceeding (or any licensing proceeding) should be conducted. NRC regulations compel that any comprehensive second look include relevant and significant features, events, and processes in the performance assessment. Kozak & Apted Affidavit at ¶9. In order to be an independent and credible TSPA, EPRI’s TSPA must be comprehensive.

The State also claims that NEI seeks to “jettison DOE’s TSPA entirely and replace it with an entirely different EPRI performance assessment.” Nevada Answer at 12. The State is wrong.¹⁹ EPRI’s independent TSPA is intended to aid in the identification and total system evaluation of credible “alternative conceptual models,” 10 C.F.R. § 63.114(c), as well as to focus on the requirement of “reasonable expectation” in long-term performance assessment. 10 C.F.R. § 63.304. Kozak & Apted Affidavit at ¶10. The EPRI TSPA has repeatedly been recognized as an independent source of repository evaluation data. *Id.* at ¶11. In fact, the NRC even considered EPRI’s TSPA in developing its own performance assessment model. *Id.* The EPRI TSPA is not intended to replace the DOE TSPA, but rather to provide independent evaluation for comparison to the DOE TSPA, analogous to the evaluation that the NRC Staff itself envisions conducting during the license review process. *Id.* at ¶¶10, 13. Furthermore, the EPRI TSPA is not “entirely different” than the DOE TSPA since it is based on and uses the same

¹⁹ The State’s position here is also contrary to the position it takes with its own contentions. For example, in contention NEV-SAFETY-01, the State essentially seeks to replace years of work on erosion with an unpublished paper that was not prepared according to quality assurance requirements. Kozak & Apted Affidavit at ¶ 10.

basic design information and site-specific information used by DOE. *Id.* at ¶10. The essential point is this: because DOE has not completed an analysis considering DPC direct disposal, NEI cited to the only existing, credible TSPA analysis that does – the EPRI TSPA. *Id.* at ¶13. Such independent, credible analyses can certainly be used to support alternatives, *id.*, particularly here at the contention admissibility stage of this proceeding.

Nevada also asserts that NEI did not attempt to modify the DOE TSPA to include direct disposal of DPCs because such a step would be too complex. Nevada Answer at 12. Nevada’s assertion has no merit. First, such modification has nothing to do with contention admissibility. In any event, modification of DOE’s TSPA would likely not be difficult, since the differences between DPC disposal and TAD canister disposal are not large. Kozak & Apted Affidavit at ¶12. It is, however, not possible for EPRI or NEI to perform the modification call for by the State since the DOE TSPA codes are not available for adaption by private parties. *Id.* The version that has been made available to the public only allows changes to parameters, not underlying assumptions. *Id.*

The State also claims that NEI failed to discuss uncertainty and quality assurance as it might apply to the EPRI TSPA. Nevada Answer at 13. Any such challenge to the EPRI TSPA is clearly a merits matter and not a contention admissibility issue. In any event, the State’s merits claims fail. The uncertainties in the behavior of DPCs are similar to the uncertainties in the behavior of TADs, and uncertainty is propagated through the EPRI TSPA in a similar manner to that used by DOE in propagating uncertainty in its TSPA. Kozak & Apted Affidavit at ¶15. While Part 63’s quality assurance (“QA”) requirements do not apply to analyses other than DOE’s, 10 C.F.R. § 63.141-44, EPRI’s analyses have been conducted to an appropriate level of QA, which is documented in a number of EPRI reports. *Id.*

The State erroneously claims that NEI's analyses failed to state compliance, or to demonstrate compliance, with the performance assessment and quality assurance requirements in Part 63. Nevada Answer at 13. The analysis presented in the contention is not intended to supplant DOE's TSPA. Kozak & Apted Affidavit at ¶16. The contention shows that direct disposal of DPCs is a viable option not permitted by the LA, and the failure to permit direct disposal of DPCs is inconsistent with ALARA principles. *Id.* By showing an alternative analysis that considers all the major potential issues, and by showing that those potential issues do not have a strong impact on system performance, the contention demonstrates that a full analysis by DOE is possible, and, if implemented, can avoid operational radiological doses associated with unloading spent fuel from DPCs and reloading spent fuel into TAD canisters, as well as the associated unnecessary resource use and costs that will result from DOE's proposed plan. *Id.* Also incorrect is the State's claim that EPRI's analysis included only "some currently licensed DPCs." Nevada Answer at 13. Apart from this being a "merits" objection, the EPRI analysis evaluated a DPC design believed to bound the behavior of most DPCs, and Nevada does not challenge this choice. Kozak & Apted Affidavit at ¶17. Even Nevada is unable predict whether there will be other licensed DPCs in the future, thus rendering fatally flawed Nevada's ostensible test of evaluating all currently licensed DPCs. EPRI's bounding analysis concluded that DPC disposal is possible, and even if only some currently licensed DPCs can be disposed of, this practice would still result in a reduction in operational dose, resource use, and costs compared to the TAD-only option that is the baseline of DOE's proposal. *Id.*

Nevada claims that admission of contention NEI-SAFETY-01 is foreclosed by the Commission's decision in *Yankee Atomic Electric Co.* (Yankee Nuclear Power Station), CLI-96-1, 43 N.R.C. 1, 7-9 (1996). Nevada Answer at 13-14. To the contrary, the Commission's

Yankee decision entirely supports admission of contention NEI-SAFETY-01. In *Yankee*, the Commission referred to a licensing board an intervention petition that contained a contention alleging the applicant's choice of one decommissioning option over another available alternative was not ALARA because the chosen option would result in 900 person-rem of additional exposure while providing no countervailing benefit. *Yankee*, CLI-96-1, 43 N.R.C. at 7. The Commission stated that the 900 person-rem dose estimate was speculative because it came from a table in the generic environmental impact statement ("GEIS") for decommissioning nuclear power plants, and was based on a larger nuclear plant than the one at issue. *Id.* at 7-8. The Commission further noted that the cost difference between implementing one decommissioning plan over another was "highly dependent on difficult-to-predict variables, like interest, discount, and inflation rates and waste disposal fees." *Id.* at 9. Therefore, the Commission could not conclude with great assurance whether switching from one plan to another would save money. *Id.* at 9. Nor could the Commission determine whether preventing additional expected exposures would cost more than \$1,000 or \$2,000 for each person-rem of dose reduction achieved (in this case, approximately \$2 million), which was the NRC Staff's general threshold for finding additional dose reductions to be ALARA. *Id.* at 8-9. Thus, the Commission advised the licensing board that, "[i]n these circumstances, [it did] not believe that potential dose reductions on the order of 900 person-rem can have ALARA significance unless there is some extraordinary aspect to the case not apparent...from the pleadings" and referred this issue to the Licensing Board to conduct its own review of the pleadings. *Id.* at 9 (emphasis added).

Contrary to Nevada's claim, Nevada Answer at 14, the Commission never deemed 900 person rem "inconsequential." Rather, in that same proceeding, the Commission emphatically stated that it "nowhere suggested that the health effects of 900 person-rem were

‘trivial’.” *Yankee*, CLI-96-7, 43 N.R.C. at 252. It only ruled that it would not permit case by case adjudication on choosing one decommissioning option over another, where their respective health effects and other impacts had been considered in a rulemaking. *Id.* No similar rulemaking has considered SNF disposal in TADs versus DPCs. Thus, the minimum of 822 person-rem of occupational exposures that would be avoided if at least 1,029 DPCs were directly disposed in Yucca Mountain is not trivial. NEI Petition Attachment 7 at ¶ 53. Further, unlike the 900 person-rem estimate in *Yankee*, the 822 person-rem figure is not a generic estimate, but rather derived from information contained in the FSEIS for this proposed action. It is DOE’s own estimate that 0.400 person-rem will be incurred per TAD canister loaded at each reactor site. *Id.* at ¶ 49. NEI’s 822 person-rem calculation is also based on a conservative assumption that 0.400 person-rem will also be incurred for each DPC unloaded at each reactor site.²⁰ Furthermore, the 822 person-rem dosage is conservative because it assumes that TADs will be deployed at the time currently anticipated by DOE, whereas any delay in the TAD program will result in an increase in the number of DPCs required to be filled with SNF and subsequently unloaded. *Id.* at ¶ 51. The contention is also based on the fact that the resultant discarded DPCs will be LLRW, which will require processing, handling, and disposal or recycling – all activities that will incur radiological dose. *Id.* at ¶ 54. Thus, Nevada’s claim that *Yankee* requires denial of the contention is baseless.

Finally, Nevada argues that NEI made no effort to establish that the estimated dose savings would be justified after taking into consideration economics and other costs and establishes nothing more than an academic point. Nevada Answer at 15. Nevada

²⁰ This is conservative because DPCs have a higher capacity than TADs, and unloading a higher capacity TAD would more than likely result in higher radiological dose incurred. *Id.* at ¶ 51.

mischaracterizes the bases of NEI-SAFETY-01, and ultimately misapplies *Yankee*. The Commission held that petitioners in that case had “show[n] no such obvious cost advantage” between the two decommissioning options that would bring “into serious question” the Commission’s prior approval of both options. *Yankee*, CLI-96-7, 43 N.R.C. at 252. Contrary to Nevada’s mistaken summary of the facts presented in the contention, NEI did not assert that the estimated dose savings will cost less than \$2,000,000. Nevada Answer at 15. NEI’s cost savings estimate is based on a present-day, unadjusted estimate that each TAD canister procured will cost approximately \$650,000. NEI-SAFETY-01 Affidavit at ¶ 55. Unloading at least 1,029 DPCs will require at least 1,029 replacement TAD canisters, with total unnecessary costs approaching, if not exceeding, \$670,000,000.00 to acquire the TAD canisters. This estimate does not include the cost of the 1,029 DPC canisters that will be discarded. This certainly amounts to an “obvious cost advantage” for direct disposal of DPCs, brings “into serious question” DOE’s sole reliance on TADs for disposal, and demonstrates that NEI’s contention raises more than simply an academic point.

Genuine Dispute [10 C.F.R. § 2.309(f)(1)(vi)]: Neither the NRC Staff nor Nevada oppose this contention on this basis. NRC Staff Answer at 120; Nevada Answer at 15. DOE claims that NEI fails to raise a genuine dispute of law or fact because (1) NEI’s ALARA claims are insufficient to raise a genuine dispute, and (2) NEI’s concerns about direct disposal of DPCs, even if true, would not make a difference in this proceeding. DOE Answer at 67-70. DOE is wrong on both counts.

DOE’s objects that NEI failed to perform a balancing of all considerations in an ALARA analysis and, in particular, failed to consider potentially increased dose to future generations that might be balanced against the asserted preclosure occupational dose reduction.

DOE Answer at 67-69. Again, DOE's objections here go to the merits of the contention, which are not an appropriate consideration at this stage of the proceeding. *See* discussion, *supra*.

DOE also attacks the contention on the grounds that it is speculative. DOE Answer at 68. But DOE's reliance on the case law it cites is misplaced. DOE relies on *Yankee*, CLI-96-7, 43 N.R.C. at 257, where the Commission rejected an ALARA-related contention where "the factors cited by Petitioners . . . represent[ed] uncertainties" and inappropriately assumed that the applicant "plan[ned] to move spent fuel [from the pool] into dry cask storage." But these circumstances do not apply here. To the contrary, it is not speculation that SNF will be unloaded from DPCs and reloaded into TADs, and that an LLRW stream will result. The LA states as much. SAR 1.5. 1.5.1, and 1.5.1.1; FSEIS at Appendix G, Table G-2, at page G-3; FSEIS Section 2.1.2.3.4.

DOE also relies on *Duke Power Co.* (Catawba Nuclear Station, Units 1 & 2), LBP-82-16, 15 N.R.C. 566, 585 (1982), where the Licensing Board held that "[s]peculation that large collective doses of radiation might be received by repairmen at some future time because of the premature failure of equipment is not grounds for a showing that ALARA principles were ignored." These circumstances are inapplicable here as well. Again, under DOE's proposal, it is inevitable and not speculative that SNF will be unloaded from DPCs and reloaded into TADs, and that an LLRW stream will result. DOE also relies on *Yankee*, CLI-96-1, 43 N.R.C. at 7-9 (discussing the speculative nature of dose values obtained from a generic environmental impact statement when applied to a single plant and cost estimates based on "difficult to predict variables like interest, discount, and inflation rates"). Here, NEI does not rely on speculative dose considerations from any generic evaluation. Rather, NEI contends that the expected radiological dose (calculated from DOE's own data), LLRW generation, and concomitant

increased resource use and costs could be completely avoided if DOE permitted direct disposal of DPCs. Furthermore, the facts in *Yankee*, CLI-96-1, 43 N.R.C. 1, as previously discussed in response to Nevada's Answer, support admission of this contention.

DOE further argues that NEI has failed to allege any deficiency in the application (other than NEI's purportedly "faulty" ALARA claims) that would make a difference in the outcome of the proceeding because only DOE "is responsible for deciding whether and how to use TADs and DPCs." DOE Answer at 69-70. To the contrary, as discussed in the previous section, NEI's ALARA claims are sound. Further, if NEI's ALARA claims are proven true, the Commission would not be able to find no unreasonable risk to public health and safety under 10 C.F.R. § 63.31(a), and would therefore have to condition any grant of construction authorization to assure that ALARA principles are being met by, for example, requiring DOE to directly dispose of DPCs. *Vermont Yankee*, CLI-06-8, 63 N.R.C. at 238; *Private Fuel Storage, L.L.C.*, CLI-00-13, 52 N.R.C. at 29; *Curators of The University of Missouri*, CLI-95-1, 41 N.R.C. at 87.

In summary, NEI-SAFETY-01 asserts that significant dose exposures can be avoided while achieving substantial cost savings. Thus, what NEI has provided far exceeds the required "minimal showing that material facts are in dispute, thereby demonstrating that an 'inquiry in depth' is appropriate." *Gulf States Utilities Co.* (River Bend Station, Unit 1), CLI-94-01, 40 N.R.C. 43, 51 (1994) (footnote omitted). The contention should be admitted for hearing.

B. NEI-SAFETY-02

Insufficient Number of Non-TAD SNF Shipments to Yucca Mountain

Contention:

Yucca Mountain's surface facility design capability to receive not less than 90% of commercial spent nuclear fuel ("SNF") in Transportation, Aging, and Disposal ("TAD") canisters is inconsistent with "as low as is reasonably achievable" ("ALARA") principles.

DOE, NRC Staff, and Nevada all oppose admission of this contention. The arguments, however, suffer from the recurring problem that these parties view the scope of this proceeding relative to NEI's participation too narrowly. Contrary to the arguments of all three, the issue of Yucca Mountain's proposed surface facility design capability to receive not less than 90% of commercial SNF in TAD canisters is squarely within the scope of this proceeding. None of the objections to NEI-SAFETY-02 has merit and the contention should be admitted for hearing.

Contention [10 C.F.R. § 2.309(f)(1)(i)]: No reply necessary.

Basis [10 C.F.R. § 2.309(f)(ii)]: No reply necessary.

Scope of Proceeding [10 C.F.R. § 2.309(f)(iii)]: This contention raises the issue that the Yucca Mountain's surface facility design capability to receive not less than 90% of commercial SNF is not consistent with ALARA principles. This is because repackaging commercial SNF from transportable casks and canisters to TADs at the repository will incur less radiological dose than if the repackaging were to occur at reactor sites. As explained in the contention and its supporting affidavit, this is because repackaging operations at the repository will be more efficient and the repository workers more experienced in repackaging than if the repackaging took place at scores of reactor sites around the country. NEI Petition at 15-16. Based on these and other considerations, DOE should amend the LA so that the Yucca Mountain surface

facilities to receive up to 25% of commercial SNF in dual-purpose canisters (“DPCs) and bare fuel casks (“BFCs”), which would allow all commercial SNF loaded into DPCs and BFCs to be shipped to the repository in those canisters. NEI Petition Attachment 8 at ¶¶ 39, 48.

DOE claims that the issue is outside the scope of this proceeding because it concerns activities and impacts at commercial reactor sites regulated by Part 50, which are outside the Geologic Repository Operations Area (“GROA”). DOE Answer at 72-74. The NRC Staff claims that the issue is outside the scope of this proceeding because it does not concern whether a construction authorization should be granted, but whether the facility design reflected in the LA will cause reactor licensees to violate ALARA when SNF is reloaded into TADs. NRC Staff Answer at 124. Nevada claims that the issue is outside the scope of this proceeding because it does not “address what is proposed in the application, but what might be proposed in the future.” Nevada Answer at 16. None of these claims has merit.

DOE and the NRC Staff are simply wrong to claim that activities or impacts outside the GROA, such as unloading and reloading SNF at reactor sites, fall outside the scope of this proceeding. Nevada is simply wrong to claim NEI-SAFETY-02 concerns only “future plans or changes in the application.” Nevada Answer at 16.²¹ As cited in NEI’s petition, multiple sections of the LA address DOE’s proposed plans to receive at least 90% of commercial SNF assemblies in TAD canisters, and that SNF will be transferred from DPCs to TADs at reactor

²¹ The State’s objection that this contention falls outside the scope of the proceeding contradicts its own position in contention NEV-NEPA-15. There, Nevada contends that DOE’s environmental analysis is flawed because DOE will not be able to implement its proposed 90% TAD receipt plan. Nevada Petition at 1107. Nevada’s contention is based in part on NEI’s estimate that “the total amount [of SNF] DOE plans to ship to the repository is already committed to storage systems that are not compatible with the TAD canister system.” Nevada Petition at 1108. NEI contends in NEI-SAFETY-02 that DOE should not implement its proposed 90% TAD receipt plan because of the ALARA and other impacts that will result if the plan is implemented. Though the contentions differ, they challenge the same underlying factual assumption in DOE’s LA.

sites. SAR Section 1.5.1.1 (“[T]he repository shall be capable of accepting, transporting, and disposing of commercial SNF where at least 90% is received in TAD canisters and no more than 10% is received as uncanistered assemblies”); GI Section 1.2.2 (“The GROA surface facilities have been designed to support a mostly canistered waste stream. A TAD canister is utilized for commercial SNF assemblies. The repository objective is to have 90% of individual commercial SNF assemblies loaded into TAD canisters by the utilities with a limited quantity of uncanistered individual commercial SNF assemblies and dual-purpose canisters requiring handling in a pool (i.e., submerged)”). See also SAR Section 1.5.1.1.1.2.1.3 (“The TAD canister is loaded with commercial SNF and sealed at utilities (e.g., reactors) or the repository”); SAR Section 1.2.1.1 (“The majority of commercial SNF received at the repository is expected to be received in TAD canisters that have been loaded, sealed, internally dried, and inerted by the commercial utilities”). FSEIS Section 4.1.14.3.2 (at page 4-100) provides “[u]nder the Proposed Action, about 90 percent of the commercial spent nuclear fuel would travel to the repository in TAD canisters; generator sites would load and seal these canisters” (emphasis added). That same section further provides that “[t]his analysis includes TAD canisters as repository components because they are an *element of the repository design* and the commercial nuclear facilities would *have to use them as appropriate*” (emphases added). Thus, DOE’s claim that issues concerning DOE’s use of TAD canisters are outside the scope of this proceeding are laid bare because the LA explicitly links the design of facilities within the GROA to DOE’s proposal to receive not less than 90% of commercial SNF in TAD canisters. NEI seeks to challenge this proposed plan, which is explicitly accounted for in the LA and therefore falls squarely within the scope of the

proceeding. *Shieldalloy Metallurgical Corp.* (Cambridge, Ohio Facility), CLI-99-12, 49 N.R.C. 347, 355 (1999).²²

DOE's arguments to the contrary have no merit. For support, DOE relies on a partial quotation from the Statement of Considerations of a decade-old proposed rule regarding the Yucca Mountain repository to claim that NRC's licensing authority is geographically limited to Yucca Mountain, and does not concern the handling of SNF at reactor sites. DOE Answer at 63 (citing 64 Fed. Reg. at 8,655). A review of the full quotation cited reveals that the Commission was merely distinguishing the scope of proposed 10 C.F.R. Part 63 from the provisions of 10 C.F.R. Part 60:

Section 63.1 *Purpose and scope.* This section defines the purpose and scope of Part 63 to be limited to the licensing of DOE to receive and possess source, special nuclear, and byproduct material at a geologic repository operations area sited, constructed, or operated at Yucca Mountain, Nevada. It states that generic regulations at Part 60 of this title do not apply, and cannot be the subject of any litigation in any licensing proceeding for the Yucca Mountain site.

64 Fed. Reg. at 8,655. The juxtaposition is clear: Part 63 shall apply to the licensing of a high-level waste repository at Yucca Mountain, Nevada, whereas Part 60 – which also concerns the

²² DOE relies on the *Shieldalloy* case to claim that potential injuries at sites outside of the GROA are governed by other NRC licenses and regulations and are therefore outside the scope of this proceeding and not a basis for standing. DOE Answer at 22-23. But *Shieldalloy* in fact supports NEI's position that the activities and impacts described by NEI which are outside the GROA are within this proceeding's scope because those activities and impacts are accounted for in the LA. In *Shieldalloy*, the opposite was true – activities unaccounted for in the license amendment application were ruled outside the scope of the proceeding. There, the Commission ruled that petitioner's interests fell outside the scope of the proceeding because the license amendment application dealt *only* with the movement of *on-site* radioactive material, whereas the petitioners sought to have off-site radioactive material moved to an on-site location. *Shieldalloy*, CLI-99-12, 49 N.R.C. at 353, 355. Because the off-site slag was “unaccounted for in the license amendment request,” the Commission ruled the petitioner's interest outside the scope of the proceeding. *Id.* at 355. DOE's repository design capability to receive not less than 90% of commercial in TAD canisters *is* accounted for in the LA and is therefore within the scope of this proceeding.

licensing of a high-level waste repository, but is not specific to any geographic location – shall not apply to the licensing of Yucca Mountain. DOE’s argument that the Commission would proscribe consideration in this hearing of activities and impacts outside the GROA by burying a statement of its intent in the Statement of Considerations of a proposed rulemaking is baseless.²³

DOE also counters NEI-SAFETY-02 with a claim that NRC is not obliged to make any findings under Part 50 regarding radiological health and safety issues at reactor sites, and therefore no litigation is required on these issues. DOE Answer at 63-64. DOE’s arguments here miss the point. DOE is seeking authorization from the Commission to construct a high-level waste repository. The Commission will grant the construction authorization if it determines that the proposed design poses no “unreasonable risk to the health and safety of the public” when considering, among other things, the adequacy of “DOE’s proposed operating procedures to protect health and to minimize danger to life or property.” *See* 10 C.F.R. § 63.31. Here, NEI contends that DOE’s proposed repository design will inevitably cause activities and impacts at reactors sites that can be avoided if DOE changes the proposed repository design. NEI does not claim that the Commission must make any findings under Part 50 to issue the construction authorization.

DOE also argues that its proposal to accept up to 90% of commercial SNF in TADs is not subject to review by the NRC. DOE Answer at 72. In other words, while the NRC can consider impacts of DOE’s proposal, the NRC must accept the proposal, and may not “specify how much commercial SNF DOE can accept in TADs.” *Id.* at 59. According to DOE, it

²³ Indeed, as discussed, *supra*, the NRC has long granted standing to persons living within a 50-mile radius of a proposed reactor. By analogy, contentions dealing with offsite consequences, such as the radiation doses imposed by DOE’s programmatic decision, should similarly be admissible.

will make decisions as to how much SNF to accept in TADs under contracts mandated by the NWPA, over which the NRC has no statutory or regulatory authority. *Id.* at 58-60.

The Board should reject DOE's crabbed view of the NRC's authority. Under DOE's view, this contention could be proven true, but NRC could do nothing about it. This is not the case, and therefore the issues NEI raises here are within the scope of the proceeding. Commission precedent is replete with instances where the Commission has issued an authorization or license subject to condition. Should the Commission find reason to object to any portion of the LA as inconsistent with ALARA principles, such as the failure to accept enough non-TAD SNF shipments at the repository, the Commission is not limited to rejecting the construction authorization. It may alternatively approve the application, but subject it to conditions. *Entergy Nuclear Vermont Yankee, L.L.C.* (Vermont Yankee Nuclear Power Station), CLI-06-8, 63 N.R.C. 235, 238 (2006) ("If the Board determines after full adjudication that the license amendment should not have been granted, [the license] may be revoked (or conditioned))." Indeed, it is standard practice for the Commission to issue licenses subject to conditions. *See, e.g., Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-00-13, 52 N.R.C. 23, 29 (2000) (holding that a license condition may be used to support a finding of reasonable financial assurance); *Curators of The University of Missouri*, CLI-95-1, 41 N.R.C. 71, 87 (1995) (upholding a decision to condition the grant of two license amendments on fire safety conditions). Thus, DOE's argument that the NRC must accept DOE's proposal without question flies in the face of longstanding Commission practice.

The NRC Staff objects to the contention claiming that ALARA considerations at reactor sites are not relevant to this construction authorization proceeding, thus rendering the contention inadmissible. NRC Staff Answer at 124. The Staff's arguments are without merit.

DOE is seeking authorization from the Commission to construct a high-level waste repository. The Commission will grant the construction authorization if it determines that the proposed design poses no “unreasonable risk to the health and safety of the public” when considering, among other things, the adequacy of “DOE’s proposed operating procedures to protect health and to minimize danger to life or property.” *See* 10 C.F.R. § 63.31. Furthermore, ALARA “requires a licensee to carry out its activity in a manner calculated to minimize radiation exposures as much “as is practical consistent with the purpose for which the licensed activity is undertaken.” *Yankee Atomic Electric Co.* (Yankee Nuclear Power Station), CLI-96-7, 43 N.R.C. 235, 251 n.10 (1996) (citing 10 C.F.R. § 20.1003) (emphasis added). DOE cannot avoid its ALARA obligations by foisting them off on other licensees and then closing its eyes on the necessary consequences. Neither can the NRC Staff.

With respect to the development of the proposed repository, the Commission explicitly stated

The ALARA principle deals with optimizing the reduction of potential doses from radiation to members of the general public and workers Application of ALARA during operations *compels* the consideration of the benefits of further reduction in potential doses to present-day populations and workers relative to impacts to present-day populations (e.g., increased cost to reduce potential doses further).

Final Rule, Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, NV 66 Fed. Reg. 55,732, 55,751 (Nov. 2, 2001) (emphasis added). The plain meaning of the Commission’s references to “the general public and workers” and “present-day populations and workers,” 66 Fed. Reg. at 55,751, includes all populations and workers,

including those at reactor sites. Had the Commission wanted to limit its consideration only to populations near, and workers at, the repository, it would have so stated.²⁴

Thus, NEI seeks admission of NEI-SAFETY-02 because DOE's proposed repository design will inevitably cause impacts at the repository and reactors sites that can reasonably be avoided if DOE changes the proposed repository design. It is this balancing of the dose impacts of DOE's action against the costs of avoiding those doses that is the essence of DOE's ALARA obligation. These concerns fall squarely within the scope of the proceeding.

Materiality [10 C.F.R. § 2.309(f)(iv)]: DOE and Nevada challenge the materiality of the issues raised in this contention only to the extent that they claim the issues are outside the scope of this proceeding. DOE Answer at 72; Nevada Answer at 16. As demonstrated above, the issues raised herein are within the scope of this proceeding, and are accordingly material to the findings NRC must make.

The NRC Staff claims that whether or not reactor sites will comply with ALARA requirements is not material to this proceeding. NRC Staff Answer at 124. The NRC Staff's claim has no merit for the same reasons discussed in the previous section.

NEI does not contend that the Commission need make ALARA findings for reactor sites in order to grant the construction authorization. The ALARA findings here are those for the operational phase of the repository, 66 Fed. Reg. at 55,751, and the NRC Staff's logic would vitiate the ALARA obligation by shifting doses to someone else. NEI contends that the proposed repository design is inextricably linked to DOE's proposal to receive not less than 90% of commercial SNF at the repository in TADS. As previously discussed, multiple sections

²⁴ For these same reasons, NEI also raises an issue that is material to the findings NRC must make.

of the LA address DOE's proposed plans to receive at least 90% of commercial SNF assemblies in TAD canisters, and the consequent requirement for utilities to reload SNF into TADs at reactor sites. SAR Sections 1.5.1.1, 1.5.1.1.1.2.1.3, 1.2.1.1; GI Section 1.2.2; FSEIS Section 4.1.14.3.2.

The NRC Staff's argument is based on a narrow reading of 10 C.F.R. § 63.111(a), which provides that the "geologic repository operations area must meet the requirements of part 20 of this chapter." NRC Staff Answer at 124. But nowhere do the Commission's regulations state that application of ALARA principles in this proceeding must cease at the boundary of the GROA. Indeed, under the NRC Staff's narrow view, DOE could exclude from consideration actions that it succeeded in pushing outside the GROA. NEI contends that the Commission's mission to protect the public health and safety in this proceeding extends beyond the GROA's boundary. *See* 10 C.F.R. § 20.1002 (stating that Part 20 applies to Part 63 licensees); 10 C.F.R. § 63.31(a)(1) (stating that a construction authorization will not be granted unless "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"). The design choices DOE is proposing within the GROA will have direct and concrete impacts beyond the GROA's boundary. This proceeding must address those impacts.

Facts, Opinions, and References [10 C.F.R. § 2.309(f)(v)]: The NRC Staff claims that NEI failed to meet the requirements of 10 C.F.R. § 2.309(f)(v) because two of its experts allegedly provide inconsistent statements in the affidavits they supplied in support of contentions NEI-SAFETY-01 and NEI-SAFETY-02. NRC Staff Answer at 125. Nevada claims that NEI has failed to support the contention with adequate facts or expert opinion because, according to

Nevada, the contention is contrary to NRC ALARA case law precedent and failed to present a cost benefit analysis. Nevada Answer at 16-17. DOE has no objection on this basis. DOE Answer at 73. Neither the NRC Staff's nor Nevada's claims have any merit.

The NRC Staff's allegation is based on a purported statement by NEI's experts that repackaging SNF from DPCs into TADs at reactors and the repository is inconsistent with ALARA, but then state that this repackaging should be conducted at the repository rather than at reactor sites. NRC Staff Answer at 125. The NRC Staff completely misunderstands the two separate contentions and therefore inappropriately confuses the statements made by NEI's experts. Accordingly, the NRC Staff's argument is without merit.

Contention NEI-SAFETY-01 contends that DOE's proposal violates ALARA because it does not permit direct disposal of DPCs containing commercial SNF, thus requiring unloading of DPCs either at Yucca Mountain or at reactor sites. NEI Petition at 9. Contention NEI-SAFETY-02, on the other hand, contends that DOE's proposal violates ALARA because the Yucca Mountain's surface facility design capability to receive not less than 90% of commercial SNF in TAD canisters will compel DPCs to be unloaded at reactor sites. NEI Petition at 13. The contentions are different, though related.²⁵ Indeed, if NEI were to prevail on NEI-SAFETY-01, NEI-SAFETY-02 might well become moot.

There is no inconsistency in the statements provided by Messrs. Gutherman and Loftin in the two affidavits. NEI-SAFETY-01 contends that the spent nuclear fuel contained in DPCs should not have to be unloaded *at all*, thus avoiding dose impacts to workers at *both* reactor sites and the repository. NEI-SAFETY-02 contends that, *assuming* DOE executes its

²⁵ The Advisory PAPO Board asked participants in this proceeding to "strive to frame narrow, single issue contentions." LBP-08-10, 67 N.R.C. ___, slip op. at 6.

proposed plan to dispose of all commercial SNF in TAD canisters, repackaging of all DPCs and BFCs should take place at the repository (which DOE does not propose to do) in order to meet ALARA principles.

Nevada objects to NEI's ALARA claims because NEI purportedly failed to perform a balancing of other considerations in the ALARA analysis. Nevada Answer at 16. Nevada's objections here would demand that NEI prove its contention at the pleading stage, which neither the Commission's regulations nor precedent require. *Private Fuel Storage, LLC* (Independent Spent Fuel Storage Installation), CLI-04-22, 60 N.R.C. 125, 139 (2004). Whether or not the contention is true is left to litigation on the merits, not this admissibility stage of the proceeding. *Washington Public Power Supply System* (WPPSS Nuclear Project No. 2), ALAB-722, 17 N.R.C. 546, 551 n.5 (1983). See also Final Rule, Changes to Adjudicatory Process, 69 Fed. Reg. 2182, 2190 (Jan. 14, 2004); *Entergy Nuclear Generation Company* (Pilgrim Nuclear Power Station), LBP-06-23, 64 N.R.C. 257, 308 (2006). All that is required at the contention admissibility stage is "some sort of minimal basis indicating the potential validity of the contention," Final Rule, Rules of Practice for Domestic Licensing Proceedings--Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,170 (Aug. 11, 1989), showing that a genuine dispute exists and indicating that further inquiry is appropriate. *Yankee Nuclear Power Station*, CLI-96-7, 43 N.R.C. at 249. In other words, NEI need not provide factual support sufficient to withstand a summary disposition motion and prove its entire case in the first instance. 54 Fed. Reg. at 33,171. Indeed, DOE's resort to addressing the merits of the contention in its opposition to NEI's intervention petition "serves to reinforce [NEI's] insistence that a genuine dispute exists with respect to the substance of the contention in issue." *Shieldalloy*

Metallurgical Corp. (Licensing Amendment Request for Decommissioning of the Newfield, New Jersey Facility), LBP-07-5, 65 N.R.C. 341, 362 n.33 (2007).

NEI has more than met the admissibility standard here. DOE plans to receive at least 90% of commercial spent nuclear fuel assemblies in TAD canisters, and the GROA surface facilities have been specifically designed to accommodate that plan. The LA states as much. SAR Section 1.5.1.1; GI Section 1.2.2. NEI contends that repacking SNF into TAD canisters to comply with this plan will result in greater radiological dose than if repacking occurred at the repository, and NEI supported this contention with factual bases and expert opinions. NEI Petition at 15-16. In summary, NEI has provided far more than the required “minimal showing that material facts are in dispute, thereby demonstrating that an ‘inquiry in depth’ is appropriate.” *Gulf States Utilities Co.* (River Bend Station, Unit 1), CLI-94-01, 40 N.R.C. 43, 51 (1994). Nevada’s demands that NEI prove its case at this stage are unwarranted.

Genuine Dispute [10 C.F.R. § 2.309(f)(1)(vi): Neither the NRC Staff nor Nevada have objections on this basis. NRC Staff Answer at 123; Nevada Answer at 22. DOE claims that NEI fails to raise a genuine dispute on a material issue of law or fact because (1) NEI’s ALARA analysis is flawed; and (2) the contention otherwise fails to allege any deficiency in the repository design. DOE Answer at 73-77. DOE is wrong on both counts.

DOE’s objects to NEI’s ALARA claims because NEI purportedly failed to perform a balancing of all considerations in an ALARA analysis and, in particular, failed to consider the ALARA implications of having a “single team conducting repackaging operations more ‘frequently’ at Yucca Mountain” as well as the possibility that “the industry could make its own improvements in repackaging efficiency.” DOE Answer at 73, 74 n.25, & 75. DOE’s objections here fail for the same reasons as do the State’s in the previous section’s discussion.

Those objections would demand that NEI prove its contention at the pleading stage, which neither the Commission's regulations nor precedent requires.

DOE also attacks the contention on the grounds that it is speculative. DOE Answer at 68. But DOE's reliance on the case law it cites is misplaced. DOE relies on *Yankee Atomic Electric Co.* (Yankee Nuclear Power Station), CLI-96-7, 43 N.R.C. 235, 257 (1996), where the Commission rejected an ALARA-related contention where "the factors cited by Petitioners . . . represent[ed] uncertainties" and inappropriately assumed that the applicant "plan[ned] to move spent fuel from the pool into dry cask storage." But these circumstances do not apply here. It is not speculation that DOE plans to receive at least 90% of commercial spent nuclear fuel assemblies in TAD canisters, and that the GROA surface facilities have been specifically designed to accommodate that plan. The LA states as much. SAR Section 1.5.1.1; GI Section 1.2.2.

DOE also relies on *Duke Power Co.* (Catawba Nuclear Station, Units 1 & 2), LBP-82-16, 15 N.R.C. 566, 585 (1982), where the Licensing Board held that "[s]peculation that large collective doses of radiation might be received by repairmen at some future time because of the premature failure of equipment is not grounds for a showing that ALARA principles were ignored." These circumstances are inapplicable here as well. Again, under DOE's proposal, it is inevitable that at least 90% of SNF will be received at the repository in TAD canisters, which will require SNF to be unloaded from DPCs and reloaded into TADs at reactor sites. DOE also relies on *Yankee*, CLI-96-1, 43 N.R.C. at 7-9 (discussing the speculative nature of dose values obtained from a generic environmental impact statement when applied to a single plant and cost estimates based on "difficult to predict variables like interest, discount, and inflation rates"). NEI does not rely on speculative dose considerations from any generic evaluation. Rather, NEI

contends that repacking SNF into TAD canisters will result in greater radiological dose than if repacking occurred at the repository, and NEI supported this contention with factual bases and expert opinions that were *not* challenged by DOE. *See* DOE Answer at 73.

DOE further argues that NEI has failed to allege any deficiency in the application (other than NEI's purportedly "flawed" ALARA claims) that would make a difference in the outcome of the proceeding because even if the contention is true, "it does not follow that DOE must change its repository design." DOE Answer at 77. Initially, DOE's argument requires proving the merits at the contention admissibility stage. And, in any event, as discussed in the previous section, NEI's ALARA claims are sound. Further, if NEI's ALARA claims are proven true, the Commission would find that DOE's proposal poses an unreasonable risk to public health and safety under 10 C.F.R. § 63.31(a), and would need to condition any grant of construction authorization to assure that ALARA principles are being met by, for example, requiring DOE to receive up to 25% of commercial spent nuclear fuel in DPCs and bare-fuel casks. *Vermont Yankee*, CLI-06-8, 63 N.R.C. at 238; *Private Fuel Storage*, CLI-00-13, 52 N.R.C. at 29; *Curators of The University of Missouri*, CLI-95-1, 41 N.R.C. at 87. Thus, contrary to DOE's assertions (DOE Answer at 76-77), the issue here is not simply a question of choosing a preferred design that has an environmental impact equal to the proposed design. Rather, it is a question of assuring that the design implemented is consistent with ALARA principles.

In summary, what NEI has provided far exceeds the required "minimal showing that material facts are in dispute, thereby demonstrating that an 'inquiry in depth' is appropriate." *River Bend*, CLI-94-01, 40 N.R.C. at 51. This contention should be admitted for hearing.

C. NEI-SAFETY-03
Excessive Seismic Design of Aging Facility

Contention:

The design requirement stated in Section 1.2.7.1.3.2.1 of the License Application (LA) Safety Analysis Report (SAR) specifying that the vertical aging overpack system “must withstand a seismic event characterized by horizontal and vertical peak ground accelerations of 96.52 ft/s² (3g) without tipover and without exceeding canister leakage rates” is excessively conservative, goes beyond the necessary safety margin, and is not consistent with ALARA principles.

DOE, NRC Staff, and Nevada all oppose admission of this contention. The arguments, however, suffer from the recurring problem that these parties view the scope of this proceeding relative to NEI’s participation too narrowly. Moreover, contrary to the arguments of all three, NEI’s experts have identified a valid dispute regarding both the conservatism of the design and the resulting impacts on the nuclear industry as well as workers at the Yucca Mountain repository. None of the objections to NEI-SAFETY-03 has merit and the contention should be admitted for hearing.

Contention [10 C.F.R. § 2.309(f)(1)(i)]: No reply necessary.

Basis [10 C.F.R. § 2.309(f)(i)(ii)]: No reply necessary.

Scope of Proceeding [10 C.F.R. § 2.309(f)(1)(iii)]: For the reasons discussed below, this contention raises issues squarely within the scope of this proceeding.

DOE re-characterizes the contention in a way that focuses on the *impacts* of the seismic design issue addressed by NEI, and then argues that “[t]he issue of potential licensing delay and uncertainty falls outside the scope of the proceeding, as does the cost.” DOE Answer at 79. However, as discussed in the NEI Petition, at 17-18, the proposed contention addresses a *design issue* specifically addressed in the LA (SAR Section 1.2.7.1.3.2.1), that is material to the preclosure safety analysis required by 10 C.F.R. § 63.112, and that is relevant to DOE’s demonstration that the performance objective of 10 C.F.R. § 63.111 will be met. The proposed

contention is also material to the finding of protection of public health and safety required under 10 C.F.R. § 63.31 and to the issue of ALARA under 10 C.F.R. § 63.111(a)(1) and 10 C.F.R. Part 20. Clarification of the licensing basis — *i.e.*, what is necessary to meet these regulations — is directly within the scope of this proceeding.

DOE acknowledges at the outset that challenges to DOE's design of a structure, system or component might be within the scope of the proceeding. DOE Answer at 79. In fact, NEI seeks to challenge proposed design elements and analyses that are explicitly accounted for in the LA and therefore fall squarely within the scope of the proceeding. DOE's fundamental argument is that NEI's contention that "DOE's designs are more conservative than necessary to satisfy legal requirements . . . raises no legal issue, as long as the alleged conservatism itself, produces no inconsistency with legal requirements." DOE Answer at 79. This logic is flawed for two reasons: (1) it is incorrect as a general rule applied to a petitioner supporting the repository, where the petitioner would demonstrate additional licensing margin and attempt to eliminate unnecessary conservatism in the licensing basis and unnecessary cost under the NWPA; and (2) in any event, in this case NEI *is* alleging an inconsistency with legal requirements (the health and safety finding, as well as ALARA).

With respect to the first point, excessive conservatism, or excessive licensing margin, may reduce margin in the relevant area or even in other areas. DOE does not dispute that seismic design of the aging facility is within the scope of the LA and NRC review. Therefore, depending upon issues raised by other parties, or by the NRC Staff in its reviews of the application, seismic design of the aging facility may be a matter subject to other contentions

or to problems raised by the NRC Staff.²⁶ NEI's demonstration of excessive conservatism may in fact lead to changes in the licensing basis, which would resolve those issues. Such changes would also provide DOE greater operational flexibility and regulatory certainty in the future. DOE's position looks at the contention in isolation, ignoring the full implications of NEI's position.

Moreover, the NWPA adds a factor to the NRC licensing process that does not exist in other NRC licensing proceedings based only on the AEA and NEPA. The goal of the NWPA is clearly to site and license a high level waste repository. *See, e.g.*, 42 U.S.C. § 10131. The NWPA further establishes the means to fund the repository. *Id.* The design, licensing, construction, and operation of the repository clearly reflect issues beyond the simple question presented by DOE, that is, whether the design meets legal requirements. Excess conservatism could clearly threaten the goal of Congress to assure construction of a repository and to assure sufficient revenue to cover the cost.

DOE also explicitly acknowledges that the NEI proposed contention includes ALARA implications. DOE challenges the basis offered for that aspect of the contention, which is addressed below. However, DOE does not challenge ALARA as outside the scope of the proceeding. Therefore, it must concede that this contention raises a matter within the scope of the proceeding by its own formula for scope.

Materiality [10 C.F.R. § 2.309(f)(iv)]: DOE, NRC Staff and Nevada challenge the contention based on this criterion for reasons similar to those discussed above in connection with scope of the proceeding. No further reply is warranted. Importantly, DOE does not object to

²⁶ NEV-SAFETY-08 is one proposed contention that specifically addresses ALARA and the Aging Facility.

NEI's contention regarding ALARA under this factor. Therefore, it must concede that the contention meets this admissibility factor.

Nevada argues that the contention is not material because "adding safety margin and increasing licensing uncertainty and delay do not violate any NRC requirement or raise any significant safety problem." Nevada Answer, at 18. However, NEI's primary goal is to *establish* compliance and, as a supporter of the project, its contentions are material to the issues in the proceeding. Moreover, NEI has addressed occupational exposure matters relevant to the NRC findings required under 10 C.F.R. §§ 63.31 and 63.111(a)(1) and 10 C.F.R. Part 21.

Facts, Opinions and References [10 C.F.R. § 2.309(f)(1)(v)]: NEI's proposed contention asserts that the seismic design of the aging facility is excessive. This is supported by a detailed affidavit from its experts, Dr. Fuller, Mr. Gray, and Dr. O'Connell (NEI Petition, Attachment 9). The implications of this design issue are patently obvious — the design will unnecessarily constrict DOE and its vendors, and will lead to increased costs and increased occupational exposures. Nonetheless, NEI included an additional affidavit from an expert, Mr. Gutherman, explaining those implications and quantifying possible impacts (NEI Petition, Attachment 10).

DOE finds the basis offered inadequate. DOE argues first that the affidavits do not provide any support for "the real concern behind this contention; namely, that over-conservatism could increase licensing uncertainty and delay as well as the costs of the project." DOE Answer at 81. However, contrary to DOE, NEI's "real concern behind this contention" is the over-design. And despite NRC Staff's assertion that NEI does not "address how ALARA principles would be violated" by the over-design, NEI has in fact offered detailed and specific support for that concern. NRC Staff Answer at 128. No more is necessary at this stage.

Nonetheless, NEI's affidavit from Mr. Gutherman does state his views that the 3g design requirement could significantly increase the costs of the overpack system. DOE itself acknowledges this point, thereby negating one part of its own argument. *See* DOE Answer at 81 n. 28. NEI is not required at this stage to present its entire evidentiary case on the proposed contention as well as the ramifications of the contention.

DOE faults the contention for lacking evidentiary support with respect to the implications related to licensing delay, arguing that these concerns "boil down to nothing more than unsupported arguments of counsel." DOE Answer at 81. However, DOE does not cite any precedent for the position that every statement in a filing addressing the admissibility of a contention, including statements concerning the *ramifications* of the contention, must have evidentiary support. In fact, DOE's position overstates the requirement for contentions in 10 C.F.R. § 2.309. The Commission has held that a petitioner need not make its case at the contention stage of the proceeding, nor is the contention pleading rule a "fortress" to deny intervention. *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 335 (1999). The Commission observed that contentions "supported by reasonably specific factual *and legal* allegations" will be admitted. *Id.* (emphasis added). The rules require some "minimal" factual or legal basis. *See Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 359 (2001). Against this backdrop, there is no requirement for an affidavit and the basis need not be sufficient to withstand summary disposition. DOE erects too high a hurdle under this criterion.

Finally, DOE does not dispute the basis provided by Mr. Gutherman regarding the ALARA implications of the seismic design issue. Therefore, even if DOE were correct

regarding the licensing and cost implications of the contention, there is still sufficient basis to admit the contention due to its ALARA implications.

NRC Staff argues that this contention is inadmissible because “NEI’s expert did not perform a cost-benefit analysis, as is contemplated by ALARA, and did not provide factual information to support NEI’s ‘unnecessary’ dose assertion.” NRC Staff Answer at 128. However, NEI has in fact offered specific and detailed support for its conclusion that ALARA principles could be violated. At this point, NEI’s experts do not even have a final design proposal for how the aging overpack will be designed and installed. Therefore, a final balancing of ALARA considerations is clearly premature. No more is necessary to support a contention at this stage of the proceeding.

Nevada argues “that mere statement that some untoward result ‘may’ occur” regarding future radiation doses cannot support an admissible contention. Nevada Answer at 18. Nevada further states that NEI’s estimated dose savings are worth less than \$500,000 — less than the cost to amend the LA to include NEI’s proposed design and to litigate the new design. *Id.* Nevada therefore claims that admission of the contention is foreclosed by the Commission’s decision in *Yankee Atomic Energy Co.* (Yankee Nuclear Power Station), CLI-96-1, 43 NRC 1, 7-9 (1996)(hereinafter *Yankee I*). Nevada Answer, at 18.

Nevada’s argument again steers away from the true focus of the contention — the seismic design issue — to focus on one of the consequences — the ALARA issue. But even focusing on ALARA, Nevada’s response goes to the merits of that aspect of the contention. As discussed above in connection with NEI-SAFETY-01, the Commission has previously addressed particular circumstances related to the ALARA differences between two previously approved decommissioning options. Ultimately, the Commission did not categorically determine that a

dose savings of less than 900 person rem is trivial or inconsequential. *Yankee Atomic Energy Co.* (Yankee Nuclear Power Station), CLI-96-7, 43 NRC 235, 252 (1996)(hereinafter *Yankee II*). The specific ALARA implications of the aging facility at issue can and should be addressed. Unlike the facts in *Yankee II*, to the extent additional aging casks containing spent fuel are installed next to in-service aging casks, occupational exposures *will* occur. The degree of these impacts and the final characterization are matters to be determined on the merits based on the record.

Moreover, apart from the ALARA implications, the crux of this issue remains: the seismic design provides ample safety margin (important in the NRC review process and potentially important to an assessment of the preclosure safety analysis), and its excessive conservatism will have cost impacts. While ALARA implications are real, there are other licensing and real world implications from this contention that must be considered in the final balancing of costs and benefits.

Genuine Dispute [10 C.F.R. § 2.309(f)(1)(vi)]: NEI's proposed contention identifies a genuine dispute with the LA related to the seismic design of the aging facility. The dispute is explained and supported in detail in the affidavit of Dr. Fuller, Mr. Gray, and Dr. O'Connell. NEI Petition, Attachment 9. This addresses a matter within the scope of the LA and the proceeding, and NEI's concern can be remedied by changes in the licensing basis that could result from this proceeding. No further showing is required under this admissibility criterion.

DOE continues to challenge the proposed contention based on the adequacy of the showing and the materiality of NEI's discussion of the implications of the proposed contention. These arguments are superfluous and can be rejected as demanding more than is needed at this stage of the proceeding. Nonetheless, these arguments can be rejected for other reasons as well.

First, DOE again argues that there is no “factual support or expert opinion for the proposition that over-conservatism, even if proven, could increase licensing uncertainty and delay.” DOE Answer at 82. DOE provides no citation supporting an argument that such a showing is necessary. Evidentiary support is provided by NEI on the technical predicate for the contention. The implications for the proceeding are admittedly speculative and are not quantifiable. In short, the licensing implications are not scientific or technical matters. Nonetheless, as discussed above, NEI maintains that it has a legitimate role in the proceeding to identify areas of licensing margin that may facilitate resolution of other contentions or NRC Staff concerns, and that may provide operational flexibility in the future. At this stage, expert opinion on all of the implications of the over-design is not necessary to establish a genuine dispute.

Second, DOE presents an evidentiary or merits response to Mr. Gutherman’s affidavit regarding the ALARA implications of the contention. DOE Answer at 83-84. Mr. Gutherman addressed the possibility of a “structural element or apparatus” to prevent overturning in a 3g seismic event. DOE’s factual assertion is that there is “neither a requirement nor an intention to install restraints or other apparatus on the aging pad or the aging overpack . . .” *Id.* at 84. DOE cites the SAR and TAD specification statements that the aging overpacks are to be “freestanding” without “seismic restraints or other tie-downs.” *Id.* However, as discussed in the attached supplemental affidavit from Mr. Gutherman, none of these DOE references preclude a collar-type apparatus around (but not necessarily touching) a cask as a means to meet the 3g requirement. Gutherman Affidavit, NEI-SAFETY-03, Attachment 3 at ¶ 7. In fact, Mr. Gutherman points out that he has uncovered an actual proposed design by a vendor that would be of exactly this type. Therefore, NEI’s experts evaluation cannot be so readily dismissed. Mr. Gutherman’s affidavit further questions whether DOE’s position is even

practicable. *Id.* at ¶ 6. The DOE Answer certainly does not establish that it will be possible to design a cask without a restraining apparatus of some sort. Nor does DOE establish that placement of specially designed casks (to prevent overturning) that are more robust than typical casks will not consume more time and thereby incur greater occupational exposures. DOE prematurely focuses on small details in an attempt to dismiss at the outset the question presented by NEI on the merits.

DOE and NRC Staff argue that NEI “misinterprets ALARA as a prescriptive standard.” DOE Answer at 84; *See* NRC Staff Answer at 129-130. However, NEI does not interpret ALARA as a prescriptive standard and recognizes that the ALARA principle embodies a balancing of considerations. This, however, is part of the dispute. The objection is not a sufficient basis to rule out the proposed contention. The point of the hearing will be to resolve the question of whether the design requirement is an appropriate use of resources, given regulatory requirements as well as the ALARA (and other) implications.

Finally, DOE broadly argues that “speculation” regarding future radiation doses cannot support an admissible contention. *Id.*, at 85. DOE first relies upon *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), LBP-82-16, 15 NRC 566, 585 (1982), where the Licensing Board found that “[s]peculation that large collective doses of radiation might be received by repairmen at some future time because of the premature failure of equipment is not grounds for a showing that ALARA principles were ignored.” The present circumstances, however, are not speculative and are very different. The aging facility at issue would be constructed and, to the extent additional aging casks containing spent fuel are placed next to in-service aging casks, occupational exposures will occur. This is not speculative. The ALARA implications can and should be addressed in the context of a complete record.

DOE also relies upon the two *Yankee* decisions involving a decommissioning plan for a power reactor. In *Yankee II*, the Commission rejected an ALARA-related contention where “the factors cited by Petitioners . . . represent[ed] uncertainties” and Petitioners inappropriately assumed that the applicant “plan[ned] to move spent fuel from the pool into dry cask storage.” 43 NRC 235, 257. There is no similar uncertainty or assumption here; fuel will be moved into the aging facility that will be massively designed to a 3g seismic design requirement. Similarly, in *Yankee I*, discussed above, the Commission discussed the speculative nature of dose values obtained from a generic environmental impact statement when applied to a single plant and cost estimates based on “difficult to predict variables like interest, discount, and inflation rates.” 43 NRC at 7-9. Here, NEI does not rely on dose consequences from a generic evaluation. And NEI has provided a dose estimate from an expert addressing the case in hand.

Finally, the additional cost involved to meet a 3g design cannot be dismissed. The expected radiological dose, increased resource use, and increased costs could be completely avoided — while still meeting repository performance requirements — if DOE utilized a more reasonable seismic design. There is a genuine dispute whether there would be an “obvious cost advantage” for a revised design. *Yankee II*, CLI-96-7, 43 NRC at 252. As already noted, the NWPA also adds a consideration to this licensing proceeding not found under the AEA and NEPA; that is, the goal of that statute is to facilitate the siting and licensing of a high level waste repository and to cover the cost of that project from the Nuclear Waste Fund.

In total, NEI’s proposed contention establishes a valid dispute regarding the proposed seismic design of the aging facility. The design as proposed will have ramifications with respect to licensing, cost, and ALARA. The ultimate balancing of these-considerations is an evidentiary question to be addressed in the proceeding.

D. NEI-SAFETY-04
Low Igneous Event Impact on TSPA

Contention

The Department of Energy (DOE) in the License Application (LA) has modeled the scenario of a volcano at the Yucca Mountain site in the Total System Performance Assessment (TSPA). Based on an unreasonable set of assumptions that postulate the complete failure of every waste package in the repository, DOE conservatively concludes that intrusive igneous events that intersect the repository account for approximately 40% of the total dose over a 10,000 year period. Based on an analysis and calculation by the Electric Power Research Institute (EPRI), DOE has been excessively conservative in its treatment in the LA TSPA of the consequences of a potential igneous event. NEI contends that in fact substantial additional safety margin exists in this area. NEI contends that if DOE considered a reasonably expected intrusive igneous scenario, the related consequences would show no significant release of radionuclides. DOE's conservative treatment and results could contribute to licensing uncertainty and could delay the development of the repository.

DOE, NRC Staff, and Nevada all oppose admission of this contention. DOE argues primarily that this contention is outside the scope of the proceeding, because the contention asserts that the LA approach is too conservative. Likewise, NRC Staff and Nevada argue that the contention focuses on licensing uncertainty and delay, and asserts no violation of the regulatory requirements. NRC Staff Answer at 133; Nevada Answer at 20. The contention, however, clearly addresses a matter directly in issue in the LA, the NRC Staff review, and this proceeding. NEI's position would identify additional safety margin to facilitate licensing of the project, and, in parallel, would clarify the licensing basis. This contention is therefore admissible. To hold otherwise could establish an insurmountable bar to any petitioner that would support an application.

Contention [10 C.F.R. § 2.309(f)(1)(i)]: No reply warranted.

Basis [10 C.F.R. § 2.309(f)(1)(ii)]: No reply warranted.

Scope of Proceeding [10 C.F.R. § 2.309(f)(1)(iii)]: As discussed in the NEI Petition, this contention explicitly addresses the LA SAR (SAR Section 2.3 and 2.4), relates directly to the

Total System Performance Assessment (“TSPA”) calculation for the post-closure performance as required by 10 C.F.R. § 63.114, and is material to whether the performance objectives of 10 C.F.R. §§ 63.113 and 63.311 are satisfied. Even though DOE may show compliance with the excessive conservatism, it does so with considerably less safety margin than is reasonable — an approach which could unduly encumber the licensing of the repository with respect to this and other issues. Accordingly, the issue is within the scope of this licensing proceeding.

DOE states at the outset of its opposition that: “[w]hile challenges to DOE’s modeling of consequences of a potential igneous event might be within the scope of the proceeding, this contention is not really about DOE’s modeling.” DOE Answer at 88. In fact, however, the contention *is* about DOE’s modeling of consequences of potential igneous events. The Licensing Board should reject DOE’s attempt to deftly recharacterize the issue away from NEI’s central concern, as explicitly stated in the contention, to NEI’s supporting reasons why the concern is important to NEI. The argument on the admissibility of a contention should not turn on whether licensing delay and NEI’s other interests are within the scope of the proceeding. These are standing issues and areas addressed as such above. The fact is, as DOE even acknowledges, the issue of the consequences of potential igneous events is an important issue in determining whether the LA is acceptable and whether the proposed repository should be licensed.

The framework for the post-closure safety analysis is provided in 10 C.F.R. § 63.304, in which the NRC recognizes that the analysis will reflect a “reasonable expectation.” The regulation provides the following examples of a “reasonable expectation”:

- (1) requires less than absolute proof,
- (2) accounts for the inherently greater uncertainties in making long-term projections of disposal system performance,

- (3) does not exclude important parameters from assessments and analyses due to the difficulty in quantifying with a high degree of confidence, and
- (4) focuses on performance assessments and analyses on the full range of defensible and reasonable parameter distributions rather than only upon extreme physical situations and parameter values.

Factors (3) and (4) reflect that there is not unfettered discretion for DOE to “exclude important parameters” that affect the analysis in either direction, or to use assessments and analyses that are “extreme” and not “defensible and reasonable.”

Assuredly, NEI’s position is again supportive of issuance of a license. And this contention, and the supporting facts, opinions and references — which include the Electric Power Research Institute (“EPRI”) performance assessment model — establish that the DOE approach is overly conservative.²⁷ This conservatism — as stated in the NEI Petition (at 23) — leads DOE to conclude that igneous events that intersect the repository account for 40% of the total dose over a 10,000 year period. This considerably reduces TSPA margin relative to the performance objective of 10 C.F.R. § 63.311. This result could affect not only the conclusion on the regulatory acceptability for igneous events in isolation, but the NRC’s overall conclusion regarding total post-closure 10,000 year dose. In the face of prospective contentions from other parties, and possible review questions from the NRC Staff, erosion of margin becomes a clear licensing issue.²⁸ Moreover, by establishing that additional margin actually exists, NEI’s

²⁷ This is a view also reflected in a report of another independent group. *See* Report of the Independent Performance Assessment Review (IPAR) Panel, prepared for Sandia National Laboratories (March 31, 2008) (LSN #001598189).

²⁸ Nevada has proposed a number of contentions on igneous events. *See, e.g.*, NEV-SAFETY-150 through 158 and NEV-SAFETY-166 to 167. Nevada has also proposed numerous contentions on post-closure safety and the TSPA more broadly. *See* NEV-SAFETY-09 through 173. Other parties have also proposed contentions on igneous activity and TSPA consequences. *See, e.g.*, CLK-SAFETY-03 through 11, INY-SAFETY-03, 06.

position could expedite resolution of other issues related to the TSPA. The EPRI model, and the value that it will bring with respect to the issues in this proceeding, is discussed further below in connection with NEI-SAFETY-06, and in the attached affidavit of Dr. Matthew Kozak and Dr. Michael Apted responding generally to arguments made by Nevada with respect to the EPRI model. Kozak and Apted Affidavit, Attachment 2.

Materiality [10 C.F.R. § 2.309(f)(1)(iv)]: This proposed contention is material to the NRC's findings for the reasons discussed in the NEI Petition and discussed further above in connection with the scope of the proceeding. DOE, citing *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 333-34 (1999), argues that the contention is not material because its resolution would not make a difference in the outcome of the proceeding. DOE Answer at 89-90. But, in fact, the issue could make a substantial difference in the outcome of the proceeding. DOE is faced with several challenges to its analysis of igneous events, and is faced with multiple challenges to its TSPA generally. Demonstrating margin on this one issue based on an independent analysis by EPRI could affect the outcome of the proceeding — by supporting the adequacy of the DOE igneous event analysis and by providing further basis on which the NRC can conclude that the post-closure assessment *overall* demonstrates compliance with the regulatory performance objectives. NEI can envision no better role for a petitioner offering a contention to support a proposed licensing action.

DOE and NRC Staff in essence argue that conservatism is a good thing, and therefore does not create a material issue. DOE Answer at 90; NRC Staff Answer at 132-133; NRC Staff and Nevada also argue that the contention cannot be material because NEI does not allege that DOE has failed to comply with regulatory requirements. *Id.*; Nevada Answer at 20.

However, NEI's demonstration of conservatism supports licensing by supporting *compliance* on this and all other issues implicating the TSPA, which makes NEI's contention very material.

NEI also agrees that conservatism in a safety analysis is *usually* a good thing. However, too much conservatism in any analysis is not necessarily good science or good policy. Too much conservatism in the present context is also not consistent with the "reasonable expectation" standard for the post-closure safety analysis embedded in 10 C.F.R. § 63.304. As DOE itself recognizes (DOE Answer at 91), 10 C.F.R. § 63.311 also refers to a "reasonable expectation" that for 10,000 years following disposal, the reasonable maximally exposed individual receives a dose of no more than 15 millirem per year. Here, adopting more reasonable expectations and assumptions in the analysis would allow a more informed licensing decision, and would *refute* claims of others that there will be a failure to comply with regulatory requirements. Adopting more reasonable expectations and assumptions in the analysis would also increase flexibility and available margin for addressing other issues raised by other petitioners or parties related to the post-closure safety analysis.

DOE also accuses NEI of a "novel interpretations" inconsistent with the regulations. DOE Answer at 91. However, NEI does not "prohibit DOE from using bounding assumptions in its modeling and evaluations," as DOE asserts. *Id.* NEI is simply arguing for a proper, more reasonable, bounding assumptions to provide for better assessment, to establish greater margin with respect to the dose standard, and ultimately to support a favorable licensing decision on this and other matters.

Facts, Opinions, and References [10 C.F.R. § 2.309(f)(1)(v)]: In support of this contention, NEI provided a comprehensive affidavit, which incorporated numerous references, from two highly qualified experts — Dr. Apted and Dr. Morrissey. NEI Petition, Attachment 11.

DOE cannot credibly dispute that NEI has satisfied this requirement with respect to its proposed contention. So DOE, in effect, reverses cause and effect, and argues that NEI's affidavit "does not provide any support for the real issues behind this contention" — which DOE asserts to be licensing delay and other consequences of a failure to timely license the facility. DOE Answer at 91. In fact, however, NEI's affidavit directly supports NEI's real issue behind this contention — that DOE has incorporated conservatism in the assessment of igneous activity that far exceeds the "reasonable expectation" contemplated by 10 C.F.R. §§ 63.311 and 63.304. The affidavit therefore fulfills the requirement for "a concise statement of the alleged facts or expert opinions which support [NEI's] position on the issue and on which the petitioner intends to rely at hearing." 10 C.F.R. § 2.309(f)(1)(v).

The Commission has held that a petitioner need not make its case at the contention stage of the proceeding, nor is the contention pleading rule a "fortress" to deny intervention. *Duke Energy Corp.*, 49 NRC at 335. The Commission observed that contentions "supported by reasonably specific factual *and legal* allegations" will be admitted. *Id.* (emphasis added). The rules require some "minimal" factual or legal basis. *See Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 359 (2001). Against this backdrop, there is no requirement for an affidavit and the basis need not be sufficient to withstand summary disposition. NEI has presented far more than the required minimal showing. DOE would erect too high a hurdle under this admissibility criterion.

DOE denigrates NEI's statements in the contention and in the supporting discussion of the admissibility criteria as "unsupported statements of counsel." DOE Answer at 92. DOE offers no support for the provocative theory that legal argument on admissibility considerations must be supported by technical affidavits. This would certainly change the

Commission's rules on admissibility of contentions in NRC proceedings. Moreover, DOE argues that NEI does not explain how the DOE analyses addressed in the contention will lead to reduced licensing margin or why such reduction could lead to delay. *Id.* at 92. However, NEI's explanation in the NEI Petition is very clear. For example, the last sentences of the contention itself describe the cause (excessive conservatism) and the logical effect (uncertainty and delay) that is asserted by NEI. The implications for the TSPA are further described above. There is clear significance with respect to safety margin, because DOE itself calculates that volcanism contributes as much as 40% of the post-closure (10,000 year) dose. NEI concludes that no further discussion or expert support is required at this stage of the proceeding.

Genuine Dispute [10 C.F.R. § 2.309(f)(1)(vi)]: DOE finally asserts that the Licensing Board must reject this contention because it does not establish a genuine dispute with DOE on a material issue of law or fact. DOE Answer at 92-93. In reality, however, there is no credible argument that NEI has failed to demonstrate that there is a genuine dispute regarding the expectations incorporated into this aspect of the LA SAR and TSPA. So DOE's argument reduces to a reiteration of the materiality argument, discussed above.

Suffice it to say, the TSPA requirements reflect a presumption that the models will reflect "reasonable expectations." *See, e.g.*, 10 C.F.R. §§ 63.311 and 63.304. DOE argues, in effect, that the regulations provide DOE with complete discretion to incorporate unbounded conservatism, free of any challenge. Obviously, however, potential parties in this proceeding would be free to challenge elements of the analysis that they believe are not sufficiently conservative. DOE offers no explanation as to why NEI is not free to argue against excessive conservatism — at a minimum, to offset prospective contentions asserting that the analysis is not sufficiently conservative. NEI's experts explain in detail how the LA analysis utilizes extreme

assumptions and excludes important parameters. In this regard, the analysis is in fact contrary to the reasonable expectation set forth in the regulations of Part 63. At bottom, the contention is material and well-supported, and therefore establishes a genuine dispute.

E. NEI-SAFETY-05
Excessive Conservatism in the Post Closure Criticality Analysis

Contention

The post-closure 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.

DOE, NRC Staff, and Nevada all oppose admission of this contention. Arguments supporting their opposition to admission include: that the impacts of the Yucca Mountain facility described in the contention concern effects (radiological exposures and costs) that occur outside of the Geologic Repository Operations Area (“GROA”) and, therefore, is outside the scope of the hearing; and that failure to allege a violation of NRC requirements and or put forth an assertion that would change the outcome of the proceeding to preclude admissibility. However, none of these arguments preclude admissibility, and this contention should be accepted. NEI has identified impacts which directly result from DOE’s own, overly conservative, repository design parameters. When applied to reactor licensees, those design parameters would obligate certain licensees to undertake activities with respect to spent fuel, before shipping to the repository, which would result in unnecessary radiological doses to the workers and unnecessary costs to the licensees. The scope of this proceeding includes such considerations and the contention should be admitted.

Contention [10 C.F.R. § 2.309(f)(1)(i)]: No reply necessary.

Basis [10 C.F.R. § 2.309(f)(i)(ii)]: No reply necessary.

Scope of Proceeding [10 C.F.R. § 2.309(f)(1)(iii)]: As discussed in the NEI Petition, this contention explicitly addresses the LA SAR (SAR Section 2.2.1.4.1.1), and relates directly to the post-closure safety analyses required by 10 C.F.R. § 63.114 and to DOE’s demonstration

that the performance objectives of 10 C.F.R. 63.113 have been met. DOE and NRC Staff each contend nonetheless that the proposed contention is not within the scope of the proceeding. DOE Answer at 94-102; NRC Answer at 134-136.

ALARA Impacts: NEI observes in the contention that 10 C.F.R. §§ 50.40 and 63.111 provide, respectively, that both reactor licensees and the GROA must meet the requirements of 10 C.F.R. Part 20, and that 10 C.F.R. § 20.1002 provides that Part 20 applies to both Part 50 and Part 63 licensees. 10 C.F.R. § 20.1101(b) states that “licensee[s] shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are [ALARA].” In addition, the NRC regulations specify that the Commission will grant the construction authorization if it determines that the proposed design poses “no unreasonable risk to the health and safety of the public” when considering, among other things, “DOE’s proposed operating procedures to protect health and to minimize damage to life or property” *See* 10 C.F.R. § 63.31.

DOE asserts first that because the contention relates to activities outside the GROA, the contention is unrelated to the scope of this proceeding. DOE Answer at 94. DOE specifically cites the fact that the increased occupational doses to workers noted in NEI’s contention occurs at reactor plant sites, not within the GROA, to support its position that the contention is outside the scope of this proceeding. DOE Answer at 94-95. For its part, the NRC contends that the proposed contention is not within the scope of the proceeding because NEI’s petition does not allege that the repository will violate ALARA requirements. NRC Answer at 134-135. It appears that both NRC and DOE attempt to confine the scope of the proceeding to only those consequences within the GROA.

Both DOE's and NRC's positions are based on a narrow reading of 10 C.F.R. § 63.111(a), which provides that the "geologic repository operations area must meet the requirements of part 20 of this chapter." Nowhere do the Commission's regulations state that application of ALARA principles (or, in other words, consideration of radiation exposures) in this proceeding must cease at the boundary of the GROA. Indeed, with such a narrow view, DOE could exclude from consideration any actions that it succeeded in relocating outside the GROA.

NEI contends that the Commission's mission to protect the public health and safety in this proceeding extends beyond the GROA's boundary. *See* 10 C.F.R. § 20.1002 (stating that Part 20 applies to Part 63 licensees); 10 C.F.R. § 63.31(a)(1) (stating that a construction authorization will not be granted unless "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").

Furthermore, ALARA "*requires* a licensee to carry out its activity in a manner calculated to minimize radiation exposures as much 'as is practical consistent with the purpose for which the licensed activity is undertaken.'" *Yankee Atomic Electric Co.* (Yankee Nuclear Power Station), CLI-96-7, 43 N.R.C. 235, 251 n.10 (1996) (citing 10 C.F.R. § 20.1003) (emphasis added).

Moreover, with respect to the development of the proposed repository, the Commission explicitly stated:

The ALARA principle deals with optimizing the reduction of potential doses from radiation to members of the general public and workers Application of ALARA during operations *compels* the consideration of the benefits of further reduction in potential doses to present-day populations

and workers relative to impacts to present-day populations (e.g., increased cost to reduce potential doses further).

Final Rule, Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, NV 66 Fed. Reg. 55,732, 55,751 (Nov. 2, 2001) (emphasis added). The plain meaning of the Commission's references to "the general public and workers" and "present-day populations and workers" includes all populations and workers, including those at reactor sites. 66 Fed. Reg. 55,751. Had the Commission wanted to limit its consideration only to populations near, and workers at, the repository, it would have so stated.

To the extent that NRC Staff's position could be read to impose an additional component of needing to allege not only an issue, but a violation of regulations, in support of a contention, that argument fails as well. NEI has offered specific information as to how ALARA principles are adversely impacted, if not violated, as a direct result of DOE's excessive conservatism in the post-closure criticality analysis. This is sufficient support at this stage of the proceeding. That ALARA principles are subject to a balancing of considerations underscores the appropriateness of addressing this matter in the proceeding, on the merits based on an evidentiary record, rather than attempting, at this stage, a black and white conclusion of whether a violation exists or not, as the NRC Staff would suggest.

At bottom, the design choices DOE is proposing within the GROA will have direct and concrete impacts beyond the GROA's boundary. This proceeding must address those impacts.

Application of Part 50-Related Standards: As a second layer of argument, DOE asserts simply that to the extent the issues raised in the contention relate to 10 C.F.R. Part 50, they are outside the scope of the proceeding. DOE Answer at 95. DOE asserts this position with respect to NEI-SAFETY-05 only in the context of the application of ALARA requirements. NEI

has already addressed, above, why consideration of ALARA in the context of activities that may occur at a Part 50 licensed facility, but are a direct result of DOE's design parameters for activities dictated by their LA SAR, are relevant to the proceeding and must be addressed.

Consideration of Costs: DOE would also exclude from the scope of the proceeding any element of the contention that is premised on unnecessary expenditures from the Nuclear Waste Fund, increased economic and environmental costs associated with dry storage and disposal of fuel, as well as unnecessary design and operational costs, with the added assertion that those costs are outside the scope of the contention because they will occur *away from the GROA*. DOE Answer at 96. However, as discussed in the NEI Petition, at 31 - 32, the proposed contention addresses a *design issue* specifically addressed in the LA SAR (SAR Section 2.2.1.4.1.1), that is material to the post-closure safety analysis required by 10 C.F.R. § 63.114, and that is relevant to DOE's demonstration that the performance objective of 10 C.F.R. § 63.113 will be met. The proposed contention is also material to the ALARA issue under 10 C.F.R. § 63.111(a)(1) and 10 C.F.R. Part 20.

As with ALARA, DOE is focused on ramifications of the issue, more than the underlying issue. As observed in the discussion of impacts related to ALARA considerations which arise away from the GROA, the real question here is whether, as a result of DOE's unnecessarily conservative design and licensing assumptions and decisions in its LA SAR, there are unnecessary costs, whether economic (including design and operational impacts) or environmental costs. If there is a nexus to the LA, then the issue of whether they would occur away from the GROA is not relevant to whether the contention is admissible.

The DOE logic is also flawed in that it would prevent a petitioner who is supporting the project from providing input that could eliminate unnecessary conservatisms and

costs, consistent with the premises of the NWPA. The NWPA adds a factor to the NRC licensing process that does not exist in other NRC licensing proceedings that are based only on the AEA and NEPA. The goal of the NWPA is clearly to site and license a high level waste repository. *See, e.g.*, 42 U.S.C. § 10131. The NWPA further establishes the means to fund the repository. *Id.* The design, licensing, construction, and operation of the repository clearly reflect issues beyond the simple question presented by DOE, that is, whether the design meets legal requirements. 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.

Excessive Conservatism and Safety Margin: In its final argument regarding scope, DOE contends that NEI's position that the DOE criteria are excessively conservative and provide a substantial safety margin itself places the contention outside the scope of the proceeding because the NRC licensing standard allows for "cautious but reasonable assumptions consistent with present knowledge in modeling future doses," and does not "put at issue" the use of a more conservative or bounding assumption. DOE Answer at 96-97.

Contrary to DOE's argument, the issue of excess conservatism in DOE's underlying design assumptions is a topic at the very core of considerations established under the NWPA. As already noted, the NWPA adds a consideration to this licensing proceeding not found under the AEA and NEPA, and that is that the goal of that statute is to facilitate the siting and licensing of a high level waste repository, and to finance that project. Accordingly, the consideration of unwarranted conservatisms in DOE's application is a significant topic that warrants consideration in this proceeding.

For instance, identification of unreasonable assumptions can provide additional licensing flexibility in that it would assist in addressing the importance (or lack thereof) of other issues raised in the proceeding, thereby clarifying the licensing basis for the facility. Further, upon recognition of unwarranted or unnecessary conservatisms, design changes or allowances therefore, whether through amendments to the LA SAR, or through the licensing process itself (e.g., license conditions), may serve to reduce the costs borne by licensees shouldering the burden of paying for the repository and may provide operational flexibility in the future (while maintaining regulatory compliance). Further, DOE's claim that it need not consider such excess margin issues under its "reasonable assumption" standard belies the potential that one or more design parameters or assumptions could be so off the mark as to preclude licensing in the first instance, if additional questions arise in a particular area and the initial licensing threshold is considered to be cast in stone as the only level at which licensing is "reasonable." These issues are for consideration in the licensing proceeding and should not be expunged *ab initio*.

Materiality [10 C.F.R. § 2.309(f)(iv)]: DOE, NRC Staff and Nevada challenge the contention based on this criterion essentially for the same reasons discussed above in connection with scope of the proceeding. To the extent additional factors or arguments are raised, they are addressed below.

Nevada, which did not object to this contention under the scope of the proceeding discussion, now asserts that NEI's proposed contention is "frivolous" and that the contention "harps" on matters relating to over-conservatisms, costs, and licensing delays. Nevada Answer at 21. As already discussed, these assertions are without merit in the context of admissibility. Nevada next maintains that absent a claim that a component of the LA SAR constitutes a *violation* of any NRC requirement, the contention raises no material issue. *Id.* However, no

precedent is provided for the principle that a party *supporting* a project must plead a violation of regulations. NEI would first demonstrate *compliance*; then it would demonstrate licensing margin; then it would demonstrate adverse impacts. Moreover, this contention does focus on compliance with ALARA requirements as well as the NRC's requirements for "reasonable" assumptions in the relevant analyses.

The NRC Staff argues that a proposed contention must show how the subject matter of the contention would impact the grant or denial of the application. NRC Answer at 135. NRC Staff then analyzes the ALARA topic, and the consideration of removing some of the overly conservative design assumptions. The NRC Staff again argues that the proposed contention does not assert a claim with respect to occupational exposure "from" the facility being greater than ALARA, or that specific individuals "from" the facility would be exposed to radiation levels not satisfying ALARA principles. The NRC Staff submits that if the contention were litigated it would not affect the NRC's decision on licensing, and therefore the contention is inadmissible. *Id.* As already examined, the application of ALARA to workers and the public away from the facility, or exposures not arising from the facility per se, where those exposures are nonetheless *directly attributable* to DOE's own design criteria for the repository, is material to the licensing standards that the NRC must consider. The NRC Staff views its responsibilities far too narrowly.

DOE for the most part reasserts its positions that to state a material claim that would warrant admissibility of the contention the petitioner must not only assert a violation of the regulations would occur absent the sought after relief, but that the claim would affect the outcome of the proceeding, citing *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 333-34 (1999). DOE argues that the contention is not material

because its resolution would not make a difference in the outcome of the proceeding. DOE Answer at 97-98. In essence DOE argues that conservatism is a good thing, and therefore cannot create a material issue; however, it cites no case law in support of this overbroad proposition. Adopting DOE's proposed standard for admissibility of a contention would create virtually an absolute barrier to admissibility of contentions by parties supporting a plant, but alleging an over-conservative analysis in an effort to establish additional safety margin to support the application. Such a barrier is particularly not appropriate where the conservatisms could have implications for operational flexibility, licensing of the project, and ALARA.

The logical conundrum faced here is that the DOE position is conceptually premised on notions that a contention addresses a concern as to whether the application would sufficiently address the underlying regulations, *i.e.*, the lower bound argument. Here, in contrast, the proposed contention addresses the other end of the spectrum, and that is that the application goes so far beyond what is required that it presents an issue of reasonableness, in the direction of "complete assurance," deemed unnecessary under 10 C.F.R. § 63.101(a)(2). NEI agrees that conservatism in a safety analysis is *usually* a good thing. However, too much conservatism in any analysis is not always good science or good policy. NEI submits such potential scenarios must be cognizable at this stage of the proceeding or the licensing standards and analyses are rendered meaningless in part, *i.e.*, the "overly-conservative" direction.

And, in fact, the issue could make a difference in the outcome of the proceeding. As noted in response to the NRC Staff Answer, the implication of ALARA to workers not located at the facility, or exposures not arising from the facility per se, where those exposures are nonetheless directly attributable to DOE's own design criteria for the repository, the issue is material to the licensing standards the NRC must consider. DOE's claim that such excess

margin issues are not material belies the potential that one or more design parameters or assumptions could be, when the scope of NRC's consideration of repository impacts is established, preclude licensing premised on the current LA SAR positions in the first instance.

Next, attempting to avoid any consideration of these repository impacts in this proceeding, DOE reiterates its position that the application of ALARA to actions taken by reactor licensees outside the boundaries of the repository, even in response to DOE repository design criteria, completely removes the issue from consideration here. *Id.* Such a restrictive perspective on the reach of DOE's design standards associated with the repository, and the scope of issues subject to consideration in this proceeding, can lead, as here, to an illogical licensing result. To further illustrate, were DOE to establish a criterion that would so obviously create unnecessary and significant exposures of reactor licensee personnel away from the repository, the NRC would be unable to address the condition in this proceeding. In that posture the NRC would be pursuing potentially conflicting regulatory agendas: one related to the repository licensing, but with a blind eye to impacts of that action; the other in the 10 C.F.R. Part 50 context, but with no reach in that context to the source of the issue, the repository licensing. Such a regulatory result is at best inefficient but, more fundamentally, inappropriate. The Licensing Board need not reach this point if it is recognized that the potential implications of the repository licensing action reach beyond the boundaries of the proposed facility itself.

Facts, Opinions and References [10 C.F.R. § 2.309(f)(1)(v)]: In support of this contention NEI provided the affidavit of Dr. Everett Redmond, to address the question of whether the assumptions DOE has employed in their post-closure analysis with respect to fuel burnup is overly conservative. Dr. Redmond does not assert that DOE's assumptions are erroneous. NEI Petition, Attachment 12. Rather, Dr. Redmond's expert opinion was provided to

demonstrate that DOE's assumptions are not consistent with industry practice, unnecessarily conservative, and would cause licensees to take additional measures with respect to spent fuel packaging that would be unnecessary if DOE were to use reasonable analytical assumptions consistent with normal practice. *Id.*

DOE asserts that Dr. Redmond's positions are not adequately supported in that they are "bare assertion[s]" that the "applicant's representations and calculations [are] erroneous," DOE Answer at 99. DOE cites *Dominion Nuclear Conn.*, (Millstone Power Station, Unit 3) CLI-08-17, 68 NRC __ (slip op. at 11)(August 13, 2008). However, that case addresses the situation where a proponent of a position is claiming that the applicant's position is erroneous. Dr. Redmond is not making such an assertion. Rather, as a matter of his professional opinion, based on experience with current licensing standards and practices, he is asserting that the assumptions underlying DOE's analyses are *unnecessarily* conservative, and as a result would compel some licensees to take *unnecessary* actions, which in turn would result in otherwise avoidable dose consequences and expense. DOE does not contest Dr. Redmond's professional opinion with respect to those consequences. Accordingly, DOE's argument that NEI has provided an insufficient basis for this contention is fatally flawed.

DOE also asserts that Dr. Redmond has not provided specific page numbers for the references cited in his affidavit. While Dr. Redmond's opinions, and the relevant portions of the documents referenced are readily apparent, NEI hereby provides further specificity through the Supplemental Redmond Affidavit (Attachment 4).

Finally, DOE also asserts that Dr. Redmond's opinion as to the over-conservatism of the DOE's analysis does not address the question of whether eliminating that unnecessary conservatism would still result in compliance with the regulatory objectives of 10 C.F.R. §

63.113. DOE Answer at 100. NEI does not argue that application of conservative, but not unnecessarily conservative, analytical assumptions consistent with industry practice would not comply with those objectives. To the extent DOE believes that such compliance would not be assured by employing assumptions consistent with current industry practices, it presents a material issue for this proceeding.

In sum, contrary to DOE's claims, the contention is supported by expert opinion and reference to supporting materials with respect to the issue presented, and should be admitted.

Genuine Dispute [10 C.F.R. § 2.309(f)(1)(vi)]: DOE argues that the contention does not demonstrate how the LA SAR does not contain information required by law or is otherwise deficient. DOE Answer at 100-101. Were NEI contending that the application was not in compliance with applicable requirements, this DOE analysis would be relevant. However, that is not the case. NEI is demonstrating how the application *establishes compliance* — but also goes far beyond what is reasonable and necessary for compliance, and as a result will produce unintended consequences. Thus, demonstrating that the DOE position fails to comply with applicable regulations is irrelevant to the premise of this contention.

Further, for DOE to suggest that licensees could separately demonstrate acceptable reactivity control, presumably in the direction of current industry practice, is a hollow offering in that DOE has already established its position as to the nature and degree of reactivity control it expects. Licensees have no assurance that DOE would reasonably consider such positions. This contention would clarify the licensing basis (*i.e.*, what is necessary for compliance), and thereby enhance licensing while also clarifying operational and regulatory flexibility going forward. In any event, for DOE to suggest that the contention should be rejected because there is an exception or exemption process is specious. Were that a valid

objection to the admission of a contention, no contentions in any proceeding would ever be admitted as NRC's regulations provide for such opportunities, no matter under what part of 10 C.F.R. a license is sought. Accordingly, that argument is irrelevant to the disposition of contentions.

Finally, DOE again asserts that because the contention does not claim that the DOE approach would not satisfy applicable requirements, it does not establish a material issue of law or fact. DOE Answer at 101. However, NEI contends that DOE in the LA has imposed unnecessarily conservative assumptions and, therefore, expectations of licensees, creating unintended adverse consequences to reactor licensees. This in itself presents a genuine issue of law or fact, the resolution of which is material to the scope and parameters of the DOE license. The Licensing Board should again reject DOE's further reiteration of its claim that, because those consequences arise away from the GROA, the contention is insulated from consideration in this proceeding.

For all the aforementioned reasons, the objections to the admission of this contention reflect an overly narrow scope for this proceeding and an improperly high threshold burden for a petitioner to establish an admissible contention. This proposed contention should be admitted for hearing.

F. NEI-SAFETY-06

Drip Shields Are Not Necessary

Contention

The drip shields that the Department of Energy (“DOE”) proposes as part of the Engineered Barrier System (“EBS”) are not necessary because the repository is capable of meeting regulatory requirements with significant performance margin and defense in depth without drip shields. Installation of the drip shields will result in significant and unnecessary radiation exposures, resource use, and costs, and is therefore inconsistent with “as low as is reasonably achievable” (“ALARA”) principles.

DOE, NRC Staff, and Nevada oppose admission of this contention. The arguments, however, suffer from the recurring problem that these parties view the scope of this proceeding relative to NEI’s participation too narrowly. The question of whether or not drip shields are appropriately installed in the repository is within the scope of the proceeding, material to the findings NRC must make, and raises a genuine dispute on a material issue of law or fact. Indeed, Nevada has submitted multiple contentions concerning the drip shields. *See, e.g.*, Nevada Petition at 701-710 (submitting NEV-SAFETY-130, which argues that DOE cannot rely on drip shields because (according to Nevada) DOE cannot assume they will be installed). NEI-SAFETY-06 (drip shields are not necessary) and NEV-SAFETY-130 (drip shields cannot be assumed) are essentially two sides of the same coin. In other words, the Board should not evaluate Nevada’s contention independent of NEI’s contention. Accordingly, the contention should be admitted.

Contention [10 C.F.R. § 2.309(f)(1)(i)]: No reply necessary.

Basis [10 C.F.R. § 2.309(f)(ii)]: No reply necessary.

Scope of Proceeding [10 C.F.R. § 2.309(f)(iii)]: Neither the NRC Staff nor Nevada object to this contention on scope grounds. NRC Staff Answer at 137; Nevada Answer at 22. DOE objects to the contention on scope grounds for multiple reasons, none of which has merit.

This contention raised the issue that DOE's proposed plan to install drip shields in the repository will result in significant and unnecessary radiation exposures, resource use, and costs, and is therefore not consistent with ALARA principles or the goals of the NWPA. As cited in NEI's petition, multiple sections of the LA address DOE's proposed plan to install drip shields in the repository. The repository design includes drip shields to prevent seepage waters from contacting the waste packages and to protect the waste package from rockfall. SAR Section 2.3.6.2. DOE also claims in the LA that the drip shields are important to waste isolation, and states that they will be fabricated from Titanium Grade 7. SAR Section 2.1.1.2. *See also* SAR Chapter 2 at page 2-2 *et seq.* ("The [engineered barrier system is composed of manmade features within the emplacement drifts, including the drip shield"). Numerous other sections describe the intended role of the drip shield in the repository design. NEI seeks to challenge these proposed plans, which are explicitly accounted for in the LA and therefore fall squarely within the scope of the proceeding. *Shieldalloy Metallurgical Corp.* (Cambridge, Ohio Facility), CLI-99-12, 49 N.R.C. 347, 355 (1999).

DOE claims that the issues of unnecessary resource use and cost are outside the scope of the proceeding. DOE Answer at 104. DOE's claim has no merit. DOE's arguments here inappropriately attempt to divorce LLRW and increased resource use and cost from the ALARA considerations NEI raises in this contention. As discussed, *infra*, those considerations raise a genuine dispute of material fact and are within the scope of this proceeding.

DOE also argues that, no matter the merits of the contention, DOE's plan to install drip shields is not subject to review by the NRC. DOE Answer 104-05. In other words, while the NRC can consider impacts of DOE's proposal, the NRC must accept the proposal. *Id.* The Board should reject DOE's crabbed view of the NRC's authority.

Under DOE's view, this contention could be proven true, but NRC could do nothing about it (save denying the application *in toto*). This is not the case, and therefore the issues NEI raises here are within the scope of the proceeding. Commission precedent is replete with instances where the Commission has issued an authorization or license subject to condition. Should the Commission find reason to object to any portion of the LA as inconsistent with ALARA principles, such as the installation of drip shields, the Commission is not limited to rejecting the construction authorization. It may alternatively approve the application, but subject it to conditions. *Entergy Nuclear Vermont Yankee, L.L.C.* (Vermont Yankee Nuclear Power Station), CLI-06-8, 63 NRC 235, 238 (2006) ("If the Board determines after full adjudication that the license amendment should not have been granted, [the license] may be revoked (or conditioned).") Indeed, it is standard practice for the Commission to issue licenses subject to conditions. *See, e.g., Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-00-13, 52 N.R.C. 23, 29 (2000) (holding that a license condition may be used to support a finding of reasonable financial assurance); *Curators of The University of Missouri*, CLI-95-1, 41 N.R.C. 71, 87 (1995) (upholding a decision to condition the grant of two license amendments on fire safety conditions). Thus, DOE's argument that the NRC must accept DOE's proposal without question flies in the face of longstanding Commission precedent.

Materiality [10 C.F.R. § 2.309(f)(iv)]: Nevada does not challenge the contention on this ground. Nevada Answer at 22. DOE challenges the materiality of the issues raised in this contention only to the extent that DOE claims they are outside the scope of this proceeding. DOE Answer at 105. As demonstrated above, the issues raised herein are within the scope of this proceeding, and are accordingly material to the findings that NRC must make.

The NRC Staff claims that this contention does not raise a material issue because the “decision regarding the use of drip shields is a design decision affecting postclosure repository performance,” and the ALARA principle does not apply to the achievement of the long term performance objective. NRC Staff Answer at 138. The NRC Staff’s claim has no merit.

The issue raised in this contention is that DOE’s proposed plan to install drip shields in the repository will result in significant and unnecessary radiation exposures, resource use, and costs, and is therefore not consistent with ALARA principles. NEI Petition at 35-36; NEI Petition Attachment 13 at ¶¶ 72-74. NEI contends that these impacts are unnecessary because, without drip shields, the repository will comply with regulatory requirements with significant performance margin. NEI Petition at 35.

The NRC Staff claims that the contention is inadmissible because the Commission has prohibited the application of ALARA principles to “the achievement of the long-term performance objective.” NRC Staff Answer at 138. The NRC Staff’s arguments misinterpret the Commission’s statements on applying ALARA principles to this proceeding, as well as misunderstand how this contention seeks to apply those principles.

In promulgating Part 63, the Commission stated its position that, while

it is appropriate to explicitly require the application of the ALARA principle to the operational and decommissioning phases of the repository, the application of ALARA to achievement of the long-term performance objective is not appropriate.

66 Fed. Reg. at 55,751. This is because “deep geologic disposal, by its very nature, was ALARA,” and “it would be problematic to evaluate compliance with the application of ALARA principles in the postclosure phase of the repository.” *Id.* Rather, application of the EPA’s dose

limit would “ensure that public health and safety and the environment are protected” in the long term. *Id.*

Contention NEI-SAFETY-06 is entirely consistent with the Commission’s position. The contention is addressing the application of ALARA to the “operational and decommissioning phases of the repository,” not to the “long-term performance objective.” Under NEI-SAFETY-06, all of the unnecessary increased dose, increased LLRW, and increased costs that NEI contends will occur under DOE’s proposed action will occur before the post-closure phase and during the relative “present day” operations phase of the repository. Long-term repository performance is not a consideration, other than to show that all such requirements will be met without drip shields. The contention does not seek to apply ALARA principles to the long-term performance objective and does not evaluate compliance with ALARA principles in the post-closure phase. Nor does NEI seek to use ALARA here as a tool to reduce short-term exposures at the expense of potential long-term exposures. These are the types of ALARA principle applications the Commission sought to prohibit.

Moreover, Commission statements made during the promulgation of Part 63 demonstrate that contention NEI-SAFETY-06 raises exactly the type of ALARA consideration that is appropriate. In that rulemaking, the Commission stated that:

Application of ALARA during operations *compels* the consideration of the benefits of further reduction in potential doses to present-day populations and workers relative to impacts to present-day populations (e.g., increased cost to reduce potential doses further).

66 Fed. Reg. at 55,751 (emphasis added). Here, NEI contends that removing drip shields from the repository design will incur less radiological dose to “present-day populations and workers,” *i.e.*, repository site workers. NEI-SAFETY-06 Affidavit at ¶¶ 72-74. Thus, contrary to the NRC

Staff, contention NEI-SAFETY-06 is precisely the type of ALARA contention contemplated by the Commission and is, accordingly, material to the findings that NRC must make.

The NRC Staff also claims that ALARA does not prohibit “unnecessary” doses because ALARA does not require absolute minimization of doses. NRC Staff Answer at 139-40. The NRC Staff’s arguments misunderstand the contention. By showing that DOE’s proposed plan will result in “unnecessary” radiation exposures, increased resource use, and increased cost, NEI is showing that the repository will comply with regulatory requirements without the drip shields. If it were the case that drip shields were “necessary” to meet repository requirements, then it could be argued that the concomitant dose, resource use, and cost were “necessary.” In ALARA terms, if the drip shields were necessary to meet repository requirements, the resulting costs (dose, resources, and dollars) would be “reasonable.” Here, the opposite is true. Drip shields are not necessary to meet repository requirements. Therefore, on balance, none of the (1) expected dose to workers that will result from installation of the drip shields; (2) thousands of tons of titanium needed to fabricate drip shields; and (3) billions of dollars to be spent on drip shields are “necessary.”

Facts, Opinions, and References [10 C.F.R. § 2.309(f)(v)]: The NRC Staff does not object to this contention on this basis. NRC Staff Answer at 137. DOE opposes admission of this contention on the basis that NEI has failed to support the contention with adequate facts or expert opinion because NEI did not provide the LSN citation for, or attach to its intervention petition, the Electric Power Research Institute (“EPRI”) report on which NEI relies for support of contention NEI-SAFETY-06. DOE Answer at 105. Nevada opposes admission of this contention on the basis that NEI has failed to support the contention with adequate facts or expert opinion because, according to Nevada, (1) NEI has failed modify DOE’s Total System

Performance Assessment to account for the no drip shield option; and (2) the contention is contrary to NRC ALARA case law precedent and failed to present a cost benefit analysis. Nevada Answer at 23-25. The claims by DOE and Nevada are wrong and thus fail to dispute the adequacy of the alleged facts and expert opinion on which NEI relies.

A. NEI complied with the copyright document production requirements in this proceeding

EPRI Report No. 1018058, “Occupational Risk Consequences of the Department of Energy’s Approach to Repository Design, Performance Assessment and Operation in the Yucca Mountain License Application,” is part of the basis for contention NEI-SAFETY-06. *See, e.g.,* NEI Petition Attachment 13 at ¶¶ 37, 49-51, 70. The LSN citation for this report was in fact provided by NEI. *Id.* at p. 38 (the reference for Report No. 1018058 (referenced in the affidavit at “EPRI 2008”) includes “LSN Accession No. NEN000000720”). This document is subject to copyright and therefore could not be attached to NEI’s intervention petition. *U.S. Dep’t of Energy* (High-Level Waste Repository: Pre-Application Matters, Advisory PAPO Board), LBP-08-10, 67 N.R.C. ___, slip op. at 8 (2008). Furthermore, there is a process in place for proceeding participants to request copyright documents from other participants “where the document is not otherwise reasonably available to the requester.” Revised Second Case Management Order (Pre-License Application Phase Document Discovery and Dispute Resolution) (July 6, 2007) at 10 (the requirements of which apply to this proceeding. *See* CAB Case Management Order #1 (Jan. 29, 2009) at 2). Most EPRI reports, including the one in question, are available to the public on EPRI’s website, <http://www.epri.com>. As of this filing, DOE has not requested any copyright documents from NEI. DOE cannot complain that NEI failed to comply with the copyright document requirements where DOE has failed to avail itself

of the process established to request such documents or to demonstrate that the report was not reasonably available to it.

Nor could DOE make any such demonstration. DOE is well aware of Report No. 1018058 and its contents. Attachment 5 to this Reply is a copy of a September 25, 2008 letter from the former Director of DOE's Office of Civilian Radioactive Waste Management to the President of EPRI. *See also* LSN Accession No. NEN000000790. The subject of the letter is EPRI Report #1018058. DOE cannot feign inadequate support for this contention based on a purportedly withheld document where that document is (or at least was) in DOE's possession.²⁹

B. Nevada's claims regarding EPRI's TSPA and the Commission's ALARA considerations have no merit.

Nevada's objection that NEI failed to "tak[e] DOE's TSPA and modify[] it to eliminate drip shields," Nevada Answer at 23, essentially demands that NEI prove its contention at the pleading stage, which neither the Commission's regulations nor precedent require. *Private Fuel Storage, LLC* (Independent Spent Fuel Storage Installation), CLI-04-22, 60 N.R.C. 125, 139 (2004). Whether or not the contention is true is left to litigation on the merits, not this admissibility stage of the proceeding. *Washington Public Power Supply System* (WPPSS

²⁹ Similarly flawed are DOE's claims that NEI relied upon other documents that it failed to attach to its petition or cited with an LSN number. DOE Answer at 105 n.32. As is the case with EPRI Report No. 1018508, NEI complied with the requirements established for this proceeding with respect to these other documents. *See* NEI Petition Attachment 13 at p. 38. Where an LSN Accession number was not provided, the document was not required to be placed on the LSN under 10 C.F.R. § 2.1005(h), which excludes from the LSN "[r]eadily available references, such as journal articles and proceedings, which may be subject to copyright." Nor could the documents be attached to NEI's petition because they are subject to copyright. LBP-08-10, 67 N.R.C. ___, slip op. at 8. In these cases, the same procedures described above and set forth in the Second Case Management Order would apply. Thus, DOE has no valid objection here because DOE has failed both to demonstrate that these documents are not otherwise reasonably available to it and to avail itself of the procedures available for requesting copyright documents.

Nuclear Project No. 2), ALAB-722, 17 N.R.C. 546, 551 n.5 (1983). *See also* Final Rule, Changes to Adjudicatory Process, 69 Fed. Reg. 2182, 2,190 (Jan. 14, 2004); *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 335 (1999) (the contention pleading rule is not a “fortress” to deny intervention). *Entergy Nuclear Generation Company* (Pilgrim Nuclear Power Station), LBP-06-23, 64 N.R.C. 257, 308 (2006). All that is required at the contention admissibility stage is “some sort of minimal basis indicating the potential validity of the contention,” Final Rule, Rules of Practice for Domestic Licensing Proceedings--Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,170 (Aug. 11, 1989), showing that a genuine dispute exists and indicating that further inquiry is appropriate. *Yankee*, CLI-96-7, 43 N.R.C. at 249. In other words, NEI need not provide factual support sufficient to withstand a summary disposition motion or to prove its entire case in the first instance. 54 Fed. Reg. at 33,171. NEI has more than met that standard here. Indeed, Nevada’s resort to addressing the merits of the contention in its opposition to NEI’s intervention petition “serves to reinforce [NEI’s] insistence that a genuine dispute exists with respect to the substance of the contention in issue.” *Shieldalloy Metallurgical Corp.* (Licensing Amendment Request for Decommissioning of the Newfield, New Jersey Facility), LBP-07-5, 65 N.R.C. 341, 362 n.33 (2007).

Even if it were permissible to consider the merits of a contention at this stage of the proceeding (which it is not), Nevada’s claims about the EPRI TSPA are completely off the mark and completely fail to recognize the acknowledged value of the EPRI TSPA. As detailed in the attached Affidavit from Drs. Kozak and Apted,³⁰ EPRI has developed an independent

³⁰ Affidavit of Drs. Matthew Kozak and Michael Apted in Support of NEI’s Reply to Nevada’s Answer to NEI’s Petition to Intervene (“Kozak & Apted Affidavit”), which is set forth at Attachment 2.

TSPA consistent with the NRC's regulations and which incorporates diverse physical, chemical, geologic, and biologic process models to evaluate how the system of multiple barriers at Yucca Mountain are expected to perform. Kozak & Apted Affidavit at ¶¶ 8-9. The State, however complains that this contention's reliance on EPRI's TSPA makes the contention "breathtaking in technical scope and complexity, and its proponents and opponents would be required to defend or oppose a total system performance assessment different from the one in the LA, engaging scores of experts and involving hundreds of scientific disciplines, and requiring vast litigation resources and time." Nevada Answer at 23.³¹ The State is seeking to turn a virtue into a vice. Under the State's view, no one should take a second or third look at DOE's analyses and find areas for improvement because (according to the State) it would be too hard to do so. That is not the standard by which this licensing proceeding (or any licensing proceeding) should be conducted. NRC regulations compel that any comprehensive second look include relevant and significant features, events, and processes in the performance assessment. Kozak & Apted Affidavit at ¶9. In order to be an independent and credible TSPA, EPRI's TSPA must be comprehensive.

³¹ What is "breathtaking" is Nevada's self-interested attempt to exclude the EPRI TSPA from consideration in this proceeding. The EPRI TSPA is the only independent, credible, and comprehensive TSPA that has considered the "no drip shield option." It also concluded that all repository requirements can be met without drip shields. Nevada, however, has submitted multiple contentions regarding the proposed drip shields, *see, e.g.,* NEV-SAFETY-130, and (among other things) claims that "[i]f the drip shields cannot be placed over any significant number of waste packages, the [DOE] TSPA model is invalid and the dose to the [reasonably maximally exposed individual] will exceed regulatory standards." Nevada Petition at 709. Nevada therefore demands that "at a minimum, the no drip shield scenario should be considered as an alternative conceptual model and propagated throughout the assessment." *Id.* at 701. It is ironic that Nevada would seek to exclude the EPRI TSPA since it is the only "alternative conceptual model" to have considered the no drip shield option that Nevada claims is lacking.

The State also claims that NEI seeks to “jettison DOE’s TSPA entirely and replace it with an entirely different EPRI performance assessment.” Nevada Answer at 23. The State is wrong.³² EPRI’s independent TSPA is intended to aid in the identification and total system evaluation of credible “alternative conceptual models,” 10 C.F.R. § 63.114(c), as well as to focus on the requirement of “reasonable expectation” in long-term performance assessment. 10 C.F.R. § 63.304. Kozak & Apted Affidavit at ¶10. The EPRI TSPA has repeatedly been recognized as an independent source of repository evaluation data. *Id.* at ¶11. In fact, the NRC even considered EPRI’s TSPA in developing its own performance assessment model. *Id.* The EPRI TSPA is not intended to replace the DOE TSPA, but rather to provide independent evaluation for comparison to the DOE TSPA, analogous to the evaluation that the NRC Staff itself envisions conducting during the license review process. *Id.* at ¶¶10, 13. Furthermore, the EPRI TSPA is not “entirely different” than the DOE TSPA because it is based on and uses the same basic design information and site-specific information used by DOE. *Id.* at ¶10. The essential point is this: because DOE has not completed an analysis considering a repository without drip shields, NEI cited to the only existing, credible TSPA analysis that does – the EPRI TSPA. *Id.* at ¶13. Such independent, credible analyses can certainly be used to support alternatives, *id.*, particularly here at the contention admissibility stage of this proceeding.

Nevada also asserts that NEI did not attempt to modify the DOE TSPA for the no drip shield option because such a step would be too complex. Nevada Answer at 23. To the contrary, it is not possible to directly use DOE’s TSPA because the codes are not available for

³² The State’s position here is also contrary to the position it takes on its own contentions. For example, in contention NEV-SAFETY-01, the State essentially seeks to replace years of work on erosion with an unpublished paper that was not conducted according to quality assurance requirements. Kozak & Apted Affidavit at ¶9.

adaption to private parties to use. Kozak & Apted Affidavit at ¶12. The version that has been made available to the public allows only changes to parameters, not underlying assumptions. *Id.*

The State also claims that NEI failed to discuss uncertainty and quality assurance as it might apply to the EPRI TSPA. Nevada Answer at 23. To the contrary, the drip shield is only one barrier component of the disposal system, and uncertainty in its function has a relatively small contribution to the overall uncertainty in EPRI's TSPA. Kozak & Apted Affidavit at ¶15. As a result, significant changes in uncertainty in overall repository performance would not arise as an expected consequence of omitting the drip shields. Uncertainty is propagated through the EPRI TSPA in a manner similar to that used by DOE in propagating uncertainty in its TSPA. *Id.* While Part 63's quality assurance ("QA") requirements do not apply to analyses other than DOE's, 10 C.F.R. § 63.141-44, EPRI's analyses have been conducted to an appropriate level of QA, which is documented in a number of EPRI reports. Kozak & Apted Affidavit at ¶ 15.

The State erroneously claims that NEI's analyses failed to state, or demonstrate, compliance with, the performance assessment and quality assurance requirements in Part 63. Nevada Answer at 13. To the contrary, the analysis presented in the contention is not intended to supplant DOE's TSPA. Kozak & Apted Affidavit at ¶16. The contention shows that the elimination of drip shields is a viable option not considered by the LA, and the installation of drip shields is inconsistent with ALARA principles. *Id.* By showing an alternative analysis that considers all the major potential issues, and by showing that those potential issues do not have a strong impact on system performance, the contention demonstrates that a full analysis by DOE is possible, and should have been done as a straightforward approach to avoid operational radiological doses associated with the installation of drip shields, and to avoid the associated unnecessary resource use and costs that will result from DOE's proposed plan. *Id.*

Nevada also claims that admission of contention NEI-SAFETY-06 is foreclosed by the Commission's decision in *Yankee Atomic Electric Co.* (Yankee Nuclear Power Station), CLI-96-1, 43 N.R.C. 1, 7-9 (1996). Nevada Answer at 24-25. To the contrary, the Commission's *Yankee* decision entirely supports admission of contention NEI-SAFETY-06.

In *Yankee*, the Commission referred an intervention petition to a licensing board that contained a contention alleging the applicant's choice of one decommissioning option over another available alternative was not ALARA because the chosen option would result in 900 person-rem of additional exposure while providing no countervailing benefit. *Yankee*, CLI-96-1, 43 N.R.C. at 7. The Commission stated that the 900 person-rem dose estimate was speculative because it came from a table in the generic environmental impact statement ("GEIS") for decommissioning nuclear power plants, and was based on a larger nuclear plant than the one at issue. *Id.* at 7-8. The Commission further noted that the cost difference between implementing one decommissioning plan over another was "highly dependent on difficult-to-predict variables, like interest, discount, and inflation rates and waste disposal fees." *Id.* at 9. Therefore, the Commission could not conclude with great assurance whether switching from one plan to another would save money. *Id.* at 9. Nor could the Commission determine whether preventing additional expected exposures would cost more than \$1,000 or \$2,000 for each person-rem of dose reduction achieved (in this case, approximately \$2 million), which was the NRC Staff's general threshold for finding additional dose reductions to be ALARA. *Id.* at 8-9. Thus, the Commission advised the licensing board that, "[i]n these circumstances, [it] did not believe that potential dose reductions on the order of 900 person-rem can have ALARA significance unless there is some extraordinary aspect to the case not apparent...from the pleadings" and referred

this issue to the Licensing Board to conduct its own review of the pleadings. *Id.* at 9 (emphasis added).

Contrary to Nevada's claim, Nevada Answer at 25, the Commission never deemed 900 person-rem "inconsequential." Rather, in that same proceeding, the Commission emphatically stated that it "nowhere suggested that the health effects of 900 person-rem were 'trivial'" *Yankee*, CLI-96-7, 43 NRC at 252. It only ruled that it would not permit case by case adjudication on choosing one decommissioning option over another, where their respective health effects and other social and economic impacts had been considered in a rulemaking. *Id.* No similar rulemaking has considered a repository with or without drip shields. Thus, the 975 person-rem of occupational exposures that would be avoided if drip shields were not installed NEI Petition Attachment 13 at ¶ 72) are not trivial. Further, unlike the 900 person-rem estimate in *Yankee*, the 975 person-rem figure is not a generic estimate, but rather is DOE's own estimate that 975 person-rem of occupational exposure will be incurred to install the drip shields. *Id.* The 975 person-rem amount does not include any dose that might be incurred from any off-normal operations. *Id.* The contention is also based on the fact that the installation of drip shields will require over fifty thousand tons of titanium over a ten year period, and DOE's own projected costs for drip shield installation will exceed \$7 billion. *Id.* at ¶¶ 73-74. Thus, Nevada's claim that *Yankee* requires denial of the contention is baseless.

Finally, Nevada argues that any reduction of occupational exposures must be weighed against any increases in public exposure, which, in these circumstances, would require weighing estimated occupational doses against probability-weighted public doses over dramatically different time frames, which, according to Nevada, the Commission does not permit. Nevada Answer at 25. While attempting to knock down the strawman it has created, the

State overlooks the fact that NEI-SAFETY-06 does not demand any comparison between present day occupational doses and any public doses far off into the future. Rather, the contention clearly states that present day occupational doses, resource use, and costs can be avoided while meeting regulatory requirements “with significant performance margin.” NEI Petition at 35.

In short, NEI-SAFETY-06 asserts that significant dose exposures can be avoided while achieving substantial cost savings. Thus, NEI has far exceeded the required “minimal showing that material facts are in dispute, thereby demonstrating that an ‘inquiry in depth’ is appropriate.” *Gulf States Utilities Co.* (River Bend Station, Unit 1), CLI-94-01, 40 N.R.C. 43, 51 (1994).

Genuine Dispute [10 C.F.R. § 2.309(f)(1)(vi): Neither the NRC Staff nor Nevada challenge this contention on this basis. NRC Staff Answer at 137; Nevada Answer at 26. DOE claims that NEI fails to raise a genuine dispute of law or fact because (1) NEI’s ALARA claims are insufficient to raise a genuine dispute, and (2) NEI’s concerns about the drip shields, even if true, would not make a difference in this proceeding. DOE Answer at 106-110. DOE is wrong on both counts.

DOE erroneously argues that NEI’s ALARA claims are flawed because NEI fails to show that drip shields are unnecessary to meet postclosure requirements, and that its ALARA analysis is incomplete. DOE Answer at 106-08. DOE’s claims fail for many of the same reasons that Nevada’s claims fail, as discussed in the previous section. First, DOE challenges the contention for purportedly failing to demonstrate that all regulatory requirements would be met without the installation of drip shields, and failing to provide a complete ALARA analysis, including the potential increased dose to future generations. DOE Answer at 106-09. Thus, DOE demands that NEI prove its contention at the contention admissibility stage, which neither

the Commission's regulations nor precedent require. See discussion *supra* (citing, *inter alia*, *Private Fuel Storage*, CLI-04-22, 60 N.R.C. at 139; 69 Fed. Reg. at 2190; 54 Fed. Reg. at 33,170; *Yankee*, CLI-96-7, 43 N.R.C. at 249; *Shieldalloy Metallurgical Corp.*, LBP-07-5, 65 N.R.C. at 362 n.33).

Even if it were appropriate to consider the merits of the contention at this stage (which it is not), the objections DOE raises have no basis, as detailed in the attached Affidavit of Drs. Matthew W. Kozak and Fraser King in Support of NEI's Reply to the DOE's Answer to Proposed Contention NEI-SAFETY-06 (Attachment 6) ("Kozak & King Affidavit"). DOE claims that the dose calculations presented with NEI-SAFETY-06 considered only early waste package failures and failed to consider all significant features, events and processes and omitted seismic and igneous events and their associated consequences, weighted by their probability of their occurrence. DOE Answer at 107. However, the analysis supporting NEI's contention did in fact consider all significant features, events, and processes, and sequences of events and processes, weighted with EPRI's estimate of their probability of occurrence. Kozak & King Affidavit at ¶ 2. NEI's analysis also considered seismic events and their consequences, and did not merely consider only early waste package failures. *Id.* at ¶¶ 3-4. With respect to igneous events, EPRI determined that the probability of such an event falls below the regulatory threshold for consideration and, therefore, no igneous events or their consequences must be considered. *Id.* at ¶ 5. Nothing in the LA suggests that the drip shields provide any protection against igneous events. Contrary to DOE's assertions (DOE Answer at 106 n.33), human intruder calculations are not relevant to the presence of drip shields, and Figure 4(b) (which shows the peak dose calculated by the EPRI TSPA when assuming no drip shields) demonstrates that the ground water protection standard is met. *Id.* at ¶¶ 6-7.

DOE also attacks the contention on the grounds that its ALARA claims are speculative. DOE Answer at 68. But DOE's reliance on the case law it cites is misplaced. DOE relies on *Yankee*, CLI-96-7, 43 N.R.C. at 257, where the Commission rejected an ALARA-related contention where "the factors cited by Petitioners . . . represent[ed] uncertainties" and inappropriately assumed that the applicant "plan[ned] to move spent fuel from the pool into dry cask storage." But these circumstances do not apply here. It is not speculation that DOE's proposal calls for the installation of drip shields and that, according to DOE, the drip shields are important to waste isolation. The LA states as much. SAR Sections 2.3.6.2 & 2.1.1.2.

DOE also relies on *Duke Power Co.* (Catawba Nuclear Station, Units 1 & 2), LBP-82-16, 15 N.R.C. 566, 585 (1982), where the Licensing Board held that "[s]peculation that large collective doses of radiation might be received by repairmen at some future time because of the premature failure of equipment is not grounds for a showing that ALARA principles were ignored." These circumstances are inapplicable here as well. Again, under DOE's proposal, it is inevitable that drip shields will be installed, and that approximately fifty thousand tons of titanium will be needed to install the drip shields. FSEIS Table 4-36 at page 4-108. DOE also relies on *Yankee*, CLI-96-1, 43 N.R.C. at 7-9 (discussing the speculative nature of dose values obtained from a generic environmental impact statement when applied to a single plant and cost estimates based on "difficult to predict variables like interest, discount, and inflation rates"). Here, NEI does not rely on speculative dose considerations from any generic evaluation. Rather, NEI contends that, according to DOE's own documents, 975 person-rem will be incurred to install drip shields, and that their installation will cost upwards of \$7 billion. NEI Petition Attachment 13 at ¶¶ 72, 74. The expected radiological dose, increased resource use, and substantial costs could be completely avoided while meeting repository requirements if DOE

removed drip shields from its repository design. This certainly amounts to an “obvious cost advantage” for a repository design without drip shields that brings “into serious question” DOE’s decision to install them. *Yankee*, CLI-96-7, 43 N.R.C. at 252.

DOE further argues that NEI has failed to allege any deficiency in the application (other than NEI’s purportedly “faulty” ALARA claims) that would make a difference in the outcome of the proceeding. In DOE’s view, even if NEI shows that the repository performance objectives are met without drip shields, “it does not follow that DOE must change its repository design.” DOE Answer at 110. To the contrary, as discussed *supra*, NEI’s ALARA analysis is sound and presents a strong basis for the Board to order further inquiry into the installation of drip shields in light of the expected doses that will be incurred to repository workers and the extraordinary costs and resource commitments that will necessarily occur.

Furthermore, if NEI’s ALARA claims are ultimately accepted by the Board, the Commission would not find that DOE’s proposal poses no unreasonable risk to public health and safety under 10 C.F.R. § 63.31(a), and would condition any grant of construction authorization to assure that ALARA principles are being met by, for example, requiring DOE to eliminate drip shields from its design, as the Commission has the authority to do. 10 C.F.R. § 63.31(c); *Vermont Yankee*, CLI-06-8, 63 NRC at 238; *Private Fuel Storage*, CLI-00-13, 52 N.R.C. at 29; *Curators of The University of Missouri*, CLI-95-1, 41 N.R.C. at 87.

In summary, the issue here is not simply a question of choosing a preferred design, but rather a question of assuring that the design implemented is consistent with ALARA principles and aligned with the multiple goals of the Nuclear Waste Policy Act, including to construct a repository without undue expenditures. NEI has provided far more than the required “minimal showing that material facts are in dispute, thereby demonstrating that an ‘inquiry in depth’ is

appropriate.” *River Bend*, CLI-94-01, 40 N.R.C. at 51. Contention NEI-SAFETY-06 should be admitted for hearing.

G. NEI-NEPA-01

Inadequate NEPA Analysis for 90% TAD Canister Receipt Design

Contention:

The Yucca Mountain Final Supplemental Environmental Impact Statement (“FSEIS”) fails to analyze reasonably foreseeable environmental impacts that will result from DOE’s proposal to receive up to 90% of spent nuclear fuel (“SNF”) at Yucca Mountain in Transport, Aging, and Disposal (“TAD”) canisters.

DOE opposes admission of this contention at the threshold because it claims that NEI failed to comply with the requirements of 10 C.F.R. § 51.109 and 10 C.F.R. § 2.326. The NRC Staff claims that this contention should be rejected for failing to comply with 10 C.F.R. § 2.326. The threshold concerns raised by DOE and the NRC Staff are contrary to a rational reading of the Commission’s regulations and to assurances provided by both DOE and the NRC Staff to the D.C. Circuit regarding the ability of intervenors to raise substantive NEPA claims in this proceeding. Consequently, their objections have no merit.

The Commission’s notice of hearing for this proceeding provides that “environmental contentions addressing any DOE environmental impact statement or supplement must also conform to the requirements and address the applicable factors outlined in 10 C.F.R. 51.109 governing NRC’s adoption of DOE’s environmental impact statements.” 73 Fed. Reg. 63,029, 63,031 (Oct. 22, 2008). Section 51.109 provides, among other things, that a petitioner who contends that it is not practicable to adopt the DOE final environmental impact statement (“FEIS”) and, in this case, the final supplemental EIS (“FSEIS”) shall file a contention “to that effect” along with an affidavit “which sets forth factual and technical bases for the claim that . . . it is not practicable to adopt the DOE [FEIS or FSEIS].” 10 C.F.R. § 51.109(a)(2). The statutory directive that NRC adopt the DOE FEIS “to the extent practicable,” 42 U.S.C. § 10134(f)(4), is intended to avoid duplication of DOE’s environmental review process and means that the NRC

will not adopt the FEIS or FSEIS “unless it meets the standards for an ‘adequate statement’ under the NEPA and the Council For Environmental Quality’s NEPA regulations.” *Nuclear Energy Institute Inc. v. EPA*, 373 F.3d 1251, 1313-14 (D.C. Cir. 2004). A basis for contending that it is not practicable to adopt the EIS or FSEIS may be based on “[s]ignificant and substantial new information or new considerations [that] render such [EIS] inadequate.” 10 C.F.R. § 51.109(c)(2).

Contention NEI-NEPA-01 meets the standards required by the Commission (and the D.C. Circuit). The issue raised in this contention is that DOE’s FSEIS fails to analyze reasonably foreseeable environmental impacts that will result from DOE’s proposal to accept at least 90% of commercial spent nuclear fuel in TAD canisters. NEI Petition at 40. These environmental impacts result from unloading commercial SNF from dual purpose canisters (“DPCs”) and transportable bare-fuel casks (“BFCs”) at reactor sites, namely the low-level radioactive waste (“LLRW”) stream (i.e., discarded DPCs and BFCs), and the environmental impacts associated with transporting the discarded DPCs and BFCs. *Id.* The contention clearly states that the failure to consider these impacts amounted to “new considerations that render the [FSEIS] inadequate.” *Id.* The technical and factual bases supporting this contention were set forth in the affidavit of Messrs. Gutherman, Magette, and Loftin. NEI Petition at Attachment 14.

DOE objects to this contention on the grounds that NEI failed to raise a significant environmental issue and failed to demonstrate that, if true, the EIS would result in a materially different outcome in this proceeding. DOE Answer at 111. The NRC Staff objects to this contention because NEI “simply” provided speculative aggregate estimates of the number of canisters that will need to be reloaded to meet the 90% TAD proposal, and merely noted that LLRW repositories are widely dispersed and do not necessarily accept all categories of LLRW.

NRC Staff Answer at 1323. These objections are baseless. As explained in the affidavit accompanying NEI's Petition, under DOE's 90% TAD canister receipt plan, the unpackaging of commercial SNF from DPCs and BFCs will result in at least 620 discarded DPCs and BFCs at reactor sites. NEI Petition Attachment 14 at ¶ 39. It is not speculation that these discarded canisters will be LLRW. DOE acknowledges that discarded canisters from *repository* operations will be LLRW requiring processing, handling, and disposal, and that these discarded canisters may be disposed of at the Nevada Test Site. *Id.* at ¶¶ 40, 46. The FSEIS states that "[LLRW] would be in the form of solids and liquids from operations such as cask, facility, and equipment decontamination with wipes and chemicals; pool system skimming and filtration operations; chemical sumps; and carrier transporter washing" and estimates that 74,000 cubic meters of LLRW will be generated at the repository," of which "[d]ual-purpose canisters would make up about 9,800 cubic meters." FSEIS Section 4.1.12.1 at page 4-91-92.

But, notwithstanding that the discarding of DPCs and BFCs at reactor sites is a necessary and inevitable consequence of the DOE proposal under review by the NRC, DOE totally fails to consider the environmental impacts to utilities at reactor sites from discarding DPCs and BFCs. Furthermore, DOE has failed to consider the limited disposal options facing utilities, the transportation impacts that will result from having to transport the LLRW over as much as 2,600 miles, and the costs associated with transportation and disposal. NEI Petition Attachment 14 at ¶¶ 41-50.

DOE further objects to this contention on grounds that the affidavit accompanying the contention "does not address the requirements of §§ 51.109(a)(2) or 2.326(a), much less separately address each of the § 2.326 criteria." DOE Answer at 112. DOE's objection misreads the Commission's regulations. First, section 51.109(a)(2) requires only that a contention be filed

at the time called for in the Commission's hearing notice, and that the accompanying affidavit set forth factual and/or technical bases for the claim that it is not practicable to adopt the DOE FSEIS. Intervention petitions in this proceeding were due on December 22, 2008, and NEI filed its petition on December 19, 2008. DOE makes no claim that this contention was filed untimely. Further, as discussed above, the affidavit surpasses the factual and technical basis requirement of section 51.109(a)(2). With respect to section 2.326(a), the contention demonstrated that each of the regulation's criteria were met, *i.e.*, stated that the issue was timely raised, concerned a significant environmental issue, and declared that the FSEIS would have been altered had it considered the significant environmental issues raised therein. NEI Petition at 41. *See also* DOE Answer at 112 n.34 (acknowledging that NEI addressed the section 2.326(a) criteria).

DOE, however, believes that the contention is flawed because the *affidavit* itself does not address the section 2.326 requirements. DOE's ritually formalistic interpretation of the Commission's regulations is incorrect. There is no such requirement that the *affidavit* address the requirements. Just as with section 51.109(a)(2), section 2.326(b) requires that the affidavit "set forth the factual and/or technical bases for the movant's claim that the criteria of paragraph (a) of this section have been satisfied." The affidavit provided the factual and technical bases, and the contention addressed the 2.326(a) factors. NEI Petition at 41. Nothing more is required. Section 2.326(b) does not state that the movant's compliance with the paragraph (a) criteria must be addressed in the affidavit. Instead, section 2.326(b) states in relevant part "[e]ach of the [2.326(a)] criteria must be separately addressed, with a specific explanation of why it has been met." This sentence does not require that the explanation be placed in the affidavit. Had the Commission intended such a requirement, it could easily have so stated (for example, by providing that "each of the criteria must be separately addressed *in the affidavit*").

DOE also claims the affidavit failed to specifically state whether a materially different outcome would result. DOE Answer at 112. Even if this were a requirement (which it is not), it has been met, for the last sentence of the affidavit demands that the FSEIS be amended to consider the environmental impacts addressed therein. NEI Petition Attachment 14 at ¶ 50. Indeed, under DOE's constrained reading of the regulation, the contention must be tossed out if the affidavit fails to contain an explicit statement that the contention and affidavit are timely filed. *See* 10 C.F.R. 2.326(a)(1). The Board should reject such a stilted interpretation of the regulation.

The NRC Staff also claims that the contention fails the section 2.326 requirements because it failed to address an alternative canister use option examined by DOE (the 75% TAD canister receipt case), which purportedly concludes that such option will result in no increased environmental impacts from SNF transportation from reactor sites to the repository. NRC Staff Answer at 1323 (citing FSEIS Appendix A.2.1 at page A-3). The NRC Staff's argument here is irrelevant. NEI contends that DOE totally failed to analyze the impacts that will result from the discarded DPCs and BFCs at reactor sites, which will inevitably result from its plan to receive 90% of commercial SNF in TAD canisters. NEI does not contend that DOE failed to analyze or insufficiently analyzed environmental impacts resulting from SNF transportation *from reactor sites to the repository* (i.e., that DOE failed to consider latent cancer fatalities, fatalities from exposure to vehicle emissions, and traffic fatalities, *see* FSEIS Appendix A.2.1 at page A-3).

This is a contention asserting an omission in DOE's NEPA analysis. NEI believes that the contention, including the detailed supporting affidavit, presents a seriously different picture of the environmental landscape than the picture portrayed by DOE. Certainly these considerations amount to a "significant environmental issue." Accordingly, the contention

demands that the FSEIS be amended to include the omitted analysis. NEI Petition Attachment 14 at ¶ 50), which is the “materially different outcome” DOE claims is lacking. *See* NEI Petition at 41. In summary, the considerations NEI raises here amount to “new considerations” that must be but are not currently considered in the FSEIS in this proceeding. Both DOE and NRC committed the D.C. Circuit that substantive claims against the FEIS and FSEIS could be raised in the NRC proceedings. *Nuclear Energy Institute Inc. v. EPA*, 373 F.3d at 1314. The Board should ensure that this commitment is carried out.

Contention [10 C.F.R. § 2.309(f)(1)(i)]: No reply necessary.

Basis [10 C.F.R. § 2.309(f)(ii)]: No reply necessary.

Scope of Proceeding [10 C.F.R. § 2.309(f)(iii)]: The NRC does not object to this contention on scope grounds. NRC Staff Answer at 1321. DOE claims that this issue is outside the scope of the proceeding because “[t]he repackaging of SNF in DPCs into TADs at commercial sites is not part of DOE’s Proposed Action in the Repository SEIS,” that “NRC has no statutory or regulatory authority over how DOE will accept commercial SNF,” and that “NRC must take DOE’s proposal to accept up to as much as 90% of commercial SNF in TADs as a given” DOE Answer at 112-14. DOE’s objections are without merit.

This contention raises the issue that DOE’s FSEIS fails to analyze reasonably foreseeable environmental impacts that will result from DOE’s proposal to accept at least 90% of commercial spent nuclear fuel in TAD canisters, namely the LLRW stream that will result from discarding DPCs and BFCs, as well as the transportation impacts that will result from disposal of those DPCs and BFCs. The issue here is not whether DOE can proceed with its plan to repackage SNF into TADs at reactor sites, and require that at least 90% of commercial SNF arrive at the repository at TADs. Rather, the NEPA contention is focused on DOE’s failure to

consider obvious environmental consequences of that plan. Nowhere in the FEIS or the FSEIS does DOE consider the environmental impacts raised by NEI.

DOE is simply wrong to claim that this issue is not part of the proposed action. FSEIS Section 4.1.14.3.2 (at page 4-100) provides “[u]nder the Proposed Action, about 90 percent of the commercial spent nuclear fuel would travel to the repository in TAD canisters; generator sites would load and seal these canisters” (emphasis added). That same section further provides “[t]his analysis includes TAD canisters as repository components because they are an *element of the repository design* and the commercial nuclear facilities would *have* to use them as appropriate.” *Id.* (emphases added). In addition, General Information Section 1.2.2. states that the surface facilities have been designed to support a mostly canisterized waste stream, and that the repository objective is to have 90% of individual commercial SNF assemblies loaded into TAD canisters by the utilities, with the remaining quantity of SNF arriving at the repository in DPCs or transportation casks. Safety Analysis Report Section 1.5.1.1 states that the repository shall be capable of accepting, transporting, and disposing of commercial SNF where at least 90% is received in TAD canisters and no more than 10% is received in DPCs or BFCs. DOE cannot argue that the issues NEI seeks to raise are not part of the proposed action when the LA (including the FSEIS) clearly states that they are. These issues are therefore within the scope of this proceeding.

Furthermore, DOE acknowledges that the FSEIS contains an analysis of environmental impacts that would result from its 90% TAD receipt proposal, as well as a sensitivity analysis analyzing a potential case where only 75% of commercial SNF arrives at the repository in TAD canisters. DOE Answer at 113-14. Therefore, DOE can hardly argue that NEI’s claim (that the FSEIS omits obvious impacts related to DOE’s 90% receipt plan) is

beyond the scope. DOE cannot ignore impacts that will necessarily accompany its proposal by thrusting them on another party. DOE's position would impermissibly segment the impacts NEI raises from those which DOE claims to have evaluated. *See generally, Churchill County v. Norton*, 276 F.3d 1060 (9th Cir. 2001).

Materiality [10 C.F.R. § 2.309(f)(iv)]: NRC Staff offers no objection on this basis. NRC Staff Answer at 1321. DOE challenges the materiality of the issues raised in this contention only to the extent that DOE claims that the issues are outside the scope of this proceeding. DOE Answer at 114. As demonstrated above, NEI's challenge is that DOE failed to consider obvious environmental impacts that will result from DOE's plan to receive at the repository at least 90% of commercial SNF in TADs. In this contention, NEI is not challenging DOE's proposal to use TADs. Therefore, the issues raised herein are within the scope of this proceeding and are material to the findings NRC must make.

Facts, Opinions, and References [10 C.F.R. § 2.309(f)(v)]: NRC Staff offers no objection on this basis. NRC Staff Answer at 1321. DOE challenges the adequacy of the alleged facts and expert opinion relied on in this contention to the extent that DOE claims that NEI failed to comply with "the requirements of 10 C.F.R. §§ 51.109 and 2.326, and as addressed in Section IV.A.3 regarding the legal standards under 10 C.F.R. § 2.309(f)(1)(v)." DOE Answer at 114. As demonstrated above, NEI complied with the requirements of 10 C.F.R. §§ 51.109 and 2.326, and has provided the necessary factual information and expert opinion to support the contention.³³

³³ To the extent DOE intended to allege as a separate ground that, "as addressed in Section IV.A.3 regarding the legal standards under 10 C.F.R. § 2.309(f)(1)(v), NEI has failed to provide the requisite supporting facts, expert opinion, and references," DOE Answer at 114, DOE fails to explain how NEI fails to meet the contention admissibility requirement. Accordingly, no further reply is warranted.

Genuine Dispute [10 C.F.R. § 2.309(f)(1)(vi): DOE claims that no genuine dispute on a material issue of fact or law exists because it has taken the required “hard look” by analyzing a sensitivity case in the FSEIS whereby only 75% of commercial SNF is received at the repository in TADs. DOE Answer at 115. Similarly, the NRC Staff claims that NEI failed to raise a material issue of genuine dispute because it failed to explain why DOE’s analyses of the 90% TAD receipt case scenario and the alternative 75% TAD receipt case scenario are not sufficient to bound likely impacts. NRC Staff Answer at 1324. To the contrary, NEI contends that DOE totally failed to analyze the impacts that will result from the discarded DPCs and BFCs at reactor sites, which will inevitably result from DOE’s plan to receive 90% of commercial SNF in TAD canisters.

NEI does not contend that DOE failed to analyze or insufficiently analyzed environmental impacts resulting from transportation of SNF from reactor sites to the repository (i.e., that DOE failed to consider latent cancer fatalities, fatalities from exposure to vehicle emissions, and traffic fatalities, *see* FSEIS Appendix A.2.1 at page A-3). NEI does not challenge the adequacy of DOE’s analyses of either the 75% or 90% TAD receipt case as to the impacts that DOE addressed. What NEI does challenge, and what NEI-NEPA-01 addresses, is the scope of DOE’s analyses. DOE simply fails to address the necessary and inevitable environmental consequences of either the base or alternative cases – the environmental impacts of the discarded DPCs and BFCs and their disposal. Under DOE’s proposed 90% TAD canister receipt plan, hundreds of DPCs and BFCs will be unloaded at reactor sites, resulting in LLRW and associated wastes. Unfortunately, those discarded materials and associated wastes will not disappear into thin air. DOE has failed to consider the limited (and potentially non-existent) disposal options

facing utilities, the transportation impacts that will result from having to transport the LLRW over as much as 2,600 miles, and the costs associated with transportation and disposal.

DOE also claims that NEI raised no genuine dispute because the issues it raises are outside the scope of the proceeding. DOE Answer at 114. To the contrary, as discussed *supra*, the issues NEI raises in this contention are within the scope of this proceeding.

In addition, DOE argues that NEI fails to raise a genuine dispute on a material issue because the FSEIS addresses the environmental impacts that would result from DOE's receipt at the repository of up to 90% of SNF in TADs. DOE Answer at 114-15 (citing sections of the FSEIS). DOE is mistaken. The pages cited by DOE do concern impacts related to DOE's proposed plan to receive at least 90% of commercial SNF at the repository, but none of those pages address the concerns raised here by NEI. *See* FSEIS at 4-64 to 4-66 (radiological impacts at the repository during operations, monitoring, closure and for the entire project period); 4-71 (radiological accidents and the receipt of SNF canisters at the repository); 4-73 to 4-74 (radiological consequences of repository operations under accident scenarios for unfavorable (95th- percentile) sector-specific meteorological conditions); 4-75 (radiological consequences of repository operations under accident scenarios for annual average (50th- percentile) sector-specific meteorological conditions); 4-90 (management of repository-generated waste and hazardous materials; 4-97 & 4-100 (impacts from manufacturing repository components, including TAD canisters); 6-8 (estimates on number shipments based on 90% TAD canister proposal); 6-10 to 6-14 (impacts from loading activities at generator sites, including transporting TAD canisters to generator sites, radiological impacts to the public, radiological impacts to workers, industrial safety impacts, and loading accidents); 6-59 (transportation impacts from repository activities); and 8-37 to 8-39 (cumulative radiological impacts of storage and loading at

generator sites). *Nowhere* does DOE address the environmental impacts that will inevitably result from unloading commercial SNF from DPCs and BFCs at reactor sites, namely the LLRW stream of discarded DPCs and BFCs, and the environmental impacts associated with transporting the discarded DPCs and BFCs. These are necessary and significant impacts of the DOE proposal. If not examined in the FSEIS and in this proceeding, they will not be examined anywhere. NEPA does not allow such impacts to be ignored. *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 553 (1978) (“NEPA places upon an agency the obligation to consider *every significant aspect* of the environmental impact of a proposed action.” (emphasis added)).

Lastly, DOE claims that NEI has failed to raise a material dispute because DOE’s proposal that 90% of commercial SNF would be shipped in TADs “should not be second guessed or challenged by potential intervenors” as well as the Commission. DOE Answer at 115-16. DOE has it wrong. Aside from the fact that this contention concerns the omission of obvious environmental impacts from DOE’s chosen plan and is not intended to “second guess” that plan, the Commission is well within its authority to subject any issuance of the construction authorization “with any appropriate conditions to protect environmental values” “after weighing the environmental, economic, technical, and other benefits against environmental costs, and consideration alternatives.” 10 C.F.R. § 63.31(c). Accordingly, NEI has raised a genuine dispute on a material issue of law or fact.

H. NEI-NEPA-02

Overestimate of Number of Truck Shipments

Contention:

The Yucca Mountain Final Supplemental Environmental Impact Statement (“FSEIS”) overestimates the radiological exposures that reactor and Yucca Mountain site workers will receive because it overestimates the number of spent nuclear fuel (“SNF”) shipments to Yucca Mountain that will occur by truck.

DOE opposes admission of this contention at the threshold because it claims that NEI failed to comply with the requirements of 10 C.F.R. § 51.109 and 10 C.F.R. § 2.326. The NRC Staff claims that this contention should be rejected for failing to comply with 10 C.F.R. § 2.326. The threshold concerns raised by DOE and the NRC Staff are contrary to a rational reading of the Commission’s regulations and to assurances provided by both DOE and the NRC Staff to the D.C. Circuit regarding the ability of intervenors to raise substantive NEPA claims in this proceeding. Consequently, their objections have no merit.

The Commission’s notice of hearing for this proceeding provides that “environmental contentions addressing any DOE environmental impact statement or supplement must also conform to the requirements and address the applicable factors outlined in 10 C.F.R. 51.109 governing NRC’s adoption of DOE’s environmental impact statements.” 73 Fed. Reg. at 63,031. Section 51.109 provides, among other things, that a petitioner who contends that it is not practicable to adopt the DOE final environmental impact statement (“FEIS”) and, in this case, the final supplemental EIS (“FSEIS”) shall file a contention “to that effect” along with an affidavit “which sets forth factual and/or technical bases for the claim that . . . it is not practicable to adopt the DOE [FEIS or FSEIS].” 10 C.F.R. § 51.109(a)(2). The statutory directive that NRC adopt the DOE FEIS “to the extent practicable,” 42 U.S.C. § 10134(f)(4), is intended to avoid duplication of DOE’s environmental review process and means that the NRC

will not adopt the FEIS or FSEIS “unless it meets the standards for an adequate statement under the NEPA and the Council For Environmental Quality’s NEPA regulations.” *Nuclear Energy Institute v. EPA*, 373 F.3d 1251, 1313-14 (D.C. Cir. 2004). A basis for contending that it is not practicable to adopt the EIS or FSEIS may be based on “[s]ignificant and substantial new information or new considerations [that] render such [EIS] inadequate.” 10 C.F.R. § 51.109(c)(2).

Contention NEI-NEPA-02 meets the standards required by the Commission (and the D.C. Circuit). The issue raised in this contention is that DOE’s FSEIS unreasonably overestimates the radiological exposures that reactor site and repository site workers will receive because it unreasonably overestimates the number of commercial spent nuclear fuel shipments that will occur by truck. NEI Petition at 44. This is because a more realistic and reasonable estimate of shipping would result in greater reliance on rail shipping, a lower number of truck shipments, and therefore a lower overall number of shipments. *Id.* The contention clearly states that the failure to appropriately consider these impacts amounted to “new considerations that render the [FSEIS] inadequate.” *Id.* The technical and factual bases supporting this contention were set forth in the affidavit of Brian Gutherman. NEI Petition Attachment 15.

DOE objects to this contention on multiple grounds, all of which are without basis. First, DOE claims that the affidavit accompanying the contention does not “address any of the requirements of §§ 51.109(a)(2) or 2.326(a) much less separately address each of the § 2.326 criteria.” DOE Answer at 118. DOE’s claim misreads the Commission’s regulations. First, section 51.109(a)(2) requires only that a contention be filed at the time called for in the Commission’s hearing notice, and that the accompanying affidavit set forth factual and/or technical bases for the claim that it is not practicable to adopt the DOE FSEIS. Intervention

petitions in this proceeding were due on December 22, 2008, and NEI filed its petition on December 19, 2008. DOE makes no claim that this contention was filed untimely.

Further, the Affidavit (NEI Petition Attachment 15) far surpasses the requirement that it set forth the factual and technical bases for the claim that adoption of the FSEIS is impracticable, in this case that there are “[s]ignificant and substantial new information or new considerations [that] render such [EIS] inadequate.” 10 C.F.R. § 51.109(c)(2). The Affidavit is quite clear that (1) FSEIS Table G-10 overestimated the number of truck shipments of commercial SNF that would occur, NEI Petition Attachment 15 at ¶18; (2) that, when considering the amount of commercial SNF that would actually be shipped by rail rather than by truck, 1,481 fewer packages would need to be prepared for shipment and received at the repository, *id.* at ¶24; and (3) therefore, the FSEIS overestimates dose to workers at reactor sites by approximately 445 person-rem, and likely by a similar amount to repository workers, *id.* at ¶¶ 25-28. DOE’s claim that the required factual and technical basis was not provided, DOE Answer at 118, is simply wrong.

With respect to DOE’s claim that the contention fails to address the section 2.326(a) criteria, the contention addressed each of the criteria and demonstrated that the issue was timely raised, concerned a significant environmental issue, and declared that the FSEIS would have been altered had it considered the significant environmental issues raised therein. NEI Petition at 44. *See also* DOE Answer at 118 (acknowledging that NEI addressed the criteria).

DOE, however, believes that the contention is flawed because the *affidavit* itself does not address the section 2.326 requirements. DOE’s ritually formalistic interpretation of the Commission’s regulations is incorrect. There is no such requirement that the *affidavit* address

the requirements. Just as with section 51.109(a)(2), section 2.326(b) requires that the affidavit “set forth the factual and/or technical bases for the movant’s claim that the criteria of paragraph (a) of this section have been satisfied.” The affidavit provided the factual and technical bases, and the contention addressed the 2.326(a) factors. NEI Petition at 44. Nothing more is required. Section 2.326(b) does not state that the movant’s compliance with the paragraph (a) criteria must be addressed in the affidavit. Instead, section 2.326(b) states in relevant part “[e]ach of the [2.326(a)] criteria must be separately addressed, with a specific explanation of why it has been met.” This sentence does not require that the explanation be placed in the affidavit. Had the Commission intended such a requirement, it could easily have so stated (for example, by providing that “each of the criteria must be separately addressed *in the affidavit*”).

DOE also claims the affidavit failed to specifically state whether a materially different outcome would result. DOE Answer at 112. There is no such requirement in the Commission’s regulations. In any event, the contention document states that, had DOE “correctly estimated these [truck] shipments, its EIS would have been altered.” NEI Petition at 44. It is not apparent why any more need be said. Indeed, under DOE’s constrained reading of the regulation, the contention must be tossed out if the affidavit fails to contain an explicit statement that the contention and affidavit are timely filed. *See* 10 C.F.R. § 2.326(a)(1). The Board should reject such a stilted interpretation of the regulation. Both DOE and NRC committed the D.C. Circuit that substantive claims against the FEIS and FSEIS could be raised in the NRC proceedings. *Nuclear Energy Institute v. EPA*, 373 F.3d at 1314. The Board should ensure that this commitment is carried out.

DOE also complains that NEI has failed to raise a significant environmental issue. Similarly, the NRC Staff objects to this contention because NEI does not present any evidence

that the FSEIS's overstatement by 445 person-rem of radiological dose is significant. These objections are without merit. The DOE FSEIS estimates that 2,319 truck shipments of SNF will occur that NEI contends will not. NEI Petition Attachment 15 at ¶24. Instead, approximately 838 rail cask-size TAD canisters will be used. *Id.* And this is not a distinction without a difference. As a consequence of DOE's overestimation of SNF truck shipments, DOE also overestimates the radiological dose that will be incurred by workers at reactor sites and the repository. *Id.* at ¶¶25-27. NEI believes this substantial exaggeration of environmental impact is a significant environmental consideration that needs to be addressed. Indeed, the NRC Staff's objection incorrectly minimizes the excess radiological dose. The Affidavit is quite clear that the FSEIS overestimates dose to workers *at reactor sites* by approximately 445 person-rem, *and likely by a similar amount to repository workers.* *Id.* at ¶¶ 25-28. Thus, the actual radiological overestimate approaches 900 person-rem. Second, NEI believes that this substantial exaggeration of environmental impact is a significant environmental consideration that needs to be addressed. The FSEIS estimates radiological dose to repository workers during repository operations at 4,400 person-rem. FSEIS Section 4.1.7.2.6 at Table 4-23 at page 4-66. Therefore, under this contention, DOE has overstated the dose to repository site workers by at least 10%.³⁴

Such an overestimate does not comply with NEPA's governing "rule of reason." From its earliest days, the obligations of agencies under NEPA have been governed by a "rule of reason." *Scientists Inst. for Pub. Info., Inc. v. AEC*, 481 F.2d 1079, 1092 (D.C. Cir. 1973). As the Supreme Court has held with respect to consideration of alternatives under NEPA,

³⁴ It is not apparent that DOE has estimated doses to reactor site workers. But, assuming that activities at reactor sites will be more limited, and therefore result in less overall dose than activities at the repository during the 50-year repository operations period, the 445 person-rem overestimate to reactor site workers will likely be a much larger portion of the estimated overall dose to reactor site workers.

environmental effects need not be discussed in EIS's for alternatives with are "remote and speculative." *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 551 (1978). Similarly, environmental impacts which are remote and speculative need not be considered. *See e.g., Public Service Electric & Gas Co. (Salem Nuclear Generating Station Unit 1) ALAB-650*, 14 N.R.C. 43 (1981). NEPA's goal is "[insuring] a fully informed and well considered decision." *Metropolitan Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 776 (1983), quoting *Vermont Yankee*, 435 U.S. at 558.

Issuing an environmental impact statement that knowingly and significantly overstates the environmental impacts of the proposed federal action violates the rule of reason underlying NEPA. Similarly, by portraying as the impacts of a federal action a significant overstatement of those impacts, the FSEIS is claiming impacts which are remote and speculative because they are not accurately described. Further, DOE's approach – having the Board exclude a contention as to the accuracy and adequacy of the information contained in the FEIS and FSEIS – would be contrary to the regulations of the Council on Environmental Quality. For example,

- Governmental "information must be of high quality." 40 C.F.R. § 1500.1(b). An EIS containing information that is incorrect fails this test.
- "The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences" 40 C.F.R. § 1500.1(c). An EIS that is based on a misunderstanding of environmental consequences violates the NEPA process.

- An EIS “shall provide a full and fair discussion of significant environmental impacts.” 40 C.F.R. § 1502.1. An EIS that substantially overstates environmental impacts may be “full” but cannot be categorized as “fair.”

Accordingly, the issues raised in this contention are significant environmental issues that must be addressed.

DOE also criticizes the qualifications of NEI expert Brian Gutherman, claiming that he is not a health physicist, and has failed to document his assertions that rail shipments, rather than truck shipments, will be used to transport commercial SNF from cited reactor sites. DOE Answer at 119. DOE’s criticisms of Mr. Gutherman’s qualifications are baseless. Arguments about the validity of an expert’s opinion are for the merits stage of the proceeding and “cannot be assessed here at the contention admissibility stage.” *Entergy Nuclear Vermont Yankee, L.L.C., and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), LBP-04-28, 60 N.R.C. 548, 563 (2004). Furthermore, Mr. Gutherman does not purport to be a health physicist (*i.e.*, an expert in the biological impacts of radiological dose), nor does Mr. Gutherman need to be a health physicist to provide the expert opinions he has provided here. As Mr. Gutherman’s affidavit makes clear, Mr. Gutherman is very knowledgeable, to say the least, in issues involving the storage and transportation of commercial SNF. NEI Petition at Attachment 15 ¶¶ 4-8; NEI Petition at Attachment 17 (Mr. Gutherman’s statement of professional qualifications). Mr. Gutherman (a Mechanical engineer) mathematically calculated the radiological dose that would result had DOE adopted a more realistic number of rail shipments. SNF NEI Petition Attachment 15 at ¶¶ 25-28. The dose values he used in his calculation were taken from Table G-2 of the FSEIS. *Id.* at ¶ 25. Aside from his not being a

health physicist (a qualification not needed to provide the expert opinions herein), DOE offers no basis to challenge Mr. Gutherman's qualifications. Thus, this claim must fail.

Also baseless is DOE's assertion that Mr. Gutherman failed to document his statement that it is public knowledge that six of the seven reactor sites will use rail shipments rather than truck shipments. First, NEI is not required "to provide . . . its . . . evidence or prove the merits of its contention at the admissibility stage." *Entergy Nuclear Generation Company* (Pilgrim Nuclear Power Station), LBP-06-23, 64 N.R.C. 257, 356 (2006), citing *Louisiana Energy Services, L.P.* (National Enrichment Facility), CLI-04-35, 60 N.R.C. 619, 623 (2004) and *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-04-22, 60 N.R.C. 125, 139 (2004). *See also Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 335 (1999) (the contention pleading rule is not a "fortress" to deny intervention). The expert opinion of Mr. Gutherman is more than a sufficient basis to establish that it is public knowledge that those six sites will ship SNF by rail. Second, Mr. Gutherman's otherwise unchallenged qualifications as an executive with a spent fuel management consulting business are more than sufficient to render an expert opinion on the utilities' intended spent nuclear fuel transportation plans. He is well aware of U.S. utilities' plans for their SNF inventories. He has extensive experience in ISFSI implementation, spent fuel management, spent fuel storage, and transportation cask licensing, including serving as a licensing manager with one of the largest vendors of spent fuel transportation and storage casks and as a consultant tracking the storage of spent nuclear fuel in the United States. NEI Petition Attachment 15 at ¶¶ 4-8. Mr. Gutherman is more than qualified to provide an expert opinion on the intended SNF storage plans of U.S. utilities.

Lastly, although NEI does not believe that any additional documentary support is required, Mr. Gutherman has executed the affidavit (“Gutherman Affidavit”) set forth at Attachment 7 addressing DOE’s concern that NEI has not adequately documented the fact that six of the seven sites will use rail shipments rather than truck shipments. The Affidavit provides that three of the cited plants are planning to use the NUHOMS SNF storage canisters, which are rail-sized canisters which, when packaged for transportation, will weigh on the order of 125 tons, making rail the intended means of shipping. Gutherman Affidavit at ¶¶ 1, 3. Representatives from the remaining three plants have directly communicated to Mr. Gutherman that they intend to use rail-sized SNF storage canisters. *Id.* at ¶ 4. Lastly, based on Mr. Gutherman’s knowledge and industry expertise, he is aware that all six plants have installed a high capacity cask cranes, or will make their current cranes high capacity capable; such capacity is required only to load and move rail-sized SNF canisters. *Id.* at ¶ 5.

Contention [10 C.F.R. § 2.309(f)(1)(i)]: No reply necessary.

Basis [10 C.F.R. § 2.309(f)(ii)]: No reply necessary.

Scope of Proceeding [10 C.F.R. § 2.309(f)(iii)]: The NRC Staff does not object to this contention on this basis. NRC Staff Answer at 1325. DOE claims that this contention is outside the scope of the proceeding because it impermissibly challenges DOE’s transportation decisions, for which NRC (according to DOE) has no direct NEPA responsibilities. DOE Answer at 119-20. Thus, according to DOE, any challenges are proper only in the U.S. Court of Appeals reviewing DOE’s transportation decisions. *Id.* at 120-21. DOE’s objections are without merit.

The issue here is not whether DOE can proceed with transporting SNF by truck or by rail or otherwise, nor does it concern DOE’s transportation alternatives. Rather, the issue is whether DOE has incorrectly estimated the radiological exposures that will occur to reactor site

and repository site workers by failing to realistically assess the number of plants that will ship SNF by rail and truck. This contention raises “new considerations” that render DOE’s FEIS and FSEIS inadequate as called for by 10 C.F.R. § 51.109(c)(2).

Moreover, DOE’s position is at odds with the D.C. Circuit’s decision in *Nuclear Energy Institute v. EPA*. There, the Court, based on assurances from both NRC and DOE counsel, held that substantive challenges to the FEIS or FSEIS would be permitted “in *any* NRC proceeding to decide whether to adopt the FEIS [and FSEIS] *and* in any DOE proceeding to select a transportation alternative.” *Nuclear Energy Institute v. EPA*, 373 F.3d at 1313 (emphases added). The Court also agreed with the NRC “that it would not be ‘practicable’ to adopt the FEIS [and FSEIS] unless it meets the standards for an ‘adequate statement’ under the NEPA and the [CEQ] regulations.” *Id.* at 1314. The Court noted that adoption of the FEIS and FSEIS will be deemed practicable unless, *inter alia*, “[s]ignificant and substantial new information or new considerations render such environmental impact statement inadequate.” *Id.* (quoting 10 C.F.R. § 51.109(c)). The Court ruled that “any substantive defects in the FEIS [or FSEIS] clearly would be relevant to the ‘practicability’ of adopting the FEIS [or FSEIS].” *Id.* Here, NEI contends that DOE’s overestimation of the number of truck shipments is a “substantive defect” in the FSEIS and, therefore, the contention falls properly within the scope of this proceeding.

Materiality [10 C.F.R. § 2.309(f)(iv)]: DOE challenges the materiality of the issues raised in this contention to the extent that DOE claims the issues are outside the scope of this proceeding and because the contention fails to demonstrate a material violation of NEPA. DOE Answer at 119,121. As discussed in the previous section, this contention falls within the scope of this proceeding. As discussed, *infra*, in response to DOE’s genuine dispute claims, NEI has

made a genuine dispute of material issue of law and fact. Accordingly, this contention is material to the findings that NRC must make.

The NRC Staff claims that NEI has failed to raise a material issue because it has not demonstrated that supplementing the EIS to decrease the stated worker dose would significantly impact the overall extent of impacts considered in the repository. NRC Staff Answer at 1328. The NRC Staff's objection is without merit. The authority contained in 10 C.F.R. § 51.109(c)(2) provides that the presiding officer will find that it is practicable to adopt the FEIS and FSEIS unless "[s]ignificant and substantial new information or new considerations render such environmental impact statement inadequate." NEI contends that the issues it raises in this contention are significant new considerations rendering the FEIS and FSEIS inadequate – at least a 10% overstatement of radiological dose to repository workers and a likely larger overstatement of dose to reactor site workers. Changes that cause effects that are significantly different from those already studied require supplemental environmental impact statements. *Hydro Resources Inc.*, CLI-01-04, 53 N.R.C. 31, 52 (2001). Under NRC practice and case law, to the extent that any environmental findings by the Presiding Officer or Commission that differ from those in the environmental impact statements, the environmental impact statements are modified by the decision. *Id.*

Contrary to the NRC Staff's position, NEPA's "rule of reason" and the CEQ regulations both demand that the significant environmental issues raised in this contention are addressed. NEI has pointed to inaccurate information contained in the FSEIS. Failure to consider this new information will result in a significant overstatement of environmental impacts, which would run counter to the "full and fair" depiction of environmental impacts demanded by CEQ regulations. 40 C.F.R. § 1502.1. It would also result in the unwarranted

consideration of remote and speculative impacts because, as NEI contends, those impacts will not occur. The only way to redress the flawed FSEIS is to amend the information contained therein to correct the flaw. Thus, NEI has raised a material issue.

Facts, Opinions, and References [10 C.F.R. § 2.309(f)(v)]: The NRC Staff does not object to the contention on this basis. NRC Staff Answer at 1328. DOE challenges the adequacy of the alleged facts and expert opinion relied on in this contention to the extent that DOE claims that NEI failed to comply with “the requirements of 10 C.F.R. §§ 51.109 and 2.326, and as addressed in Section IV.A.3 regarding the legal standards under 10 C.F.R. § 2.309(f)(1)(v).” As demonstrated above, NEI complied with the requirements of 10 C.F.R. §§ 51.109 and 2.326, has provided the necessary factual information and expert opinion to support the contention.³⁵

Genuine Dispute [10 C.F.R. § 2.309(f)(1)(vi)]: The NRC Staff does not object to the contention on this basis. NRC Staff Answer at 1328. DOE claims that NEI raised no genuine dispute because the issues it raises are outside the scope of the proceeding. DOE Answer at 121. To the contrary, as discussed *supra*, the issues NEI raises in this contention are within the scope of this proceeding.

DOE also claims that NEI fails to raise a genuine dispute on a material issue because it is not a cognizable complaint under NEPA to argue that an agency has overstated an environmental impact. DOE Answer at 121. DOE cites no case law for this proposition. Moreover, under DOE’s rationale, it could overstate environmental impacts (or, conversely, understate benefits) no matter how outlandish those estimations are. However, NEPA is

³⁵ To the extent DOE intended to allege as a separate ground that, “as addressed in Section IV.A.3 regarding the legal standards under 10 C.F.R. § 2.309(f)(1)(v), NEI has failed to provide the requisite supporting facts, expert opinion, and references,” DOE Answer at 114, DOE fails to explain how NEI fails to meet the contention admissibility requirement. Accordingly, no further reply is warranted.

governed by a “rule of reason,” *see* discussion *supra*, that does not permit DOE to issue an environmental impact statement that knowingly and significantly overstates the environmental impacts of the proposed federal action. Moreover, DOE is not allowed to act arbitrarily or capriciously in executing its NEPA responsibilities. *See Klamath Siskiyou Wildlands Ctr. v. Boody*, 468 F.3d 549, 554 (9th Cir. 2006) (agency decisions that allegedly violate NEPA may be set aside if they are “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law” (quoting 5 U.S.C. § 706(2)(A) (2005)).” Therefore, DOE cannot insist on relying on estimates of truck shipments that NEI contends (and will demonstrate at hearing) are obviously wrong.

DOE’s also claims that all it has done here is estimate the reasonably foreseeable upper bound of an action’s impacts. DOE Answer at 121. But this does not support rejection of the contention. Rather, these claims go to the merits of the contention, which are not at issue of this stage of the proceeding. In other words, the question here is whether or not DOE’s estimates are too conservative, which is a question left for the merits. NEI contends that the estimate of the number of SNF truck shipments provided in FSEIS Table G-10 is wrong, and NEI seeks to correct that estimate. NEI is not required to prove its contention at the pleading stage. *Private Fuel Storage*, CLI-04-22, 60 N.R.C. at 139. *Washington Public Power Supply System*, ALAB-722, 17 N.R.C. at 551 n.5 (holding that, whether or not the contention is true is left to litigation on the merits).³⁶

³⁶ DOE again claims that NEI failed to provide any documentary support for its statements that the utilities identified in its contention will ship SNF by truck. DOE Answer at 122. As discussed *supra*, NEI disputes that any such documentation is required above and beyond the expert opinion provided by Mr. Gutherman. Nonetheless, that documentation is set forth at Attachment 7 to this Reply.

The situation here is analogous to situations where an environmental impact statement ought to be supplemented. 10 C.F.R. § 51.109(c)(2) provides that the presiding officer will find that it is practicable to adopt the FEIS and FSEIS unless “[s]ignificant and substantial new information or new considerations render such environmental impact statement inadequate.” Similarly, NEPA’s implementing regulations require that a supplement be prepared if “[t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.” *Animal Defense Council v. Hodel*, 840 F.2d 1432, 1438 (9th Cir. 1988) (citing 40 C.F.R. § 1502.9(c)(1)). Changes that cause effects that are significantly different from those already studied require supplemental environmental impact statements. *Hydro Resources Inc.*, CLI-01-04, 53 N.R.C. at 52.³⁷ As previously discussed, NEPA’s “rule of reason” and the CEQ regulations both demand that the significant environmental issues raised in this contention are addressed.

³⁷ Under NRC practice and case law, to the extent that any environmental findings by the Presiding Officer or Commission that differ from those in the EIS, the EIS is modified by the decision. *Id.*

I. NEI-NEPA-03
Over-Conservatism in Sabotage Analysis

Contention

The Final Supplemental Environmental Impact Statement (SEIS) for the Yucca Mountain repository, in Section 4.1.8.4, discusses environmental consequences of hypothetical terrorist attacks at the repository site. (The sabotage analysis for a “representative scenario” is also presented in Appendix E of the SEIS.) The SEIS, in Section 6.3.4, also discusses transportation sabotage events and consequences. These discussions of the consequences of highly unlikely and speculative scenarios are unreasonable and unnecessary. Moreover, the analyses are based on unrealistic, overly conservative assumptions that result in hypothetical impacts that are significantly over-estimated.

DOE opposes admission of this proposed contention, at the threshold, because NEI did not support the contention with an affidavit. DOE argues that 10 C.F.R. § 2.326(b) applies to environmental contentions and demands an affidavit. DOE Answer at 126. NRC Staff makes a similar procedural argument. NRC Staff Answer at 1331. NEI instead supported the contention by references to its public comment letters previously filed in connection with DOE’s analyses of sabotage or terrorist events. NEI’s contention, along with the references, established NEI’s rationale for its position that the NEPA analyses are too conservative. Moreover, NEI maintained that the discussion of terrorism scenarios is not necessary as a matter of law.

NEI acknowledges that 10 C.F.R. § 51.109(a)(1) specifies a procedure for the NRC to present its position on whether it is practicable to adopt, without further supplement, the environmental impact analyses prepared by DOE. Further, 10 C.F.R. § 51.109(a)(2) states that a party “who contends that it is not practical to adopt the DOE environmental impact statement, as it may have been supplemented, shall file a contention” to that effect, and such contention “must be accompanied by one or more affidavits which set forth factual and technical bases for the claim that . . . it is not practicable to adopt the DOE environmental impact statement.”

However, NEI’s contention first preserves a purely legal argument on the need for a terrorism analysis under NEPA in the context of the high level repository. This is an issue that

neither the Commission nor the Court of Appeals has ever addressed. No affidavit is required for a legal matter. Moreover, to the extent an affidavit is required to support NEI's previously documented position on the merits, attached is an affidavit summarizing the points previously stated in the contention, which summarized the referenced NEI letters. McCullum Affidavit, NEI-NEPA-03, Attachment 8.

Issuing an environmental impact statement that knowingly and significantly overstates the environmental impacts of the proposed federal action violates the "rule of reason" underlying NEPA. Similarly, by portraying as the impacts of a federal action a significant overstatement of those impacts, the FSEIS is claiming impacts which are remote and speculative since they are not accurately described. Further, DOE's approach — having the Board exclude a contention as to the accuracy and adequacy of the information contained in the FSEIS — would be contrary to the regulations of the Council on Environmental Quality. For example,

- Governmental "information must be of high quality." 40 C.F.R. § 1500.1(b). An EIS containing information that is incorrect fails this test.
- The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences 40 C.F.R. § 1500.1(c). AN EIS that is based on a misunderstanding of environmental consequences violates the NEPA process.
- An EIS "shall provide a full and fair discussion of significant environmental impacts." 40 C.F.R. § 1502.1. An EIS that substantially overstates environmental impacts may be "full" but cannot be categorized as "fair".

Accordingly, the issues raised in this contention are significant environmental issues that must be addressed.

Similarly, NEPA's implementing regulations require that a supplement be prepared if "[t]here are significant new circumstances or information relevant to environmental

concerns and bearing on the proposed action or its impacts.” *Animal Defense Council v. Hodel*, 840 F.2d 1432, 1438 (9th Cir. 1988) (citing 40 C.F.R. § 1502.9(c)(1)). Changes that cause effects that are significantly different from those already studied require supplemental environmental impact statements. *Hydro Resources Inc.*, CLI-01-04, 53 N.R.C. 31, 52 (2001).³⁸ NEI’s contention discusses precisely such considerations.

In addition, this proposed contention preserves NEI’s right to participate on any contention of another party related to sabotage or terrorism issues under NEPA, and to pursue its position that there is conservatism in the DOE analyses of consequences, to offset any contrary claims of other parties. Nevada, for example, has submitted several contentions addressing transportation sabotage scenarios (*e.g.*, NEV-NEPA-01, 02, 08, 11) and others related to the repository facilities (*e.g.*, NEV-NEPA-23). Without conceding the admissibility of these contentions, these are matters that NEI would address if admitted for hearing, based on the information presented in NEI-NEPA-03..

Contention [10 C.F.R. § 2.309(f)(1)(i)]: No reply warranted.

Basis [10 C.F.R. § 2.309(f)(1)(ii)]: No reply warranted.

Scope of Proceeding [10 C.F.R. § 2.309(f)(1)(iii)]: DOE’s primary objection to NEI’s proposed contention based on this criterion is that transportation decisions, and environmental impact statements on which those decisions are based, are beyond the scope of this proceeding. DOE Answer at 127-128. NEI’s proposed contention, it should be noted, was not limited to DOE’s analysis of sabotage or terrorism events during transportation. NEI also addressed the potential for such events at the repository site. *See* NEI Petition, at 52-54.

³⁸ Under NRC practice and case law, to the extent that any environmental findings by the Presiding Officer or Commission that differ from those in the EIS, the EIS is modified by the decision. *Id.*

With respect to terrorism/sabotage related to the repository and to transportation matters, as discussed above a contention that it is not practicable to adopt an EIS or FSEIS in its entirety may be based on “[s]ignificant and substantial new information or new considerations [that] render such [EIS or FSEIS] inadequate.” 10 C.F.R. § 51.109(c)(2). NEI’s contention and supporting references set forth the basis for NEI’s position that DOE’s environmental analyses were not based on all available information. As discussed above, the decision of the Court of Appeals for the DC Circuit in *Nuclear Energy Inst. Inc. v. EPA*, reflects that challenges to the EIS or FSEIS would be relevant “in any NRC proceeding to decide whether to adopt the FEIS [and FSEIS] and in any DOE proceeding to select a transportation alternative.” 373 F.3d 1251, 1313 (D.C. Cir. 2004). Thus, NEI’s views are relevant to the adoption issue. NEI’s views are also relevant to a full understanding of the environmental consequences of the proposed action, and to a full and fair discussion of those consequences as required under CEQ regulations.

Moreover, to the extent these issues are raised by other parties and admitted for hearing, NEI presents a differing and well-informed perspective. NEI seeks to participate to demonstrate the conservatism in the analysis. (NEI’s members in fact are responsible for protecting their facilities on a day-to-day basis, and have direct, relevant experience on these issues.) NEI’s expert views should be incorporated into the overall NEPA balancing of the costs and benefits of the project.

Materiality [10 C.F.R. § 2.309(f)(1)(iv)]: DOE’s points with respect to materiality are addressed above.

Facts, Opinions, and References [10 C.F.R. § 2.309(f)(1)(v)]: DOE’s points with respect to 10 C.F.R. §§ 51.109 and 2.326 are addressed above. However, to the extent that DOE further argues that NEI has failed to meet 10 C.F.R. § 2.309(f)(1), DOE overstates this

requirement. NEI satisfied this criterion by summarizing its opinions and factual arguments, referencing public documents that express NEI's viewpoint, and identified individuals who signed those documents. There is no requirement in 10 C.F.R. § 2.309(f)(1)(v) for an affidavit. The Commission has observed that contentions "supported by reasonably specific factual and *legal allegations*" will be admitted. *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 335 (1999) (emphasis added). The rules also require only some "minimal" factual or legal basis. *See Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 359 (2001). This NEI has provided.

Genuine Dispute [10 C.F.R. § 2.309(f)(1)(vi)]: As discussed above, NEI has no desire to engage in a "battle of the experts" or to "second guess" DOE's conclusions on this issue in isolation. DOE Answer at 130, 130. NEI simply contends that there should be more accurate disclosure on this issue and a more complete record of decision at the NRC. Moreover, NEI would demonstrate that DOE's conclusions are in fact conservative (and therefore bounding) — and that any claims to the contrary should be rejected.

Similarly, NRC Staff argues that NEI has not shown that there would be a "materially different result" and that NEI-NEPA-03 "does not meet the heightened admissibility standards of 10 C.F.R. §§ 2.326(a) and 51.109(a)(2)." NRC Staff Answer at 1322-1323. However, NEI maintains that conservatisms in the DOE analysis do create an erroneous public disclosure on this issue. Moreover, NEI's position would — in any NRC proceeding to decide whether to adopt the DOE final environmental analyses — refute any claims that the DOE analysis is not bounding. These facts and opinions may not change the DOE analysis, but they are relevant to, and should be included in, any NRC record of decision — whether on adoption or in a new environmental analysis of the issue.

IV. CONCLUSION

For the reasons discussed in the NEI Petition, as supplemented and discussed above, NEI should be found to have standing and its specific proposed contentions should be admitted for hearing. NEI should be allowed to participate with respect to certain other admitted contentions, to be identified on an appropriate schedule.

Respectfully submitted,

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Dated in Washington, District of Columbia
this 24th day of February 2009

3. All of the aforementioned unions have a reasonable expectation that their members will be employed at the Yucca Mountain High Level Waste Repository, during both construction and operation.

4. As addressed in its contentions, NEI asserts that certain aspects of the repository design proposed by the Department of Energy (“DOE”) will negatively impact workers employed at the repository site. For example, implementation of the DOE design for the fuel aging facility would be likely to impact union members by increasing occupational doses to repository site workers.

5. NEI is also concerned about DOE’s intention to install drip shields as part of its system design. As addressed in contentions, NEI asserts that these drip shields are not required in order for the repository to comply with regulatory requirements, and their installation would likely result in significant and unnecessary radiation exposures to workers at the repository site.

6. NEI also maintains an office located at 2625 North Green Valley Parkway, Henderson, Nevada. The NEI office is approximately 90 miles from the Yucca Mountain repository site. NEI’s employee, Mr. Paul Seidler, is resident in and responsible for that office. Mr. Seidler has been employed by NEI in Nevada since October 2007, and also resides in Henderson. Mr. Seidler also spends significant time at the repository site, for tours, fact-finding, and other official duties.

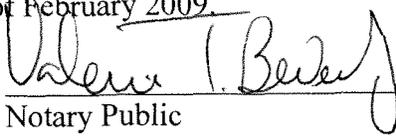


Rodney J. McCullum

District of Columbia)

ss:

Sworn and subscribed to before me this 24th day of February 2009.



Notary Public

My Commission expires: 5/14/2012

VALERIE T. BEVERLY
Notary Public District of Columbia
My Commission Expires 5/14/2012

evaluation of disposal of DPCs complies fully with the performance assessment and quality assurance requirements in Part 63”); *id* at 23 (there is no “statement or demonstration that EPRI’s performance assessment with the no drip shield option complies fully with the performance assessment and quality assurance requirements in Part 63”).

3. These and other statements by the State fail to recognize and understand the regulatory requirements for, and scientific validity of, utilizing TSPAs (such as the EPRI TSPA) as a fundamental activity in examining regulatory compliance within the Yucca Mountain licensing process. Therefore, we make this affidavit in support of the Nuclear Energy Institute’s (“NEI’s”) “Reply to the Answer of the State of Nevada to [NEI’s] Petition to Intervene” to rebut the State’s mischaracterizations and misunderstandings.

TSPA Overview

4. 10 C.F.R. § 63.2 defines “Performance Assessment” (“PA”) as an analysis that: “(1) Identifies the features, events, processes (except human intrusion), and sequences of events and processes (except human intrusion) that might affect the Yucca Mountain disposal system and their probabilities of occurring during 10,000 years after disposal; (2) Examines the effects of those features, events, processes, and sequences of events and processes upon the performance of the Yucca Mountain disposal system; and (3) Estimates the dose incurred by the reasonably maximally exposed individual, including the associated uncertainties, as a result of releases caused by all significant features, events, processes, and sequences of events and processes, weighted by their probability of occurrence.” Under 10 C.F.R. § 63.101(a)(2), demonstrating compliance with long-term performance objectives “will involve the *use of complex predictive models* that are supported by limited data from field and laboratory tests, site-specific

monitoring, and natural analog studies that may be supplemented with prevalent expert judgment” (emphasis added).

5. The phrase “total system” in TSPA addresses the requirement in 10 C.F.R. § 63.115, “Requirements for multiple barriers,” that the identification and description of the waste isolation properties of both engineered and natural barriers be “...based on and consistent with the technical basis for performance assessments used to demonstrate compliance with Part 63.113(b) and (c).” In addition, 10 C.F.R. § 63.101(a)(2) states that, “[t]he performance assessments and analyses should focus upon the full range of defensible and reasonable parameter distributions rather than only upon extreme physical situations and parameter values. Further, in reaching a determination of reasonable expectation, the Commission may supplement numerical analyses with qualitative judgments including, for example, consideration of the degree of diversity among the multiple barriers as a measure of the resiliency of the geologic repository.”

6. According to the U.S. National Academy of Sciences in their “Technical Bases for Yucca Mountain Standards” (National Research Council, 1995), at page 70, “The only way to evaluate the risks of adverse health effects and to compare them with the standard is to assess the estimated potential future behavior of the *entire repository system* (emphasis added) and its potential impact on humans. This procedure, involving modeling of processes and events that might lead to releases and exposures, is called performance assessment. It involves computer calculations using *quantitative models of physical, chemical, geologic, and biologic processes*, taking uncertainties into account” (emphasis added).

7. Based on these fundamental NRC regulatory standards, as well as the review by the National Academy of Sciences, regarding a TSPA for Yucca Mountain, Nevada’s critique of

EPRI's TSPA is a mischaracterization with respect to context, complexity and independence as set forth in 10 C.F.R. Part 63.

EPRI's TSPA

8. As noted in 10 C.F.R. §§ 63.101(a)(2) and 63.115, performance assessment must be based on a system of barriers that may provide resiliency with respect to waste isolation. Many extreme physical situations and extreme parameter ranges can be contemplated (i.e., “what if” scenarios), but unless and until such individual speculations are placed into the context of a multiple barrier repository system using reasonable expectation constraints (i.e., placed into a TSPA), it is impossible to determine if there is any unreasonable impact on risk (*see* 10 C.F.R. § 63.101(a)(2)). EPRI has developed an independent TSPA consistent with 10 C.F.R. Part 63, which has allowed EPRI to examine the risk-importance of a wide range of “what if?” features, events, and processes, and to place these topics into the context of overall regulatory compliance. The EPRI TSPA has supported the technical basis of multiple NEI contentions.

9. As identified in 10 C.F.R. §§ 63.2, 63.101 and 63.115 (and according to the National Academy of Sciences) a meaningful TSPA is anticipated to be a complex, computer-based analysis incorporating diverse physical, chemical, geologic and biologic process models, in order to allow a defensible evaluation of how the system of multiple barriers at Yucca Mountain may provide resiliency with respect to assuring long-term waste isolation. The State, however, objects that reliance on EPRI's published, independent TSPA makes contentions NEI-SAFETY-01 and NEI-SAFETY-06 “breathtaking in technical scope and complexity, and its proponents and opponents would be required to defend or oppose a total system performance assessment different from the one in the LA, engaging scores of experts and involving hundreds of scientific disciplines, and requiring vast litigation resources and time.” The State's

disparagement of “complexity” is attempting to turn a virtue into a vice; 10 C.F.R. § 63.114 compels comprehensiveness in the inclusion of relevant and significant features, events and processes in performance assessment.

10. The State incorrectly asserts that contentions NEI-SAFETY-01 and NEI-SAFETY-06 “...propose[] to jettison DOE’s TSPA entirely and replace it with an entirely different EPRI performance assessment” Nevada Answer at 12, 23. The State is guilty of the same argument it asserts against NEI. We have reviewed many of the contentions the State filed in this proceeding, and, for example, Nevada’s erosion contention, NEVADA-SAFETY-41, would be seeking to replace years of work on erosion with an unpublished paper that was not conducted according to a QA plan at all. In any event, Nevada’s assertion against the EPRI TSPA is simply wrong. The EPRI TSPA and associated analyses provide an independent consideration of “...alternative conceptual models of features and processes that are consistent with available data and current scientific understanding and evaluate the effects that alternative conceptual models have on the performance of the geologic repository” as required for post-closure performance assessments. 10 C.F.R. § 63.114(c). There is no intent to “replace” DOE’s TSPA or its associated analyses. Instead, EPRI’s independent TSPA is intended to aid in the identification and total system evaluation of credible “alternative conceptual models,” 10 C.F.R. § 63.114(c), as well as to focus on the requirement of “reasonable expectation” in long-term performance assessment. 10 C.F.R. § 63.304. The EPRI TSPA is not intended to replace the DOE TSPA, but rather to provide independent evaluation for comparison to the DOE TSPA, analogous to the repository evaluation that the NRC staff itself envisions conducting during the license review process. *See* NUREG-1804, Yucca Mountain Review Plan, Appendix A.1.1.1, Page A-4. Furthermore, the EPRI TSPA is not “entirely different” than the DOE TSPA because

it is based on and uses the same basic design information and site-specific information used by the DOE, as required in 10 C.F.R. § 63.114(a). The EPRI work substantiates NEI's safety claims in its contention and supplements rather than replaces the DOE TSPA.

11. Indeed, EPRI's TSPA has repeatedly been recognized as an independent, credible safety-assessment code that can be used to help inform Yucca Mountain licensing decisions. *See, e.g.*, Letter from Michael T. Ryan, Chairman, Advisory Committee on Nuclear Waste ("ACNW") to Nils J. Diaz, Chairman, NRC, Subject: Working Group on the Evaluation of Igneous Activity and Its Consequences for a Geologic Repository at Yucca Mountain, Nevada (Nov. 3, 2004), available at LSN Accession No. NEN000000374 (recommending EPRI analyses evaluating waste package/magma interactions to offer insights on how to improve NRC Staff modeling on this topic); Letter from Michael T. Ryan, Chairman, Advisory Committee on Nuclear Waste ("ACNW") to Nils J. Diaz, Chairman, NRC, Subject: Future Volcanism at Yucca Mountain – Comments on the Igneous Intrusion Scenario (June 8, 2006), available at LSN Accession No. NEN000000354 (recommending EPRI analyses a "viable alternative concerning the impact of intruding magma on the repository and waste containers" which "should be evaluated by the NRC Staff as an alternative to their current position"); Letter from Michael T. Ryan, Chairman, Advisory Committee on Nuclear Waste ("ACNW") to Dale E. Klein, Chairman, NRC, Subject: Postclosure Degradation of Emplacement Drifts and Its Impact on Engineered Barrier System Performance at the Proposed Yucca Mountain High-Level Radioactive Waste Repository (Feb. 26, 2008), available at NEN000000683 (commenting on the "notable advances . . . in the modeling of drift degradation as the result of spalling as evidenced in the recent modeling of DOE and EPRI"); Transcript of the 183rd ACNW Meeting (Oct. 17, 2007), available at LSN Accession No. NEN000000487, at pages 14, 21, and 55 (NRC Staff

Member Dr. Bret Leslie commenting that the NRC Staff's risk insights baseline report was based, in part, on EPRI analysis and results).

Response to Specific Nevada Assertions

12. The State asserts that NEI's contentions NEI-SAFETY-01 and NEI-SAFETY-06 "ma[de] no effort . . . to take DOE's TSPA and modify[] it" to consider direct disposal of SNF in DPCs or elimination of drip shields "likely because the complexity of DOE's TSPA made this impossible." Nevada Answer at 12, 23. Nevada is mistaken. Modification of DOE's TSPA would likely not be difficult, since the differences between DPC disposal and TAD canister disposal are not large. It is, however, not possible to directly use DOE's TSPA because the codes are not available for private parties to adapt. The version that has been made available to the public only allows changes to parameters, not underlying assumptions. As a result, the contentions are better supported by the independent analysis provided by EPRI's TSPA, rather than the limited public version made available by DOE.

13. The State asserts that NEI "proposes to jettison DOE's TSPA entirely and replace it with an entirely different EPRI performance assessment, and then use this entirely new performance assessment to calculate post-closure doses with DPCs" and "without drip shields" which makes the respective contentions "breathtaking in technical scope and complexity." Nevada Answer at 12-13, 23. To the contrary, the State misconstrues the intent of citing the EPRI TSPA. Since DOE has not completed a full analysis considering either direct disposal of DPCs or a repository without drip shields, we have cited the only existing TSPA analysis for the Yucca Mountain repository that considers these scenarios – the EPRI TSPA. EPRI's TSPA is an independent source of information that can be used to inform the licensing decision, in much the

same manner as the NRC's own TPA code. Independent analyses may credibly be used to support opinions and explore alternatives that differ from DOE's.

14. Nevada's fears of having more than one TSPA to consider are further undermined by the fact that the NRC has developed its own independent TSPA in preparing to receive and review the LA. As described in Mr. Timothy McCartin's article, "Regulatory Perspective on Implementation of a Dose Standard for a One-Million Year Compliance Period," (which is available in Mater. Res. Soc. Symp. Proc. Vol. 985, Materials Research Society, Pittsburgh, PA): "In light of the requirements for the performance assessment for the period beyond 10,000 years, NRC is currently reviewing its performance assessment models and techniques to assure they are consistent with EPA's proposed requirements for the period after 10,000 years and appropriate to assist the review of a potential license application from the DOE." In addition, the NRC has documented that it will use TSPA codes during its review of the LA to develop risk-insights. *See* NUREG-1804, Yucca Mountain Review Plan, Appendix A, A1.1 Conduct of The Yucca Mountain Licensing Review, A1.1.1 Licensing Review Philosophy, page A-4 (the "Staff may do quick, bounding calculations and performance assessments, and confirmatory analyses using process-level models; however, in-depth, detailed analyses may be limited to a few applications. ..."]. The NRC's own TSPA code is called "TPA", and the current version is Version 5.1. Inclusion and use of alternative TSPAs in the licensing review process allows NRC (and other independent parties) to make a broader contemplation of alternative assumptions, conceptual models, and data uncertainties, consistent with requirements in 10 C.F.R. §§ 63.113 and 63.114.

15. The State argues that NEI failed to discuss "uncertainty, or quality assurance, and the most that [NEI's analysis] concludes is that only very minor differences exist between DPC disposal and TAD disposal 'for a variety of scenarios, assumptions, and sensitivity analyses.'"

Nevada Answer at 13; *see also* Nevada Answer at 23 (NEI failed to discuss “uncertainty, or quality assurance” in the no drip shield option). To the contrary, the uncertainties in the behavior of DPCs are similar to the uncertainties in the behavior of TADs. Similarly, the drip shield is only one barrier component of the disposal system, and uncertainty in its function has a relatively small contribution to the overall uncertainty in EPRI’s TSPA. As a result, significant changes in uncertainty in overall repository performance would not arise as an expected consequence of omitting the drip shields. Uncertainty is propagated through the EPRI TSPA in a similar manner to that used by DOE in propagating uncertainty in its TSPA. Part 63’s quality assurance (“QA”) requirements do not apply to analyses other than the license applicants. 10 C.F.R. § 63.141-44. EPRI’s analyses have been conducted to an appropriate level of QA, which is documented in a number of EPRI reports. *See* EPRI 2006; EPRI 2005 at page 1-4 and page 5-6 et seq.; EPRI 2003 at page 4-3 et seq.; EPRI 2002; EPRI 1996.

16. The State argues that, “notably absent from [NEI’s analyses] is any statement or demonstration that EPRI’s evaluation of disposal of DPCs [and EPRI’s performance assessment with the no drip shield option] compl[y] fully with the performance assessment and quality assurance requirements in Part 63.” Nevada Answer at 13, 23. To the contrary, the analyses presented in the contentions are not intended to supplant DOE’s TSPA. NEI-SAFETY-01 shows that direct disposal of DPCs is a viable option not permitted by the LA, and the failure to permit direct disposal of DPCs is inconsistent with ALARA principles. NEI-SAFETY-06 shows that the elimination of drip shields from the repository design is also a viable option not permitted by the LA, and that the installation of drip shields is inconsistent with ALARA principles. By showing alternative analyses that consider all the major potential issues, and by showing that those potential issues do not have a strong impact on system performance, the contentions

demonstrate that a full analysis by DOE is possible, and should have been done as a straightforward approach to avoid operational radiological doses associated with unloading SNF from DPCs and reloading SNF into TAD canisters, and the installation of drip shields, and to avoid the associated unnecessary resource use and costs that will result from DOE's proposals.

17. The State argues that "the EPRI evaluation only included 'some currently licensed DPCs' [and] [c]onsequently, there is not adequate support for the statement in the Petition . . . that '[t]he proposed repository would meet all performance requirements if DPCs were directly disposed of in the repository.'" Nevada Answer at 13. To the contrary, the EPRI analysis evaluated a DPC design believed to bound the behavior of most DPCs. Nevada fails to challenge this choice. This bounding analysis resulted in a robust conclusion that DPC disposal is possible. Even if only some currently licensed DPCs prove to be disposable, this practice would still result in a reduction in operational dose, resource use, and costs compared to the only TAD canister baseline. In any event, Nevada's ostensible test of evaluating all currently licensed DPCs is flawed since not even Nevada can predict that there will not be other licensed DPCs in the future.

Conclusion

18. Nevada's assertions with respect to the EPRI TSPA are baseless. EPRI has developed an independent, comprehensive, and credible TSPA to estimate potential future behavior of the entire repository system. Both the ACNW and the NRC have evaluated and relied on EPRI's work. The EPRI TSPA has been applied here to consider alternative assumptions, conceptual models, and data uncertainties, such as evaluating repository performance in the cases of direct disposal of DPCs and the no drip shield option. The EPRI TSPA conclusions provide solid support for NEI's contentions that DOE needs to consider both direct disposal of DPCs and the no drip shield option.

Matthew Kozak

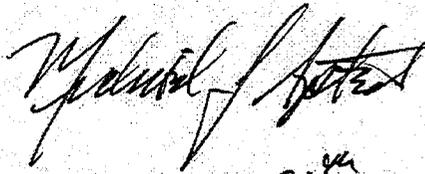
Dr. Matthew Kozak

Sworn and subscribed to before me this 20th day of Feb 2009.

Jennifer K. Chance
Notary Public
State of Colorado
My Comm. Expires 1/25/2010

Jennifer K. Chance
Notary Public
My Commission expires: 1/25/2010

Dr. Michael Apted



Sworn and subscribed to before me this 20th day of February 2009.

Jennifer K. Chance
Notary Public
State of Colorado
My Comm. Expires 1/26/2010

Jennifer K. Chance
Notary Public
My Commission expires: 1/26/2010

References

EPRI 2006. *Evaluation of a Spent Fuel Repository at Yucca Mountain, Nevada 2006 Progress Report*. EPRI Report 1013445, Electric Power Research Institute, Palo Alto, CA. LSN Accession No. NEN000000636.

EPRI 2005. *EPRI Yucca Mountain Total System Performance Assessment Code (IMARC) Version 8*. EPRI Report 1011813. Electric Power Research Institute, Palo Alto. LSN Accession No. NEN000000484.

EPRI 2003. *EPRI. Scientific and Technical Priorities at Yucca Mountain*. EPRI Report 1003335. Electric Power Research Institute, Palo Alto, May 2003. LSN Accession No. NEN000000005.

EPRI 2002. *Integrated Yucca Mountain Safety Case and Supporting Analysis: EPRI's Phase 7 Performance Assessment*, Report number 1003334, Electric Power Research Institute, Palo Alto, CA. LSN Accession No. NEN000000035.

EPRI 1996. *Yucca Mountain Total System Performance Assessment, Phase 3*, EPRI TR-107191, Electric Power Research Institute, Palo Alto, CA. LSN Accession No. NEN000000072.

storage at onsite Independent Spent Fuel Storage Installations (ISFSIs) and by performing third-party assessments of ISFSI operations.

3. As discussed in my prior affidavit, I have been engaged by NEI to evaluate certain aspects of the License Application (LA) and Safety Analysis Report (SAR) related to seismic design submitted to the Nuclear Regulatory Commission (NRC) by the Department of Energy (DOE) for the proposed high level nuclear waste repository at Yucca Mountain, Nevada. In particular, Section 1.2.7.1.3.2.1 of the LA Safety Analysis Report (SAR) states that the vertical aging overpack system of the aging facility “must withstand a seismic event characterized by horizontal and vertical peak ground accelerations of 96.52 ft/s^2 (3g) without tipover and without exceeding canister leakage rates.” I contend that the 3g design requirement could significantly increase the costs of the aging overpack system and, depending on the design ultimately adopted for that system, additional time is likely to be required for installation of the system (*e.g.*, installing structural restraints or other apparatus), thereby increasing occupational doses to workers.

4. DOE has stated in its response to the NEI Petition that there will be no requirement to install restraints or other apparatus on the aging pad or the aging overpack in order to meet the 3g design requirement. DOE cites the SAR and the TAD specifications that the aging overpacks are to be “freestanding” without “seismic restraints or other tie-downs.” However, in fact vendors will be designing the aging casks to the TAD specification and not the SAR. The reference in the TAD specification states only that the cask shall remain upright and freestanding during and after the design basis seismic event. There is no explicit reference there to a prohibition on restraints.

5. With respect to the SAR, which does assume no “restraints” or “tie-downs,” this does not mitigate the cost or dose impacts developed in my prior affidavit. Nor does it establish the technical legitimacy of the 3g assumption. It remains quite possible that there will need to be some sort of apparatus, whether a restraint, tie down, or other movement limiter. For example,

there could be a collar-type apparatus around the cask, but not touching it, to preclude tip-over. Any such apparatus — whether touching or not — would require additional installation time and additional exposures relative to more conventional storage canister.

6. Given no restrictions, designers could certainly increase the diameter of the aging cask until the height-to-diameter (H-D) ratio is low enough that the cask would not tip over at 3g. (A short, wide cask is less susceptible to tip-over because of its low center-of-gravity.) The TAD specification (at Table 3.3-1) limits the aging cask [overpack] maximum diameter to 144 inches and the maximum height to 264 inches, or an H-D ratio of 1.83. This maximum height limit is higher than a typical vertical concrete storage cask. The height of the aging cask needs to be sufficient to house the TAD canister, which is 212 inches tall (TAD Specification at 3.1.1.(1)(a)) plus a cask lid, which places the actual height of the cask, in my estimation, approximately 230 inches. The diameter of the aging cask is limited to 144 inches by the TAD specification. So the H-D ratio of the aging cask can only be reduced to about 1.6 within these dimensional bounds. Using the Holtec HI-STORM 100S Version B overpack as an example, the H-D ratio for that cask is 218/132 (HI-STORM FSAR Section 1.2.1), or 1.65. The Holtec cask cannot be deployed freestanding above a horizontal acceleration of 2.12 g and a vertical seismic acceleration of 1.5 g (NAC's limits are even less). Given this actual storage cask example and the fact that there is a DOE-specified limit on the width of the aging overpack and a minimum height necessary to fit the TAD canister inside, it remains reasonable to assume that the designers will not be able to meet the 3g “freestanding” requirement without a tie-down, restraint, or other apparatus installed around, but not touching, the casks.

7. An example of such a design feature for a proposed Yucca Mountain aging cask design is shown in Slide 17 of the AREVA presentation given at the January 2009 meeting of the Institute of Nuclear Material Management (attached). In order for this aging cask design to meet the TAD specification, its diameter can be no larger than 144 inches. Typical vertical concrete spent fuel storage overpacks are on the order of 132-135 inches in diameter. The aging cask

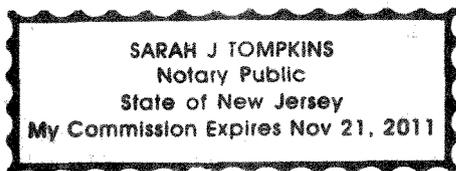
would likely be of similar diametral dimension over its entire length to provide the necessary radiation shielding. The AREVA aging cask conceptual design sketch shows a collar-type component at the bottom of the cask that, in my opinion, serves no other design function than to prevent the cask from tipping over during a seismic event. If this collar is more than about six inches wide (which it appears to be from the sketch) and is permanently attached to the cask body, the cask would violate the TAD specification maximum diameter requirement. Thus, the collar would have to be a separately installed component to permit the aging cask design to meet the diameter limit in the TAD specification.

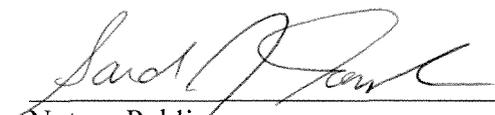
8. In total, the DOE response to the NEI proposed contention amounts to an argument that there will be no tie-down, restraint, or other apparatus because DOE says that will be the case. The fact remains, the design requirement and specifications present a significant design challenge — one that will almost certainly have cost and dose implications as discussed in my prior affidavit.



Brian Gutherman

Sworn and subscribed to before me this 23rd day of February 2009.





Notary Public

My Commission expires: Nov. 21, 2011

industry regulatory issues including criticality burnup credit. My full Statement of Professional Qualifications is Attachment 12 to the Nuclear Energy Institute (NEI) Petition to Intervene.

2. I am employed by the Nuclear Energy Institute (NEI) and have been asked to evaluate certain aspects related to postclosure criticality of the License Application (LA) and Safety Analysis Report (SAR) submitted to the Nuclear Regulatory Commission (NRC) by the Department of Energy (DOE) for the proposed high level nuclear waste repository at Yucca Mountain, Nevada. I have prepared this affidavit, based on my review of the LA, SAR, and related reference materials, in support of proposed contention NEI-SAFETY-05.

Overview

3. Section 2.2.1.4.1.1 of the LA Safety Analysis Report (SAR) describes the postclosure criticality analysis with respect to methodology in detail. It is common practice in criticality analyses to use conservative values to bound the wide range of variability in important parameters. The analysis described in the LA is generally consistent with this approach as illustrated by the use of conservative parameters (e.g. fuel temperature, moderator temperature) for the depletion analysis (Section 2.2.1.4.1.1.2.2 of the LA Safety Analysis Report). However, NEI submits that certain aspects of the postclosure criticality analysis, as described in detail below, are unnecessarily and excessively conservative.

4. The postclosure criticality analysis described in Section 2.2.1.4.1.1 of the LA Safety Analysis Report (SAR) determines an allowable burnup versus enrichment criterion for fuel assemblies which is depicted in Figures 2.2-7 and 2.2-8 of the SAR. As described in Section 2.2.1.4.1.1.3, disposal control rod assemblies will be required to be inserted into those fuel assemblies that fall within the “Not Acceptable” area on these figures. Inserting these disposal control rod assemblies into fuel assemblies at the nuclear power plants exposes workers to

increased radiation exposure, creates unnecessary expenditures from the Nuclear Waste Fund, and may result in licensing delays for approving a Transportation, Aging and Disposal (TAD) canister design, that could be obviated by reducing the excessive conservatism in the postclosure criticality analysis while still maintaining a reasonable level of conservatism. More reasonable assumptions in this regard are discussed below.

Design Basis Configuration Excessive Conservatism

5. Section 2.2.1.4.1.1.2.1 of the LA SAR states: “Irrespective of the relevant probabilities, for all waste forms the design basis configuration that is used to assess the potential for a criticality event assumes full flooding with water and neutron absorber material that is degraded, beyond the maximum credible extent.” While assuming full flooding with water is conservative, this bounding calculation is not required by the regulation (10 CFR 63.114). Therefore, NEI submits that the LA SAR should have analyzed more realistic, yet conservative, scenarios of water intrusion into the commercial spent nuclear fuel waste packages. Analyzing configurations that are not fully flooded will result in calculated k-effectives that are considerably lower than those calculated with a fully flooded configuration and will lower the allowable burnup versus enrichment curve. Lowering the curve will increase the number of assemblies that do not require disposal control rod assemblies. There is precedent, within NRC guidance, for not assuming a fully flooded configuration. Interim Staff Guidance 19 in the NRC Division of Spent Fuel Storage and Transportation, permits the licensee to analyze the most credible configuration for accident scenarios rather than a fully flooded configuration (**NRC, 2003, pp. 2, 3, 5**). Therefore, a similar approach should have been taken in the LA since the regulations do not require a fully flooded configuration.

6. Section 2.2.1.4.1.1.2.2 of the LA states that a neutron absorber thickness used in the criticality analysis of the TAD canister is less than the predicted thickness based on 10,000 years of general corrosion. The LA also states that the value used is 6 mm and that the predicted thickness is greater than or equal to 9 mm. This 33% reduction in absorber thickness is arbitrary and results in an excessively conservative criticality analysis. There is no regulatory basis for assuming such conservatism, in this case an arbitrary 33% reduction, in the absorber thickness compared to the predicted value. Criticality analyses performed for NRC licensing efforts typically assume either a nominal absorber thickness or a minimum absorber thickness without any additional penalty (**NRC, 1998, p. 5**). Analyses performed for spent fuel pools typically assume nominal neutron absorber thickness and account for manufacturing tolerances while analyses of dry cask storage systems typically assume minimum neutron absorber thicknesses (**NRC, 1997 (NUREG-1536), p. 6-3**). In either case, an additional arbitrary reduction in thickness is not applied. That approach is unjustified, at odds with DOE's own prediction, and is unnecessarily conservative.

7. Section 2.2.1.4.1.1.2.2 of the LA states that the criticality analysis is only taking credit for 75% of the neutron absorber content in the neutron absorber material consistent with **NRC, 1997 (NUREG-1536, p. 6-2), NRC, 2000a (NUREG-1617, p. 6-4), and NRC, 2000b (NUREG-1567, p. 8-4)** which are the Standard Review Plans (SRP) for dry cask storage and transportation systems and facilities. It should be noted that these NUREGs also permit the licensee to take credit for a higher percentage if additional fabrication testing is performed (**same page references, as above**). Various licensees have received approval of designs while taking credit for 90% of the neutron absorber content with the imposition of additional manufacturing

requirements. Therefore the LA should allow for the use of realistic credit for the neutron absorber content rather than defaulting to the 75% credit mentioned in the NUREGs.

8. Section 2.2.1.4.1.1.2.2 of the LA states that the isotopic compositions for use in the criticality calculation will be calculated for a cooling time of 5 years. The LA states that this is “not actually possible given the preclosure time frame” of 100 years. Therefore, the use of 5 years cooling time is arbitrary and unreasonably short. A more appropriate cooling time consistent with the preclosure time frame and the inventory of fuel that will be emplaced should have been used for the postclosure criticality analysis.

9. Section 2.2.1.4.1.1.2.4.1 describes the development and use of a calculational bias based on measured radiochemical assay data. This calculational bias is used to account for potential uncertainty in the calculation of the isotopic compositions of burned fuel assemblies. This approach is loosely based on the NRC guidance for criticality analyses for spent fuel transportation outlined in the Division of Spent Fuel Storage and Transportation Interim Staff Guidance-8 Revision 2 (NRC, 2002, p. 2). However, criticality calculations that are performed for wet storage pools at nuclear reactor facilities do not use a bias based on radiochemical assay data (Kopp memorandum (NRC, 1998, p. 7)). Rather, these calculations account for the uncertainty in the depletion calculations by utilizing a penalty which is equivalent to 5% of the reactivity (NRC, 1998, p. 7) difference between a calculation of the configuration with fresh fuel and burned fuel. This approach yields a penalty which is appropriately adjusted increasing with increasing burnup and decreasing with decreasing burnup, and that is considerably smaller than the bias calculated from the radiochemical assay data (-0.0249 Δk). Therefore, the LA and NRC guidance in ISG-8 Revision 2 (NRC, 2002, p. 2) are overly conservative in this regard and it

would be more reasonable to allow for the approach that has been approved by NRC in wet storage criticality analyses rather than an approach based on radiochemical assay data.

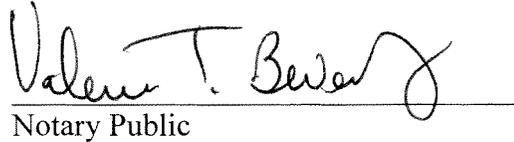
10. Revising the criticality analysis as discussed above would still maintain a high level of conservatism while decreasing the operational burden and dose by eliminating the need for disposal control rod assemblies.



Everett L Redmond II

District of Columbia) ss:

Sworn and subscribed to before me this 24th day of February 2008. *gms*



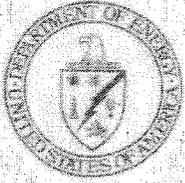
Notary Public

My Commission expires: 5/14/2012

VALERIE T. BEVERLY
Notary Public District of Columbia
My Commission Expires 5/14/2012

References:

- NRC, 1997. NUREG-1536, "Standard Review Plan for Dry Cask Storage Systems," January 1997 (LSN Acc. No. DN2001326217).
- NRC, 1998. Memorandum to Timothy Collins, Chief Reactor Systems Branch, Division of Systems Safety and Analysis, NRC from Laurence Kopp, Senior Reactor Engineer, Reactor Systems Branch, Division of Systems Safety and Analysis, "Guidance on the Regulatory Requirements for Criticality Analysis of Fuel Storage at Light-Water Reactor Power Plants," August 19, 1998 (LSN Acc. No. DEN001320731).
- NRC, 2000a. NUREG-1617, "Standard Review Plan for Transportation Packages of Spent Nuclear Fuel," March 2000 (LSN Acc. No. DN2001777257).
- NRC, 2000b. NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities," March 2000 (LSN Acc. No. DN2002062792).
- NRC, 2002. Spent Fuel Storage and Transportation Interim Staff Guidance 8, Revision 2, "Burnup Credit in the Criticality Safety Analyses of PWR Spent Fuel in Transport and Storage Casks" (LSN Acc. No. DN2001347107).
- NRC, 2003. Spent Fuel Storage and Transportation Interim Staff Guidance 19, "Moderator Exclusion Under Hypothetical Accident Conditions and Demonstrating Subcriticality of Spent Fuel under the Requirements of 10 CFR 71.55(e)" (LSN Acc. No. DN2001046811).



Department of Energy
Washington, DC 20585

QA: N/A

September 25, 2008

Dr. Steven R. Specker
President
Electric Power Research Institute
3420 Hillview Avenue
Palo Alto, CA 94304

Subject: EPRI Report #1018058

Dear Dr. Specker:

I am writing to you concerning the subject EPRI report, *Occupational Risk Consequences of the Department of Energy's Approach to Repository Design, Performance Assessment, and Operation in the Yucca Mountain License Application*. As a former nuclear industry executive who was a member of EPRI's Nuclear Power Council (NPC) for several years, I have a well-founded appreciation for the invaluable work EPRI has done over the years assisting the nuclear industry to solve challenging technical problems. As an NPC member, I could expect that the technical reports generated by EPRI and its contractors could be counted on to provide a robust and unbiased technical analysis of issues and that they would have received some level of review by knowledgeable subject matter experts and comment resolution prior to being published as an EPRI report.

Based on my and my staff's review, it does not appear that the subject report was held to that same high standard of preparation.

I offer the following issues for your consideration:

1. The Authors of the Technical Work Being Critiqued Were Not Asked to Comment on the Draft Report

The report draws a number of technical conclusions and states a number of criticisms regarding analytic assumptions and approaches in the Yucca Mountain license application. The analyses in the application are highly technical and were developed over a number of years by a large team of experts. The authors of the EPRI report reached their conclusions and issued their report in less than eight weeks after the application and supporting documents were filed with the Nuclear Regulatory Commission (NRC). During this time, the authors did not seek any clarification by or discussion with the Department of Energy (DOE) or the authors of the documents they were reviewing. The authors of the EPRI report stated as fact a number of conclusions which are not supported by rigorous analyses and that they may have

Should we do
anything?

Maw
Steve Kraft
Ralph Anderson



changed if they had taken the time to discuss their preliminary assessments with the authors of the reports they were reviewing. Based on our review of the report after its issuance, we believe that EPRI's conclusions regarding several technical issues are wrong.

Given the complex technical issues analyzed in the license application and evaluated by EPRI in this report, we believe that EPRI should have conducted a more thorough review and consulted with the cognizant technical authors prior to publishing the report.

2. The Report Has an Apparent Bias in Favor of Dual-Purpose Canisters

The report appears to be written with a purposeful bias towards justifying the use of Dual-Purpose Canisters (DPC) for acceptance by DOE for disposal in Yucca Mountain. It should be noted that the acceptability of DPC's for use at Yucca Mountain is a point of contention in the current litigation between some Standard Contract holders and the federal government. A number of statements and conclusions are made in the report regarding canister material, corrosion mechanisms, and emplacement drift size that attempt to justify why DOE should accept the use of DPC's for disposal in Yucca Mountain. These statements are not supported by rigorous independent analyses in the report. In fact, there are a number of technical issues which have driven the DOE approach which the authors did not attempt to evaluate or even discuss with the DOE team. Many of these issues have been the subject of reviews by the Nuclear Waste Technical Review Board.

It should also be noted that the use of DPC's has been raised in the spent fuel litigation, and that at least one of the report's authors has served as an expert witness for the plaintiffs in that litigation. EPRI should determine if it believes that this report in fact provides an unbiased assessment of the technical issues.

3. The Report Uses a Flawed Risk Assessment Methodology

The report tries to argue that there are increased occupational risks because of purported over conservatism in the design analyses contained in the license application. This is done without evaluating the impact on overall risk to the public from the operation of the repository with the lower design margins and lesser conservatisms that the authors advocate. The report also fails to acknowledge that the regulatory basis for licensing the repository is a risk-informed, performance-based regime which requires designing systems, structures and components such that the probability of failures are below threshold values. For example, in their critique of the seismic design criteria for buildings, the authors attempt to make the qualitative case that conservative design of a building for seismic loads increases occupational risk associated with constructing the building. There is no quantitative evaluation of this assessment and the conclusion ignores the state-of-the-art risk-informed seismic design approach taken on this project to meet the licensing criteria.

In another example, the report on page 1.1.10 not only draws an incorrect conclusion that additional wet handling facilities are needed at the repository, but then assesses the risk of this possibility as "...it will require additional processing time, which could cause nuclear utilities to have to load and store additional spent nuclear fuel at the reactor sites, leading to additional radiation dose to both workers and the public nearby to the spent fuel storage facilities." It is not apparent how the throughput of wet handling facilities increases the amount of spent fuel needed to be loaded at reactor sites. In addition, any unbiased assessment of offsite dose to the public from onsite storage facilities at reactor sites would show it to be zero. The methodology used by the report's authors implies that there is a non-trivial incremental risk associated with each fuel bundle movement. The report does not quantify this risk nor make comparisons to other accepted levels of risk in nuclear power operations such as routine fuel movements.

We find the methodology of the report to assign added occupational risk resulting from a conservative design approach to a risk-informed, performance-based set of regulations to be counter to accepted nuclear industry practice and the regulatory framework for the repository. While DOE agrees that there are a number of conservative assumptions and design approaches embodied in the Yucca Mountain license application, we believe that these are appropriate given that this is a first-of-a-kind facility that will receive thorough scrutiny during the licensing proceeding. The approaches taken are consistent with the regulatory requirements for licensing the repository. We do not accept EPRI's characterization of these conservatisms on page 1-3 as "Unjustified and unnecessary..."

We ask that DOE OCRWM be allowed to review and comment on any future reports that EPRI may generate on the Yucca Mountain license application prior to their issuance. We believe you would provide the same opportunity to any other applicant to the NRC if you were generating a report on their license application.

Sincerely,



Edward F. Sproat III, Director
Office of Civilian Radioactive
Waste Management

cc: C.B. Larsen - EPRI
F.L. Bowman - NEI

evaluates the failure of waste packages at all times, not just the “early waste package failure events.” The TSPA includes all relevant features, events, and processes (“FEPs”) according to the relative importance EPRI assigned to the FEPs. EPRI 2008 (page 6-1) describes the basis for Figures 4(a) and 4(b) as follows:

There are several conservatisms in DOE’s analyses of post-closure performance that have led DOE to unnecessarily include drip shields in its repository design. These conservatisms include:

1. Overestimation of the amount of net infiltration, thereby incorrectly indicating a larger benefit of the use of a drip shield than is actually the case;
2. Overestimation of the fraction of the repository experiencing seepage into the open drifts, having the same effect as overestimation of net infiltration;
3. Overestimation of seismic energy and rockfall. This leads DOE to the conclusion that drip shields would provide significant protection from rockfall;
4. Overestimation of damage to the TADs due to seismic and rockfall events. This also leads to the incorrect conclusion that drip shields would be required to provide additional protection from damage of the waste packages;
5. Overestimation of the rate at which Alloy 22 (part of the waste package (WP)) will degrade. This, in turn, gives greater performance credit to the drip shields than is warranted.
6. Cladding performance has been neglected. EPRI analyses indicate that including credit for the performance of the CSNF cladding in the dose analysis is appropriate and that such inclusion would provide an additional barrier to the release of radionuclides from the waste form. This, in turn, would also reduce the need for a drip shield;
7. Performance of the stainless steel barriers (i.e., the inner WP cylinder and the outer shell of the TAD) in the waste package has been neglected. Including performance of these components in the overall performance analysis would also reduce the need for a drip shield.
8. DOE notes that it typically uses the more conservative of two or more conceptual models. Some of these conservatisms could also result in the apparent need for drip shields. As a consequence of this general approach, each conservatism is compounded by conservatisms in other parts of the

analysis. Therefore, each of the conservatisms identified here, significant in their own right, compound each other to produce a very large degree of conservatism.

3. (MK) When these considerations are taken into account, the EPRI analysis shows that consequences associated with seismic effects are small, as described in detail in Section 5 (pp. 9-30) of the affidavit initially submitted in support of the NEI-SAFETY-06, and the effects on TSPA results are similarly small. Therefore, Figures 4(a) and 4(b) in the affidavit account for the effects of seismic events and their consequences, but their importance is less than in DOE's TSPA.

4. (FK) In addition, Section 5.2 of the affidavit submitted in support of contention NEI-SAFETY-06 concerns the effect of seismic activity on the integrity of the waste packages in the event that the drip shields are not emplaced. The basis for this analysis is described in the report EPRI 2006, which was cited in the initial affidavit. In brief, the Section 5.2 analysis considers the following factors:

1. the DOE over-estimation of the seismic hazard and the consequent extent of rockfall;
2. an assessment of the number of structural waste package failures caused by energetically ejected rocks;
3. an assessment of the possibility of waste package structural failures due to impacts with adjacent waste packages due to vibratory ground motion;
4. an assessment of the number of delayed stress corrosion cracking waste package failures due to residual stress resulting from an accumulated rock pile on the surface of the waste package; and
5. the consequences to the overall safety of this limited number of additional waste package failures that would result from seismic ground motion assuming the drip shields were not installed.

Therefore, DOE's assertion that NEI has not considered the effects of seismic-induced processes on waste package failure and overall safety is incorrect.

5. (MK) With respect to igneous events and their consequences, EPRI 2008 (page 1-5) notes that “EPRI has determined that the probability of an igneous event intersecting the Yucca Mountain repository is less than 10^{-8} per year.” As a result, DOE’s assertion that EPRI’s TSPA analysis must include an analysis of igneous events and their associated consequences is incorrect because in EPRI’s TSPA such events are below the regulatory threshold for consideration. As a result, Figures 4(a) and 4(b) are not required to include igneous events within the construct of EPRI’s TSPA.

6. (MK) DOE's also erroneously asserts that NEI has not demonstrated that drip shields are unnecessary for compliance with intruder calculations. DOE Answer at 106 n.33. However, the presence or absence of drip shields are not relevant to such calculations.

7. (MK) DOE also asserts that NEI has not shown that groundwater provisions have been met, DOE Answer at 106 n.33, but this is also incorrect. The groundwater protection limit is based on a dose limit of 4 mrem/y for the first 10,000 years, which Figure 4(b) demonstrates is met.

Matthew W. Kozak

Dr. Matthew Kozak

Sworn and subscribed to before me this 24th day of Feb 2009.

Matthew W. Kozak
Notary Public
State of Colorado
My Commission Expires: 1/25/2010

Jennifer R. Chase
Notary Public
My Commission expires: 1/25/2010

Fraser King

Dr. Fraser King

Sworn and subscribed to before me this 19 day of February 2009.

[Signature]
Notary Public

My Commission expires: N/A

Brian J. Kirkhope
MANNING & KIRKHOPE
Barristers, Solicitors & Mediators
430 Wentworth Street
Nanaimo, B.C. V9R 3E1

**Witnessed only as to execution.
No legal advice sought or given.**

References

EPRI 2006. Effects of Multiple Seismic Events and Rockfall on Long-Term Performance of the Yucca Mountain Repository. EPRI, Palo Alto, CA: 2006. 1013444. LSN Accession No. 000000612.

EPRI 2008. Occupational Risk Consequences of the Department of Energy's Approach to Repository Design, Performance Assessment and Operation in the Yucca Mountain License Application. EPRI, Palo Alto, CA: 2008. 1018058. LSN Accession No. NEN000000720.

shielded canisters (DSC), which, when packaged for transportation, are rail-sized shipping packages.

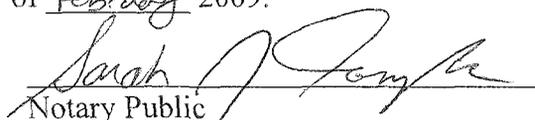
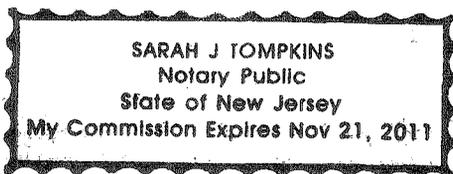
4. Second, I have received e-mails from representatives of the Pilgrim, Cook, and LaCrosse plants stating that they are using or are going to use rail-sized dual-purpose spent nuclear fuel canisters.

5 I am also aware through my work experience and by monitoring industry news and information that these six plants either already have a high-capacity cask crane (capable of lifting over 100 tons) installed at their sites, or are upgrading their cask cranes to make them high-capacity. These plants would have no need for such a crane unless they intended to store spent nuclear fuel in rail-sized canisters.



Brian Gutherman

Sworn and subscribed to before me this 23rd day of February 2009.



Notary Public
My Commission expires: Nov 21, 2011

ATTACHMENT 8
UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Atomic Safety and Licensing Board

Before Administrative Judges:

ASLBP BOARD 09-876-HLW-CAB01 William J. Froehlich, Chairman Thomas S. Moore Richard E. Wardwell	ASLBP BOARD 09-877-HLW-CAB02 Michael M. Gibson, Chairman Lawrence G. McDade Nicholas G. Trikouros	ASLBP BOARD 09-878-HLW-CAB03 Paul S. Ryerson, Chairman Michael J. Farrar Mark O. Barnett
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In the Matter of)
) Docket No. 63-001-HLW
 U.S. DEPARTMENT OF ENERGY)
 (High-Level Waste Repository))
)

AFFIDAVIT OF RODNEY J. McCULLUM
IN SUPPORT OF PROPOSED CONTENTION NEI-NEPA-03

Rodney J. McCullum, being duly sworn, states as follows:

1. My name is Rodney J. McCullum. I am Director of the Yucca Mountain Project at the Nuclear Energy Institute, Inc. (NEI). I hold a Bachelor of Engineering degree in Nuclear Engineering (1985, University of Cincinnati) and a Master of Business Administration degree (2000, Lewis University). In my current position at NEI, I am responsible for developing and carrying out programs to achieve the goals of the nuclear energy industry with respect to the Yucca Mountain High Level Waste Repository.

2. A full description of my professional qualifications was previously submitted in this proceeding.

3. I am the signatory on two documents referenced by NEI in Proposed Contention NEI-NEPA-03: 1) NEI Letter from R. McCullum to J. Summerson, DOE, dated December 12, 2006 (“Nuclear Energy Institute Comments on the U.S. Department of Energy Notice of Intent:

Supplement to the Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, 71 Federal Register 60490, October 13, 2006”(LSN Acc. No. DEN001599158); and 2) NEI Letter from R. McCullum to J. Summerson, DOE, dated January 9, 2008 (“Nuclear Energy Institute Comments on the Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada”)(LSN Acc. No. NEN000000671).

4. I actively participated with Stephen P. Kraft, Senior Executive Director of Used Fuel Management at NEI, in the drafting of the third document referenced by NEI in Proposed Contention NEI-NEPA-03: NEI Letter from S. Kraft to J. Summerson, DOE, dated January 9, 2008 (“Nuclear Energy Institute Comments on the Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada — Nevada Rail Transportation Corridor; and the Draft Environmental Impact Statement for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geologic Repository at Yucca Mountain, Nye County, Nevada”)(LSN Acc. No. NEN000000676).

5. NEI has consistently maintained that used fuel storage and transportation canisters are extremely robust and highly resistant to sabotage. A defense-in-depth design philosophy makes these canisters resistant to terrorist attacks. Given the security requirements that will be in place for the Yucca Mountain repository and spent fuel shipments, the remote location of the repository, and the available mitigation measures, the repository and transportation casks are not attractive targets and terrorist attacks are not likely to be successful.

6. DOE's Final Supplemental Environmental Impact Statement (SEIS) for the Yucca Mountain repository, in Section 4.1.8.4, discusses environmental consequences of hypothetical terrorist attacks at the repository site. (The sabotage analysis for a "representative scenario" is also presented in Appendix E of the SEIS.) The SEIS, in Section 6.3.4, also discusses transportation sabotage events and consequences.

7. The SEIS itself sufficiently establishes on a site-specific basis that terrorist attacks are unlikely and that further analysis of speculative consequences are misleading and do not promote meaningful agency decisionmaking. The record on this point is reflected in the SEIS:

a) Section 4.1.8.4 of the SEIS (at 4-72 to 4-78) outlines various considerations that reduce the threat of sabotage at the Yucca Mountain repository site. These include: security requirements to prevent terrorists from gaining control of commercial aircraft; the safety and security (post-closure) provided by deep geologic disposal of spent nuclear fuel in robust waste packages; the remote location and restricted access of the proposed repository for pre-closure storage; the restricted airspace surrounding the site as well as access to a "highly effective" rapid-response security force; and the security regulations applicable to storage of spent nuclear fuel at the site. These factors, taken together with the robust design of the storage and transportation canisters, make the Yucca Mountain site an unattractive and unlikely target for terrorist attacks.

b) Section 6.3.4 of the SEIS (at 6-24 to 6-25) discusses transportation sabotage considerations. DOE again references many of the factors noted above that make terrorist attacks on transportation canisters very unlikely and speculative events. In addition, DOE notes NRC rules and compensatory

measures promulgated subsequent to September 11, 2001, specifically to protect the public from harm that could result from sabotage of spent nuclear fuel casks. These measures include: armed escorts for fuel shipments; safeguarding of shipment schedule information; and monitoring of shipments and coordination among state and federal agencies. These factors are combined with the stringent structural, thermal, shielding and criticality requirements applicable to certified storage and transportation casks that provide high assurance of confinement integrity. In this context, DOE's decision to evaluate in the SEIS the consequences of an aircraft crash into a spent nuclear fuel cask and an attack with "a modern weapon (high-energy-density device)" are grossly speculative, unreasonable, and unnecessary.

8. Even if an evaluation of the consequences of a terrorist event is required or performed, the analysis must be reasonable in order to properly inform the public and agency decisionmakers. The SEIS evaluations are overly conservative in several specific respects:

a) Based on information presented in the draft SEIS, in Section 4.1.8.4 and Appendix E, NEI has previously commented on the specific input assumptions regarding the response to sabotage events. For example, DOE's analysis, as summarized in Appendix E, Section E.7, of the final SEIS, assumes evacuation of the affected population only after 24 hours. This evacuation time may reflect a bounding approach, but is longer than would actually be the case and therefore does not lead to reasonable results.

b) NEI has also previously commented on other conservative assumptions in the DOE analysis, such as the release fractions summarized in SEIS Section 6.1.11 and reflected in the analysis presented in Section 6.3.4. The analysis remains overly conservative based on the assumptions utilized. For example, the analysis uses highly conservative and unrealistic release fractions in the event of an attack on the aging casks. Studies of existing dry cask storage designs, such as those proposed for the Private Fuel Storage Facility in Utah, have shown that structural damage to a cask would be minimal to none at all. The casks would bounce or roll away, but would most likely remain intact with no releases of radiological inventory. Fuel assemblies would remain largely intact even if there were minor breaches in the cask. The DOE release fractions assume extreme damage to the cask and to the fuel assemblies and rods. The DOE release fractions also do not take into account the additional barrier that a TAD canister would add in a sabotage scenario.

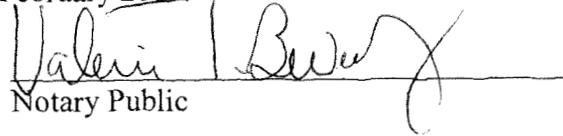
c) The SEIS assumes that a PWR TAD package would hold 21 assemblies; nonetheless, DOE chose to estimate the consequences of a rail sabotage event based on the radionuclide inventory in 26 PWR assemblies. Presenting the results of an overly conservative consequence analysis is not appropriate.

9. The extreme conservatism of DOE's approach diminishes the value of the SEIS as a public communications tool, because it could raise concerns that are not justified, increase licensing uncertainty, and delay licensing of the repository.


Rodney J. McCullum

District of Columbia) m ss:

Sworn and subscribed to before me this 21 day of February 2009


Notary Public

My Commission expires: 5/14/2012

VALERIE T. BEVERLY
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**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

Atomic Safety and Licensing Board

Before Administrative Judges:

ASLBP BOARD 09-876-HLW-CAB01 William J. Froehlich, Chairman Thomas S. Moore Richard E. Wardwell	ASLBP BOARD 09-877-HLW-CAB02 Michael M. Gibson, Chairman Lawrence G. McDade Nicholas G. Trikouros	ASLBP BOARD 09-878-HLW-CAB03 Paul S. Ryerson, Chairman Michael J. Farrar Mark O. Barnett
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In the Matter of)
)
U.S. DEPARTMENT OF ENERGY) Docket No. 63-001-HLW
(High-Level Waste Repository))
) February 24, 2009
)

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing “Reply of the Nuclear Energy Institute to the Answers to Its Petition to Intervene by the Department of Energy, the NRC Staff, and the State of Nevada” have been served upon the following persons on this 24th day of February, 2009 by Electronic Information Exchange.

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