

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
FIRSTENERGY NUCLEAR OPERATING CO.) Docket No. 50-346-LRA
)
(Davis-Besse Nuclear Power Station, Unit 1))
)

NRC STAFF'S ANSWER TO JOINT PETITIONERS' REQUEST FOR A
HEARING AND PETITION FOR LEAVE TO INTERVENE

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January 21, 2010

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INTRODUCTION

Pursuant to 10 C.F.R. § 2.309(h)(1), the Staff of the U.S. Nuclear Regulatory Commission ("Staff") hereby files its answer to the petition for leave to intervene and request for hearing jointly filed by Beyond Nuclear, Citizens Environment Alliance of Southwestern Ontario ("Ontario Citizens Alliance"), Don't Waste Michigan, and Green Party of Ohio (collectively "Joint Petitioners")¹ on FirstEnergy Nuclear Operating Company's ("FENOC") license renewal application for Davis-Besse Nuclear Power Station, Unit 1 ("Davis-Besse").²

The Staff's answer will provide a brief description of this license renewal proceeding's background, a discussion of each group's standing to intervene, and argument on the admissibility of each contention³ advanced by the Joint Petitioners. Although Beyond Nuclear,

¹ See Request for a Public Hearing and Petition for Leave to Intervene in the Matter of FirstEnergy's Application to Relicense the Davis-Besse Nuclear Power Plant (Facility Operating License No-NFP-003, Docket No. 50-346, NRC-2010-0299) for 20 Additional Years of Extended Operation (Dec. 27, 2010) ("Joint Petition").

² Letter from Barry S. Allen, Vice President, dated August 27, 2010, transmitting the license renewal application for Davis-Besse (Agencywide Document Access and Management System ("ADAMS") Accession No. ML1024505650) ("LRA").

³ The Joint Petitioners have asserted four contentions regarding the Davis-Besse application. Three of the four contentions assert that the environmental report failed to appropriately consider alternatives to the license renewal because it failed to consider wind energy, solar photovoltaic energy,

Don't Waste Michigan, and the Green Party of Ohio submitted sufficient information to support standing, the Ontario Citizens Alliance has not.⁴ Further, Joint Petitioners have not submitted an admissible contention.

BACKGROUND

This proceeding concerns FENOC's August 27, 2010 application to renew its operating license for Davis-Besse for an additional twenty years from the current expiration date of April 22, 2017.⁵ The Davis-Besse site is located in Ottawa County, Ohio, twenty (20) miles east of Toledo, Ohio.⁶ Davis-Besse employs a pressurized water reactor and nuclear steam supply system furnished by the Babcock & Wilcox Company.⁷

Notice of receipt of the license renewal application ("LRA") was published in the *Federal Register* on September 20, 2010.⁸ The Staff accepted the LRA for Review, and on October 25, 2010, published a *Federal Register* Notice providing a Notice of Opportunity for Hearing.⁹ On December 27, 2010, Joint Petitioners filed the instant petition. A Board was convened by Order dated January 13, 2011.¹⁰

and combination of wind and solar photovoltaic. Joint Petition at 10, 68, and 93. The fourth contention concerns the conclusions of Davis-Besse's severe accident mitigation alternatives analysis. Joint Petition at 99.

⁴ As discussed below, Ontario Citizens Alliance has not provided sufficient information to demonstrate standing based on the proximity of its members' residences to Davis-Besse.

⁵ LRA at 1.2-1. If the LRA is approved, Davis-Besse's new license expiration date would be April 22, 2037.

⁶ *Id.*

⁷ *Id.*

⁸ FirstEnergy Nuclear Operating Company; Notice of Receipt and Availability of Application for Renewal of Davis Besse Nuclear Power Station, Unit 1, Facility Operating License No. NPF-003 for an Additional 20-Year Period, 75 Fed. Reg. 57,229 (Sept. 20, 2010).

⁹ Notice of Acceptance for Docketing of the Application, Notice of Opportunity for Hearing for Facility Operating License No. NPF-003 for an Additional 20-Year Period; FirstEnergy Nuclear Operating Company, Davis-Besse Nuclear Power Station, Unit 1, 75 Fed. Reg. 65,528 (Oct. 25, 2010).

¹⁰ Establishment of Atomic Safety and Licensing Board at 1 (Jan. 13, 2011).

DISCUSSION

I. Standing to Intervene

A. Legal Requirements to Establish Standing

The Commission's rules of practice provide:¹¹ "[a]ny person¹² whose interest may be affected by a proceeding and who desires to participate as a party must file a written request for hearing or petition for leave to intervene and a specification of the contentions which the person seeks to have litigated in the hearing." 10 C.F.R. § 2.309(a). In accordance with the regulations, the Board "will grant the request/petition if it determines that the requestor/petitioner has standing under the provisions of [10 C.F.R. § 2.309(f)]." *Id.* A request for hearing or petition for leave to intervene must state:

(i) The name, address, and telephone number of the requestor or petitioner;

(ii) The nature of the requestor's/petitioner's right under [the Atomic Energy Act of 1954, as amended,] to be made a party to the proceeding;

(iii) The nature and extent of the requestor's/petitioner's property, financial or other interest in the proceeding; and

(iv) The possible effect of any decision or order that may be issued in the proceeding on the requestor's/petitioner's interest.

10 C.F.R. § 2.309(d)(1).¹³

¹¹ See "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," 10 C.F.R. Part 2.

¹² "Person" is defined as "(1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, government agency other than the Commission ... any State or any political subdivision of, or any political entity within a State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and (2) any legal successor, representative, agent, or agency of the foregoing." 10 C.F.R. § 2.4.

¹³ Any state, local governmental body (county, municipality or other subdivision), or any affected Federally-recognized Indian Tribe that desires to participate as a party in a proceeding must submit a request for hearing/petition to intervene that meets the requirements of 10 C.F.R. § 2.309. In lieu of participating as a party, an interested state, local governmental body, or affected Federally-recognized Indian Tribe may seek to participate pursuant to 10 C.F.R. § 2.315(c).

The Commission has observed, “[a]t the heart of the standing inquiry is whether the petitioner has ‘alleged such a personal stake in the outcome of the controversy’ as to demonstrate that a concrete adverseness exists which will sharpen the presentation of the issues.” *Sequoyah Fuels Corp. & Gen. Atomics* (Gore, Oklahoma Site), CLI-94-12, 40 NRC 64, 71 (1994) (citation and quotation omitted). The Commission explained that in order to determine whether a petitioner has demonstrated a personal stake in the outcome,

the Commission applies contemporaneous judicial concepts of standing. Accordingly, a petitioner must (1) allege an “injury in fact” that is (2) “fairly traceable to the challenged action” and (3) is “likely” to be redressed by a favorable decision.”

Id. at 71–72 (citing *Lujan v. Defenders of Wildlife*, 504 U.S. 555 (1992)).

In license renewal proceedings, standing may be based on a petitioner’s proximity to the facility at issue. *See, e.g., Entergy Nuclear Operations, Inc.*, (Indian Point, Units 2 & 3), LBP-08-13, 68 NRC 43, 60 (2008). Accordingly, “a petitioner is presumed to have standing to intervene without the need specifically to plead injury, causation, and redressability if the petitioner lives within 50 miles of the nuclear power reactor.” *Id.* (citing *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), LBP-01-06, 53 NRC 138, 146 (2001), *aff’d on other grounds*, CLI-01-17, 54 NRC 3 (2001)).

An organization may establish its standing to intervene based on organizational standing (showing that its own organizational interest could be adversely affected by the proceeding), or representational standing (based on the standing of its members). *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), CLI-91-13, 34 NRC 185, 187 (1991). To show “organizational standing,” an organization must show a discrete institutional injury to itself, not just a general environmental or policy interest. *Int’l Uranium (USA) Corp.* (White Mesa Uranium Mill), CLI-01-21, 54 NRC 247, 252 (2001). When an organization seeks to establish “representational standing,” it must identify a member by name and address, and it must show that the member “has authorized the organization to represent him or her and to request a

hearing on his or her behalf.” See, e.g., *Consumers Energy Co.* (Palisades Nuclear Power Plant), CLI-07-18, 65 NRC 399, 409 (2007); *AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), LBP-06-07, 63 NRC 188, 195 (2006) (citing *GPU Nuclear Inc.* (Oyster Creek Nuclear Generating Station), CLI-00-06, 51 NRC 193, 202 (2000)). Further, for the organization to establish representational standing, the member seeking representation must qualify for standing in his or her own right, the interests that the organization seeks to protect must be germane to its own purpose, and neither the asserted claim nor the requested relief must require an individual member to participate in the organization’s legal actions. *Palisades*, CLI-07-18, 65 NRC at 409; *Private Fuel Storage, LLC* (Independent Spent Fuel Storage Installation), CLI-99-10, 49 NRC 318, 323 (1999) (citing *Hunt v. Wash. State Apple Advertising Comm’n*, 432 U.S. 333, 343 (1977)).

B. Beyond Nuclear, Don’t Waste Michigan, and the Green Party of Ohio Plead Sufficient Facts to Establish Standing to Intervene

Beyond Nuclear, Don’t Waste Michigan, the Green Party of Ohio, and Ontario Citizens Alliance seek representational standing in this proceeding. Joint Petition at 4-10. Beyond Nuclear states that it is a non-profit organization based in Takoma Park, Maryland, with members who live, work, and recreate within 50 miles of Davis-Besse. *Id.* at 4.

Similarly, Don’t Waste Michigan states it is a federation of environmental organizations based in Michigan and is opposed to the designation of Michigan as a repository for high-level waste, with members who live, work, and recreate within 50 miles of Davis-Besse. *Id.* at 5.

Finally, the Green Party of Ohio is a political organization with members who live, work, and recreate within 50 miles of Davis-Besse. *Id.* at 5–6.

These three organizations submitted affidavits from members, including one for Beyond Nuclear, one for Don’t Waste Michigan, and three for the Green Party of Ohio. Each affiant provides the address of his or her residence and states the residence is within the “emergency Planning Zone” for Davis-Besse. Phyllis Oster’s affidavit does not expressly authorize Beyond

Nuclear to represent her in this proceeding, but the intent to authorize seems to be a reasonable inference from the statement, “my interests will not be adequately represented without this action to intervene and without the opportunity of [Beyond Nuclear] to participate as a full party on my behalf.”¹⁴ The affiants for Don’t Waste Michigan and the Green Party of Ohio did expressly authorize each organization respectively to represent their interests in the proceeding. The affiants state that they believe Davis-Besse’s LRA is inadequate; that if the safety and environmental concerns raised on their behalf are not addressed, the plant may pose an unacceptable risk to public health and safety and the environment; and that if an accident occurred at Davis-Besse, they “might be killed, injured, or sickened by the radioactive releases.”¹⁵ Accordingly, Beyond Nuclear, Don’t Waste Michigan, and the Green Party of Ohio have provided sufficient information to show representational standing.

C. Ontario Citizens Alliance Failed to Establish Standing to Intervene

Ontario Citizens Alliance seeks representational standing in this proceeding. Joint Petition at 4. It states that it is a non-profit organization based in Windsor, Ontario, Canada, with members who live, work, and recreate within 50 miles of Davis-Besse. *Id.* It designated Derek and Richard Coronado as its members on whose behalf they seek to intervene. Derek and Richard Coronado both declared that they resided at 808 Hall Avenue, Windsor, Ontario, N9A 2M3.¹⁶ Davis-Besse is located at 41° 35’ 47” N and 83° 5’ 13” W. As such, Derek and Richard Coronado are located outside of 50 mile radius centered on Davis-Besse by approximately 300 feet. Thus, Ontario Citizens Alliance’s members and the organization have not shown that they are entitled to a presumption of standing in this license renewal proceeding.

¹⁴ Declaration of Phyllis Oster at 2.

¹⁵ See, e.g., Declaration of Michael Keegan at 1.

¹⁶ See Declaration of Derek Coronado at 1; Declaration of Richard Coronado at 1. The Coronado’s address is located at 42° 19’ 6” N and 83° 1’ 3” W.

Since Ontario Citizens Alliance's members are located outside the 50 mile radius from Davis-Besse, it is incumbent upon Ontario Citizens Alliance and Richard and Derek Coronado to allege an injury in fact that is traceable to the license renewal of Davis-Besse and demonstrate that a decision in their favor would redress their alleged harm. The organization and the Coronados have only alleged proximity to Davis-Besse and, thus, have not established they have standing in this proceeding. However, as explained above, the Staff has no objection to standing of the three other organizations, Beyond Nuclear, Don't Waste Michigan, and the Green Party of Ohio.

II. Admissibility of Joint Petitioners' Proposed Contentions

A. Legal Requirements For Contentions

1. General Requirements for Admissibility

The legal requirements governing the admissibility of contentions are well-established and set forth in 10 C.F.R. § 2.309(f) of the Commission's Rules of Practice.¹⁷ Specifically, in order to be admitted, a contention must satisfy the following requirements:

(f) Contentions. (1) A request for hearing or petition for leave to intervene must set forth with particularity the contentions sought to be raised. For each contention, the request or petition must:

(i) Provide a specific statement of the issue of law or fact to be raised or controverted;

(ii) Provide a brief explanation of the basis for the contention;

¹⁷ These requirements substantially reiterate the requirements as they appeared in former § 2.714, published in revised form in 1989. See Changes to Adjudicatory Process, 69 Fed. Reg. 2,182, 2,217 (Jan. 14, 2004); Statement of Considerations, "Rules of Practice for Domestic Licensing Proceedings – Procedural Changes in the Hearing Process," 54 Fed. Reg. 33,168 (Aug. 11, 1989), as corrected, 54 Fed. Reg. 39,728 (Sept. 28, 1989). Further, while § 2.714 was revised in 1989, those revisions did not constitute "a substantial departure" from then existing practice in licensing cases. 54 Fed. Reg. at 33,170-71; see also *Louisiana Energy Serv., L.P.* (Claiborne Enrichment Center), LBP-94-11, 39 NRC 205-07 (1994). Thus, while the 1989 amendments superseded, in part, the prior standards governing the admissibility of contentions, those standards otherwise remained in effect to the extent they did not conflict with the 1989 amendments. *Arizona Public Serv. Co.* (Palo Verde Nuclear Generating Station, Units 1, 2 & 3), LBP-91-19, 33 NRC 397, 400 (1991).

(iii) Demonstrate that the issue raised in the contention is within the scope of the proceeding;

(iv) Demonstrate that the issue raised in the contention is material to the findings the NRC must make to support the action that is involved in the proceeding;

(v) Provide a concise statement of the alleged facts or expert opinions which support the requestor's/petitioner's position on the issue and on which the petitioner intends to rely at hearing, together with references to the specific sources and documents on which the requestor/petitioner intends to rely to support its position on the issue; and

(vi) Provide sufficient information to show that a genuine dispute exists with the applicant/licensee on a material issue of law or fact. This information must include references to specific portions of the application (including the applicant's environmental report and safety report) that the petition disputes and the supporting reasons for each dispute, or, if the petitioner believes that the application fails to contain information on a relevant matter as required by law, the identification of each failure and the supporting reasons for the petitioner's belief.

(2) Contentions must be based on documents or other information available at the time the petition is to be filed, such as the application, supporting safety analysis report, environmental report or other supporting document filed by an applicant or licensee, or otherwise available to a petitioner. On issues arising under the National Environmental Policy Act, the petitioner shall file contentions based on the applicant's environmental report . . .

10 C.F.R. § 2.309(f)(1)-(2).¹⁸

The requirements governing the admissibility of contentions are "strict by design."

Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Units 2 & 3), CLI-01-24, 54 NRC 249, 358 (2001), *petition for reconsideration denied*, CLI-02-01, 55 NRC 1 (2002).

Thus, they have been strictly applied in NRC adjudicatory proceedings, including license

¹⁸ Similarly, long-standing Commission precedent establishes that contentions may only be admitted in an NRC licensing proceeding if they fall within the scope of issues set forth in the *Federal Register* notice of hearing and comply with the requirements of former § 2.714(b) (subsequently restated in § 2.309(f)), and applicable Commission case law. See, e.g., *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2, Catawba Nuclear Power Station, Units 1 & 2), CLI-02-14, 55 NRC 278, 289-90 (2002).

renewal proceedings. For example, in a recent license renewal decision, the Commission stated:

The requirements for admissibility set out in 10 C.F.R. § 2.309(f)(1)(i)-(vi) are “strict by design,” and we will reject any contention that does not satisfy these requirements. Our rules require “a clear statement as to the basis for the contentions and the submission of . . . supporting information and references to specific documents and sources that establish the validity of the contention.” Mere ‘notice pleading’ does not suffice.” Contentions must fall within the scope of the proceeding – here, license renewal – in which intervention is sought.

AmerGen Energy Company, LLC (Oyster Creek Nuclear Generating Station), CLI-06-24, 64 NRC 111, 118-19 (2006) (footnotes omitted). In short, the contention admissibility rules require “a detailed, fact-based showing that a genuine and material dispute of law or fact exists.” *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-02-14, 55 NRC 278, 289 (2002).

The basic requirements serve to: (1) assure that the contention raises a matter appropriate for adjudication in a particular proceeding; (2) establish a sufficient foundation for the contention to warrant further inquiry into the assertion; and (3) put other parties sufficiently on notice of the issues so that they will know generally what they will have to defend against or oppose. *Philadelphia Elec. Co.* (Peach Bottom Atomic Power Station, Units 2 & 3), ALAB-216, 8 AEC 13, 20 (1974); *Palo Verde*, LBP-91-19, 33 NRC at 400. The *Peach Bottom* decision requires that a contention be rejected if:

- (1) it constitutes an attack on applicable statutory requirements;
- (2) it challenges the basic structure of the Commission’s regulatory process or is an attack on the regulations;
- (3) it is nothing more than a generalization regarding the petitioner’s view of what applicable policies ought to be;
- (4) it seeks to raise an issue which is not proper for adjudication in the proceeding or does not apply to the facility in question; or

(5) it seeks to raise an issue which is not concrete or litigable.

Peach Bottom, ALAB-216, 8 AEC at 20-21.

The Commission has explained that it “toughened its contention rule in a conscious effort to . . . obviate serious hearing delays caused in the past by poorly defined or supported contentions.” *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, & 3), CLI-99-11, 49 NRC 328, 334 (1999). The Commission observed that prior to the revision of the rule, “[l]icensing Boards had admitted and litigated numerous contentions that appeared to be based on little more than speculation. Indeed, in practice, intervenors could meet the rule’s requirements merely by copying contentions from another proceeding involving another reactor.” *Id.* (internal quotation omitted). The petitioner in *Oconee* submitted a contention based on the fact that the Staff had requested additional information from the applicant. The petitioner submitted no documents, expert opinion, or fact-based argument in support of the contention, and the *Oconee* Board ruled the contention inadmissible. In upholding the Board, the Commission wrote:

It is surely legitimate for the Commission to screen out contentions of doubtful worth and to avoid starting down the path toward a hearing at the behest of Petitioner who themselves have no particular expertise – or expert assistance – and no particularized grievance, but are hoping something will turn up later as a result of NRC staff work.

Id. at 342.

An expert’s affidavit is not required to support every contention. The regulation governing admissibility requires an intervenor to present “a concise statement of the alleged facts or expert opinion” supporting the contention and “references to the specific sources and documents on which [the intervenor] intends to rely.” 10 C.F.R. § 2.309(f)(1)(v). For some contentions, materiality, specificity, and concreteness can be demonstrated by factual analysis or documentary evidence and no expert affidavit is required.

However, some contentions must be supported by an expert's affidavit. Where a contention is based on a conclusory allegation, speculation or opinion, and the allegation, speculation, or opinion is not supported by an expert's affidavit, boards have ruled those contentions inadmissible. See, e.g., *Private Fuel Storage, LLC* (Indep. Spent Fuel Storage Installation), CLI-04-22, 60 NRC 125, 139-140 (2004). Similarly, where a contention seeks to connect a set of facts with a specific result and that result is not self-evident, expert analysis is needed to bridge the gap. See, e.g., *Nuclear Mgmt. Co., LLC* (Palisades Nuclear Plant), LBP-06-10, 63 NRC 314, 352 (2006), *aff'd*, CLI-06-17, 63 NRC 727 (2006). As the Board in *Georgia Tech* recognized, "it is the petitioner who is obligated to provide the analyses and expert opinion showing why its bases support its contention." *Georgia Inst. of Tech.* (Georgia Tech Research Reactor), LBP-95-6, 41 NRC 281, 305 (1995). That obligation must be satisfied when the petition is filed.

[T]he mere possibility ... that Petitioner might in the future find an expert who could provide the assistance necessary to define clearly the issues in question and effectively litigate them, does not warrant admitting the contention at this stage of the proceeding, when we must rule on such questions of admissibility based on what has been provided to this point.

Nuclear Mgmt. Co., LLC (Palisades Nuclear Plant), CLI-06-17, 63 NRC 314, 352 n. 152 (2006).

2. Scope of License Renewal Proceedings

The Commission's regulations in 10 C.F.R. Part 54¹⁹ limit the scope of a license renewal proceeding to the specific matters that must be considered for the license renewal application to be granted. Pursuant to 10 C.F.R. § 54.29, the Commission considers the following standards in determining whether to grant a renewed license:

A renewed license may be issued by the Commission up to the full term authorized by § 54.31 if the Commission finds that:

¹⁹ See generally Nuclear Power Plant License Renewal, 56 Fed. Reg. 64,943 (Dec. 13, 1991) ("1991 License Renewal Rule"); Nuclear Power Plant License Renewal; Revisions, 60 Fed. Reg. 22,461 (May 8, 1995) ("1995 License Renewal Rule").

(a) Actions have been identified and have been or will be taken with respect to the matters identified in Paragraphs (a)(1) and (a)(2) of this section, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the [Current Licensing Basis] CLB, and that any changes made to the plant's CLB in order to comply with this paragraph are in accord with the Act and the Commission's regulations. These matters are:

(1) managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under § 54.21(a)(1); and

(2) time-limited aging analyses that have been identified to require review under § 54.21(c).

(b) Any applicable requirements of Subpart A of 10 C.F.R. Part 51 have been satisfied.

(c) Any matters raised under § 2.335 have been addressed.

These standards, along with other regulations in 10 C.F.R. Part 54, and the environmental regulations related to license renewal set forth in 10 C.F.R. Part 51 and Appendix B thereto, establish the scope of issues that may be considered in a license renewal proceeding. A proposed contention must demonstrate that the issue it raises is within the scope of the proceeding or there are grounds for its dismissal. 10 C.F.R. § 2.309(f)(1)(iii); *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 & 3), CLI-05-24, 62 NRC 551, 567 (2005).

The Commission has provided guidance for license renewal adjudications regarding which safety and environmental issues fall within or beyond its license renewal requirements. See *Turkey Point*, CLI-01-17, 54 NRC at 6. *Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-14, 71 NRC ___, (June 17, 2010) (slip op. at 4-8). Specifically, the NRC conducts a technical review pursuant to 10 C.F.R. Part 54 to assure that pertinent public health and safety requirements have been satisfied. *Id.* at 6. In addition, the NRC performs an environmental review pursuant to 10 C.F.R. Part 51 to

assess the potential impacts of an additional twenty (20) years of operation. *Id.* at 6–7.

Regardless of whether a license renewal application has been filed for a facility, the Commission has a continuing responsibility to oversee the safety and security of ongoing plant operations, and it routinely oversees a broad range of operating issues under its statutory responsibility to assure the protection of public health and safety for operations under the existing operating license. Therefore, for license renewal, the Commission has found it unnecessary to include a review of issues already monitored and reviewed in the ongoing regulatory oversight process. *Id.* at 8–10.

In addition to its safety review, the NRC performs an environmental review pursuant to 10 C.F.R. Part 51 to assess the potential environmental impacts of twenty additional years of operation. *Turkey Point*, CLI-01-17, 54 NRC at 6-7. Contentions raising environmental issues in a license renewal proceeding are similarly limited to those issues which are affected by license renewal and have not been addressed by rulemaking or on a generic basis. *Turkey Point*, CLI-01-17, 54 NRC at 11-12. In 10 C.F.R. Part 51, the Commission divided the environmental requirements for license renewal into generic and plant-specific components. *Id.* at 11. The Generic Environmental Impact Statement (“GEIS”) contains “Category 1” issues for which the NRC has reached generic conclusions.²⁰ *Id.* Applicants for license renewal do not need to submit analyses of Category 1 issues in their Environmental Reports, but instead may reference and adopt the generic findings. *Id.* Applicants, however, must provide a plant-specific review of the non-generic “Category 2” issues. *Id.* Category 1 issues “are not subject to site-specific review and thus fall beyond the scope of individual license renewal proceedings.” *Id.* at 12;²¹ see 10 C.F.R. § 51.53(c)(3)(i)-(ii).

²⁰ See NUREG-1437, “Generic Environmental Impact Statement for License Renewal of Nuclear Plants,” Final Report, (May 1996) (ADAMS Accession No. ML040690705).

²¹ In *Turkey Point*, the Commission recognized that “even generic findings sometimes need revisiting in particular contexts.... In the hearing process, for example, petitioners with new information

The Commission recently reiterated this principle and specified that the GEIS Category 1 conclusions generally may not be challenged in a license renewal proceeding:

In 1996, the Commission amended the environmental review requirements in 10 C.F.R. Part 51 to address the scope of environmental review for license renewal applications. The regulations divide the license renewal environmental review into generic and plant-specific issues. The generic impacts of operating a plant for an additional 20 years that are common to all plants, or to a specific subgroup of plants, were addressed in a 1996 GEIS. Those generic impacts analyzed in the GEIS are designated "Category 1" issues. A license renewal applicant is generally excused from discussing Category 1 issues in its environmental report. Generic analysis is "clearly an appropriate method" of meeting the agency's statutory obligations under NEPA.

The license renewal GEIS determined that the environmental effects of storing spent fuel for an additional 20 years at the site of nuclear reactors would be "not significant." Accordingly, this finding was expressly incorporated into Part 51 of our regulations. Because the generic environmental analysis was incorporated into a regulation, the conclusions of that analysis may not be challenged in litigation unless the rule is waived by the Commission for a particular proceeding or the rule itself is suspended or altered in a rulemaking proceeding.

Entergy Nuclear Vermont Yankee, LLC & Entergy Nuclear Operations, Inc. (Vermont Yankee Nuclear Power Station), *Entergy Nuclear Generation Co. & Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-07-03, 65 NRC 13, 17 (2000) (footnotes omitted), *reconsidered*, CLI-07-13, 65 NRC 211, 214 (2007).

B. Joint Petitioners' Contentions 1, 2, and 3 Regarding Alternatives to Relicensing Davis-Besse

Joint Petitioners have alleged three contentions based on alternatives to renewing Davis-Besse's license. Contention 1 asserts that wind would be a suitable alternative to license renewal. Contentions 2 asserts that solar would be a suitable alternative to Davis-Besse's

showing that a generic rule would not serve its purpose at a particular plant may seek a waiver of the rule." *Turkey Point*, CLI-01-17, 54 NRC at 12.

license renewal. Contention 3, in turn, asserts that a combination of wind and solar should be considered as an alternative to license renewal.

The Staff notes at the outset that aspects of Contentions 1 and 2 appear to lack an adequate factual basis and seek to litigate issues that are outside the scope of this licensing proceeding. Contentions 1 and 2 are worded such that they appear to disagree with the ER's treatment of renewable energy sources generally, although the contentions' bases and supporting information speak only to wind power and solar power, respectively.²² An "efficiency" alternative is briefly mentioned in Contention 1,²³ but Petitioners do not anywhere assert, much less provide support for an assertion, that the ER's discussion of energy efficiency programs is in any way deficient, as required by 10 C.F.R. § 2.309(f)(1)(v) and (vi).²⁴ Furthermore, Contentions 1 and 2 appear to suggest in part that the ER is deficient for failing to consider the need for Davis-Besse as a source of power for the region of interest.²⁵ Such assertions, however, do not meet the requirements of 10 C.F.R. § 2.309(f)(1)(iii), because NRC regulations plainly state that for the purposes of an operating license renewal, an ER is not required to discuss the need for power. See 10 C.F.R. § 51.53(c)(2). Therefore, the Staff opposes the admission of Joint Petitioners' Contentions 1 and 2 to the extent they challenge the ER's treatment of alternatives other than wind and solar and call on the ER to consider the need for Davis-Besse as a source of power.

The Staff also opposes the admission of Joint Petitioners' Contentions 1 and 2 because they do not raise a genuine dispute with the application. Joint Petitioners have not provided sufficient information to show a genuine dispute with the ER's conclusions that solar power and

²² See Joint Petition at 10; 68-69.

²³ *Id.* at 15-16; 18.

²⁴ Moreover, Joint Petitioners do not refer to the portion of the ER addressing energy efficiency programs, which can be found at Section 7.2.2.1, "Conservation Programs."

²⁵ See Joint Petition at 10: 68-69.

wind power cannot replace Davis-Besse as a source of 910 MWe of baseload power²⁶ by the commencement of the relicensing period, 2017. Consequently, the Board should dismiss these contentions pursuant to 10 C.F.R. § 2.309(f)(1)(vi). The Staff opposes the admission of Contention 3 because it does not raise a genuine dispute with the application and therefore does not meet the contention admissibility requirements of 10 C.F.R. § 2.309(f)(1)(vi). Furthermore, Joint Petitioners' argument that the GEIS is outdated is not litigable in this proceeding. Therefore, Contention 3 should not be admitted because it does not meet the contention admissibility requirements of 10 C.F.R. § 2.309(f)(1)(iii) and (vi).

The Staff begins its analysis of Joint Petitioners' proposed contentions with a discussion of issues common to Contentions 1 and 2. Following that discussion, the Staff discusses Contention 2, then Contention 1, individually. Finally, the Staff concludes its discussion of the alternatives analysis contentions with proposed Contention 3.

1. Legal Standards Governing Contentions Challenging Alternatives Analyses in an ER

An applicant is required to include in its ER "an analysis that considers and balances . . . the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects." 10 C.F.R. § 51.45(c). An applicant's alternatives analysis is not required to discuss every conceivable alternative to the proposed action. Rather, NEPA requires only consideration of "feasible, nonspeculative, and reasonable

²⁶ A baseload generating unit runs continuously to produce electricity at an essentially constant rate in order to satisfy all or part of the minimum, or base, system load. U.S. Department of Energy, U.S. Energy Information Administration, "Overview – Generating Capability/Capacity," available at <http://www.eia.doe.gov/electricity/page/prim2/chapter2.html>. The GEIS, in its discussion of intermittent versus baseload technologies, also cites a U.S. Department of Energy study that describes a baseload source as "able to operate at all times," as distinct from "peaking" and "intermittent" sources. See, e.g., GEIS § 8.3.1 ("Wind") (citing DOE/EIA-0561, Renewable Resources in the U.S. Electricity Supply, U.S. Department of Energy, Energy Information Administration, Washington, D.C., February 1993, Appendix C at 73).

alternatives.”²⁷ In defining the scope of alternatives that must be considered by an applicant, the Commission has held that an ER “need only consider the range of alternatives that are capable of achieving the goals of the proposed action.”²⁸

FENOC’s ER identifies the goal of the present action as the relicensing of Davis-Besse to generate approximately 910 MWe²⁹ of baseload power for an additional twenty years of operation. Applicant’s Environmental Report Operating License Renewal State, at Attachment E (August 2010) (ADAMS Accession Nos. ML102450568 & ML102450563) (“ER”) at 7.1-3; 7.2-1. The NRC generally defers to an applicant’s stated purpose “so long as that purpose is not so narrow as to eliminate alternatives.”³⁰ Generation of baseload power is an acceptable purpose for a licensing action and has been determined to be broad enough “to permit consideration of a host of energy generating alternatives.” *Envtl. Law & Policy Ctr.*, 470 F.3d 676, 684 (7th Cir. 2006). Discussing alternatives that could meet system generating needs, the ER states that, if the Davis-Besse operating license is not renewed, Ohio and the wholesale power market “would lose approximately 910 MWe of baseload capacity,” and further states, “[c]onsidering that Davis-Besse serves as a large base-load generator, FENOC considers reasonable alternatives to be those that would also be able to generate base-load power.” ER at 7.2-1. Referring specifically to alternatives requiring new generating capacity, the ER indicates that the “[c]riteria used to determine if the potential energy alternatives represent a reasonable alternative include

²⁷ *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 & 3), LBP-08-14, 68 NRC 43, 95 (2008). See also *Nuclear Mgmt. Co., LLC* (Monticello Nuclear Generating Plant), LBP-05-31, 62 NRC 735, 753 (2005) (citing *Vermont Yankee*, 435 U.S. at 551); *City of Carmel-by-the-Sea v. Dep’t of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1997); *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), CLI-91-2 (1991).

²⁸ *Hydro Res., Inc.* (P.O. Box 15910, Rio Rancho, New Mexico 87174), CLI-01-4, 53 NRC 31, 55 (2001); *Rancho Seco*, CLI-93-3, 37 NRC at 144-45.

²⁹ The ER uses 910 MWe for calculation convenience in place of the actual net generating capacity of 908 MWe. See ER at 7.1-3; 7.2-1.

³⁰ *South Carolina Elec. & Gas Co.* (Virgil C. Summer Nuclear Station, Units 2 and 3), LBP-09-2, 69 NRC 87, 110 (2009).

whether the alternative is developed and proven, *can provide generation of approximately 910 MWe of electricity as a base-load supply*, is economically feasible, and does not impact the environment more than Davis-Besse.” *Id.* at 7.2-7 (emphasis added).

As these statements in the ER indicate, the ability of individual wind and solar alternatives to serve as baseload replacement power for Davis-Besse is material to the ER’s determination of whether either technology is a reasonable alternative to the relicensing action. The ER states that intermittency and availability issues remain obstacles that prevent either wind or solar power from serving as a baseload source of 910 MWe of electricity, and the ER in both cases concludes that neither will provide a reasonable alternative to Davis-Besse. *Id.* at 7.2-9; 7.2-10. Therefore, to demonstrate the existence of a material dispute with the ER, Petitioners must provide sufficient information to dispute the conclusion that neither wind (Contention 1) nor solar (Contention 2) can reasonably be expected to provide approximately 910 MWe of baseload power at the time that the period for extended operation would commence, that is, 2017.³¹

Recent Commission and Board decisions have considered, and rejected, similar contentions relating to the adequacy of an alternatives analysis on the basis that the petitioners did not sufficiently demonstrate that the proposed alternative could achieve the goals of the proposed action.³² In *Summer*, the Board denied admission of a contention challenging the

³¹ While the 910 MWe of replacement baseload power must be available by 2017, the time period for consideration of alternatives should be based on information presently available. The Supreme Court has held that an EIS, and thus the alternatives analysis required therein, must be prepared when a project is proposed. *Kleppe v. Sierra Club*, 427 U.S. 390, 405-06 (1976). Accordingly, the environmental documents that are required to be prepared by Part 51 and NEPA must be prepared at the present time because the license renewal decision is being made now. While a certain level of prediction on the part of an agency is implicit in NEPA, only alternatives that are not considered “remote and speculative possibilities” need be analyzed. *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 551 (1978).

³² All of the decisions discussed herein were entered in combined license (COL) proceedings.

analysis of wind, biomass and solar alternatives in the applicant's ER.³³ The Board noted that the purpose of the proposed action was to develop approximately 2,000 MWe of baseload power, and found that the petitioners did not meet the requirements of 10 C.F.R. § 2.309(f)(1)(vi) because they did not challenge the applicant's conclusion that individual wind, biomass and solar alternatives could not generate baseload power. *Summer*, LBP-09-2, 69 NRC at 110.³⁴ On appeal, the Commission examined the petitioners' supporting expert declaration in upholding the Board's ruling excluding the alternatives contention.³⁵ The Commission noted that, although the expert declaration deemed wind power a "proven source of generation," it also recognized wind power as intermittent and unable to supply baseload power. *Summer*, CLI-10-1, 71 NRC at ___ (Jan. 7, 2010)(slip op. at 13). Further, although the expert declaration spoke to progress in the development of solar technology, it did not directly challenge the analysis contained in the ER. *Id.* The Commission observed that "such general assertions, without some effort to show why the assertions undercut findings or analyses in the ER, fail to satisfy the requirements of Section 2.309(f)(1)(vi)." *Id.*

In *Levy County*, the Board denied admission to a contention challenging the applicant's analysis of solar power and thermal options in its ER.³⁶ The Board based its ruling in part on the petitioners' failure to allege facts supporting their claim that solar water heating could serve as a substitute for the proposed project, noting that the petition and the documents it cited

³³ The contention stated, "SCE&G dismisses the potential of renewable sources of power, such as solar, wind, [and] biomass to contribute substantially to meeting its future need for resources." *Summer*, LBP-09-2, 69 NRC at 110.

³⁴ The Board further found that the petitioners did not point to any specific error in the applicant's analysis of renewable alternatives. *Summer*, LBP-09-2, 69 NRC at 110.

³⁵ *South Carolina Elec. & Gas Co. & South Carolina Pub. Serv. Auth.* (Also Referred to as Santee Cooper) (Virgil C. Summer Nuclear Station, Units 2 & 3), CLI-10-1, 71 NRC ___ (Jan. 7, 2010) (slip op. at 13).

³⁶ *Progress Energy Florida, Inc.* (Levy County Nuclear Power Plant, Units 1 & 2), LBP-09-10, 70 NRC 51, 96 (2009), *rev'd in part on other grounds*, CLI-10-2, 71 NRC ___ (Jan. 7, 2010)(slip op.).

provided no information to suggest that a solar water heating alternative could realistically substitute for a proposed 2200 MWe project. *Levy County*, LBP-09-10, 70 NRC at 96.³⁷ Finally, in *Calvert Cliffs*, the Board denied admission to a contention challenging the Draft Environmental Impact Statement's ("DEIS") analysis of wind and solar alternatives for failure to meet the requirements of 10 C.F.R. § 2.309(f)(1)(vi).³⁸ The Board noted that the NRC Staff's DEIS dismissed each alternative as unreasonable because "neither of those sources was deemed capable of serving the purpose and need of the project, generating 1600 MW(e) of baseload power," and held that, "[b]ecause Intervenors [did] not contest that basic conclusion," the petitioners did not present a genuine dispute with the DEIS. *Calvert Cliffs*, LBP-10-24, 72 NRC __ (slip op. at 43-44).³⁹

Joint Petitioners assert challenges to many aspects of the ER's wind and solar alternatives analyses, but here, as in the decisions above, they do not challenge the ER's ultimate conclusion that neither wind nor solar power can be a reasonable baseload power alternative to relicensing. Because Joint Petitioners do not provide sufficient information to establish that individual wind and solar alternatives will be a viable source of 910 MWe of baseload power by 2017, and thereby do not show how a detailed study of these alternatives is required under NEPA, the Joint Petitioners do not demonstrate the existence of a material factual dispute with FENOC's ER as required by § 2.309(f)(1)(vi).

³⁷ The Board also concluded that the contention was inadmissible because the petitioners had phrased it essentially as a contention of omission, arguing that the ER failed to address the option of solar thermal water heating, where the ER had, in fact, discussed such an option. *Id.* at 69/131.

³⁸ *Calvert Cliffs 3 Nuclear Project, LLC & Unistar Nuclear Operating Serv., LLC* (Combined License Application for Calvert Cliffs, Unit 3), LBP-10-24, 72 NRC __ (Dec. 28, 2010) (slip op. at 43-44).

³⁹ *See also Detroit Edison Co.* (Fermi Nuclear Power Plant, Unit 3), LBP-09-16, 70 NRC 227, 303-04 (2009) (ruling inadmissible an alternatives contention that failed to present factual or expert support sufficient to show that an ER disregarded a feasible alternative based on wind power, solar power, or a combination of the two).

2. Contention 2 Does Not Raise a Genuine Material Dispute With the ER's Conclusion that Solar Power Cannot Replace Davis-Besse As a Source of Baseload Power

Joint Petitioners state in Contention 2:

[FENOC's] Environmental Report fails to adequately evaluate the full potential for renewable energy sources, such as solar electric power or photovoltaics . . . to offset the loss of energy production from Davis-Besse, and to make the requested license renewal action from 2017 to 2037 unnecessary.

Joint Petition at 68-69.

Joint Petitioners' proposed Contention 2 does not raise a material dispute with FENOC's application as required by 10 C.F.R. § 2.309(f)(1)(vi). Joint Petitioners have neither alleged nor provided sufficient information to support the assertion that photovoltaic (PV) solar energy can replace Davis-Besse's baseload power generation. Accordingly, Joint Petitioners do not raise a genuine dispute with FENOC's ER, which concludes that solar power is not a reasonable alternative to Davis-Besse's license renewal.

FENOC's ER concludes that solar power is not a reasonable alternative to Davis-Besse's license renewal primarily because "it is an intermittent source of energy, requiring energy storage or a supplemental power source to provide electric power at night." ER at 7.2-9-10. Additionally, solar power would require 12,740 acres of land to generate 910 MWe of electricity. *Id.* Finally, FENOC determines that, because "many solar power technologies are still in the demonstration phase," high costs render use of solar power cost-prohibitive. *Id.*

a. Joint Petitioners' Exhibits Demonstrate that Solar is Not Suitable as a Replacement for Baseload Power

One of FENOC's primary reasons for classifying solar power as an unreasonable alternative is the fact that solar power is an intermittent source of energy, and that "energy storage or a supplemental power source [would be needed] to provide electric power at night." ER at 7.2-9-10. Joint Petitioners attempt to overcome this issue by including in their petition a discussion of solar power's ability to meet the time-of-day demand curve for electricity. See

Joint Petition at 85. Joint Petitioners' discussion, however, focuses on how solar power can reduce "the demand on fuels used for peak power generation." Joint Petition at 85. Joint Petitioners have confused the idea of baseload power with meeting peak load demands, which do not fulfill the same purpose. Joint Petitioners assert, and support, their proposition that solar power can be used to *supplement* nuclear power during peak demand in place of fuels that have higher emissions, like coal. *Id.* Joint Petitioners also state that solar power can help reduce the peak demand of electricity. *Id.* While all this may be true, the point is inconsequential because Joint Petitioners do not address the problem of solar power's intermittency or explain how a reduction of peak electrical demand will allow FENOC to provide baseload power during times when solar power cannot be generated. Joint Petitioners must allege and support the assertion that solar power can provide 910 MWe of baseload power in order to raise a genuine dispute with FENOC's conclusion that solar power is an unreasonable alternative. Here, Joint Petitioners do not demonstrate or even suggest a way for FENOC to overcome the drawback of the intermittency of solar power without resorting to additional distinct and separate power generating sources. Therefore, Joint Petitioners do not raise a genuine dispute with the application, as is required by 10 C.F.R. § 2.309(f)(1)(vi).

b. Joint Petitioners' Challenges to the ER Do Not Raise a Genuine Dispute with FENOC's Application

Joint Petitioners assert that FENOC's ER contains several "omissions, errors, and inadequacies." Joint Petition at 70. First, Joint Petitioners claim that "FENOC has failed to recognize that the solar industry has developed rapidly since 1996," the year the GEIS was published. *Id.* Joint Petitioners also assert that the cost of solar has been steadily declining since 1996, and that FENOC fails to take this into consideration in its ER. *Id.* at 71, 74-75. Further, Joint Petitioners take issue with FENOC's reliance on the GEIS's conclusion that the western United States has the best potential for solar power, arguing that this conclusion is based on the misconception that solar energy is only collected from direct sunlight. *Id.* at 77.

Joint Petitioners also argue that solar power has a much smaller footprint than nuclear power, and that use of solar energy would meet Ohio's mandates for renewable energies. *Id.* at 71. Finally, Joint Petitioners state that "[e]conomical sources of energy storage and back-up power are available to provide good base-load power, in conjunction with solar." *Id.* Joint Petitioners acknowledge that solar is not suitable for baseload power without other forms of power generation.

Joint Petitioners' argument that the solar industry has developed rapidly since 1996 does not undermine FENOC's conclusion that solar power is not a reasonable alternative to Davis-Besse's license renewal. While Petitioners claim that solar energy output in 2010 worldwide was twenty times the energy generation of Davis-Besse,⁴⁰ Joint Petitioners do not demonstrate that there is enough solar power installed and readily accessible in FENOC's Region of Interest ("ROI") to provide baseload power. Because Joint Petitioners have not alleged that the rapidly growing solar industry can provide baseload power by 2017 in FENOC's ROI, a genuine dispute has not been raised with the application sufficient to support an admissible contention.

FENOC concludes that solar power is an unreasonable alternative to Davis-Besse's license renewal due to the fact that it is costly and cannot provide 910 MWe of baseload power to replace Davis-Besse's generating capacity. Joint Petitioners challenge FENOC's conclusion that solar power is too costly, citing a variety of sources that show the cost of solar power has decreased since 1996. The Staff does not dispute the idea that the cost of installing and utilizing solar energy may have decreased in the last 14 years. However, challenging FENOC's conclusion that solar power is too expensive to be "competitive with fossil or nuclear-based technologies"⁴¹ does not undermine FENOC's ultimate conclusion that solar power is an unreasonable alternative to Davis-Besse's license renewal. Even if solar energy was shown to

⁴⁰ Joint Petition at 73.

⁴¹ ER at 7.2-10.

be a competitively priced alternative, Joint Petitioners still have not shown that it is capable of replacing Davis-Basse's 910 MWe baseload power.⁴² Their petition acknowledges that solar is an intermittent source, which is, therefore, not capable of providing baseload power without additional back-up power sources. See Joint Petition at 71. Joint Petitioners' assertions do not support that solar is capable of economically competing based on costs with more traditional sources of power. Joint Petitioners therefore have failed to raise a genuine dispute with FENOC's application, in contravention of the requirements 10 C.F.R. § 2.309(f)(1)(vi).

Joint Petitioners argue that FENOC's conclusion that the ROI is not as promising a source of solar power than the southwestern United States is based on a misconception that only direct sunlight is a source of solar power. Joint Petition at 77. Joint Petitioners argue that measuring indirect sunlight in addition to direct sunlight is the proper method of calculating the potential for solar energy in FENOC's ROI. *Id.* Joint Petitioners provide two maps to support their argument. See Exhibits 59 and 60, Joint Petition at 77. However, Joint Petitioners do not demonstrate that an adjustment to NRC's calculations would alter the conclusion in the ER that "[s]olar resource availability in Ohio, western Pennsylvania, and northern West Virginia is low compared to other parts of the United States." ER at 7.2-10. The ER concludes that solar resources in the ROI provide "less than half of that available in the southwestern United States." *Id.* At best, according to Joint Petitioners' calculations, the ROI will generate 67% of the solar power generated in the Mojave Desert. *Id.* However, Joint Petitioners do not show that this increase in solar resource availability will enable solar energy to provide 910 MWe of baseload power to replace Davis-Besse.

Joint Petitioners also argue that rooftop installations of solar panels can reduce the amount of land needed for installation of solar technology, which the ER concludes is large. Joint Petition at 80. However, Joint Petitioners do not challenge the ER's conclusion that a

⁴² See *Calvert Cliffs*, LBP-10-24, 72 NRC at ___ (slip op. at 44).

large amount of land would be needed to install enough solar panels to replace Davis-Besse's 910 MWe baseload power. Also, the study cited by the Joint Petition focuses on market penetration and is decidedly forward-looking, stating that "there is significant *potential* in the United States for PV on buildings." Exhibit 61 at vii (emphasis added). Since buildings sit on land, Joint Petitioners have not demonstrated that rooftop installations can reduce the amount of land needed for 910 MWe baseload power generation by 2017. Joint Petitioners have therefore not undermined the conclusion in the ER that large amount of land resources are necessary for solar power to be a viable alternative to Davis-Besse's license renewal.

Joint Petitioners' assertion that solar power has less of a carbon footprint than nuclear power, and their concern that Davis-Besse's license renewal will not satisfy Ohio's mandate regarding renewable energies, also does not raise a genuine dispute with FENOC's application. Joint Petitioners only make blanket statements regarding solar power's low emissions without referencing FENOC's LRA at all. See Joint Petition at 82-83. Similarly, Joint Petitioners voice their concern that Davis-Besse's license renewal will not allow FENOC to meet a state-mandated requirement to utilize renewable power sources to generate a certain percentage of electricity.⁴³ Again, Joint Petitioners do not mention FENOC's application and do not use this information to dispute FENOC's conclusion that solar energy is not a reasonable alternative to Davis-Besse's license renewal.

Finally, Joint Petitioners contend that "wide-scale installation of solar power combined with a storage facility" is a viable alternative to Davis-Besse's license renewal. Joint Petition at 89. Joint Petitioners mention FENOC's purchase of the Norton Energy Storage Project, a cavern that will be used to develop compressed-air energy storage, as support for their

⁴³ See *Louisiana Energy Services, LP* (National Enrichment Facility), LBP-05-13, 61 NRC 385, 419 (2005) ("compliance with state requirements is . . . a matter for the state") (citing *Consolidated Edison Company of New York* (Indian Point, Unit 2), ALAB-453, 7 NRC 31, 34 (1978)). NRC is but one decision-maker in the licensing process; state decisions regarding such issues as energy needs in their jurisdictions operate separately from decisions made by this agency.

assertion that storage of solar power is cost effective. *Id.* Joint Petitioners state that the Norton Project has the potential “to provide storage for up to 2700 MW of capacity which is about three times the size of the 908 MW Davis-Besse nuclear plant.” *Id.* Unfortunately, in order to successfully provide a baseload level that is equal to Davis-Besse’s 910 MWe, “wide-scale installation of solar power”⁴⁴ is needed *in addition* to development of the Norton project, neither of which Joint Petitioners show to be feasible by 2017. In fact, the press release cited by Joint Petitioners states that FENOC is “evaluating its options related to the project, but has not yet committed to development scope or timing.” See Exhibit 54. Because Joint Petitioners have not demonstrated that 910 MWe of baseload power can be generated through solar panels or storage in the Norton facility by 2017, it has not shown that a genuine dispute exists with the application because it has not shown that FENOC’s conclusion that solar power is an unreasonable alternative is incorrect.

In summary, Joint Petitioners’ proffered Contention 2 is inadmissible because it does not raise a genuine dispute with FENOC’s application. Though Joint Petitioners assert many arguments in this contention, they do not succeed in demonstrating that solar power can replace the 910 MWe of baseload power that Davis-Besse provides and acknowledge in their petition that solar is an intermittent energy source. Therefore, Contention 2 does not meet the admissibility requirements of 10 C.F.R. § 2.309(f)(1) and is inadmissible.

3. Contention 1 Does Not Raise a Genuine Material Dispute With the ER’s Conclusion that Wind Power Cannot Replace Davis-Besse As a Source of Baseload Power

Contention 1 reads:

The FirstEnergy Nuclear Operating Company [FENOC] Environmental Report fails to adequately evaluate the full potential for renewable energy sources, such as wind power, to offset the loss of energy production from Davis-Besse, and to make the requested license renewal action from 2017 to 2037 unnecessary.

⁴⁴ Joint Petition at 89.

In violation of the requirements of 10 C.F.R. §51.53(c)(3)(iii) and of the GEIS § 8.1, the FENOC Environmental Report (§ 7.2) treats all of the alternatives to license renewal except for natural gas and coal plants as unreasonable and does not provide a substantial analysis of the potential for significant alternatives, such as wind power, in the Region of Interest for the requested relicensing period of 2017 to 2037. The scope of the SEIS⁴⁵ is improperly narrow, and the issue of the need for Davis-Besse as a means of satisfying demand forecasts for the relicensing period must be revisited due to dramatically-changing circumstances in the regional energy mix that are currently underway already during this decade of Davis-Besse's remaining operating license (2010 to 2017), and can especially be expected to accelerate and materialize over two decades to come covering FENOC's requested license extension period (2017 to 2037).

Petition at 10-11. Contention 1 does not meet the admissibility requirements of 10 C.F.R. § 2.309(f)(1)(vi) because it fails to demonstrate a genuine dispute with the application on an issue material to the NRC's licensing decision. Joint Petitioners have neither alleged nor provided sufficient information to support their assertions that offshore and onshore wind energy can replace Davis-Besse's baseload power generation. Accordingly, Joint Petitioners do not raise a genuine dispute with the ER, which concludes that wind power is not a reasonable alternative to relicensing.

a. The Joint Petitioners have Not Produced Sufficient Evidence to Demonstrate that Wind Power Can Serve as a Baseload Power Replacement

The Davis-Besse ER dismisses wind as a reasonable alternative to relicensing for several reasons. The ER states that the average annual capacity factors for wind plants are less than 30 percent. ER at 7.2-9. For this reason, the ER concludes that "wind power by itself is not suitable for large base-load capacity." *Id.* The ER also rejects wind power as an alternative because it presents technological challenges. The ER acknowledges that wind power combined with energy storage technology might enable wind to serve as a means of

⁴⁵ The Staff interprets the Joint Petitioners' reference to the "SEIS" as an inadvertent misstatement. At this stage in the license renewal process, the ER stands in for the SEIS, and so the appropriate challenge is to the Applicant's ER. See 10 C.F.R. § 2.309(f)(2).

providing baseload power. However, the ER states, “current energy storage technologies are too expensive for wind power to serve as a large baseload generator.” *Id.* The ER concludes that, “[c]onsidering that wind conditions are variable [and] energy storage technologies do not currently allow supply to more closely match demand,” a utility-scale wind power project is not a reasonable alternative. *Id.*

The ER also rejects wind as an alternative for its significant land requirements and aesthetic impacts. *Id.* The ER states that an estimated 214 square miles of land would be required to generate 910 MWe of power, although it concedes that wind turbines could be collocated with other land uses. *Id.* The ER notes that “[n]oise produced by the rotor blades, visual impacts, and bird and bat fatalities are also of some concern.” *Id.*

Joint Petitioners assert several arguments regarding the ER’s analyses and conclusions on the wind power alternative. Joint Petitioners broadly disagree with the ER’s conclusion that wind is not a reasonable alternative to relicensing, see Joint Petition at 18; 47; 52, and disagree with the ER’s conclusion that wind power cannot provide baseload power due to intermittency and technological challenges, stating that solutions to address intermittency and baseload will be “reasonably, scientifically and commercially projected as available” for the period 2017-2037 in the “Applicant’s region of interest (Ohio, Pennsylvania, West Virginia, New Jersey).” Joint Petition at 38; see *also* Joint Petition at 42. With respect to their challenge to the ER’s conclusions regarding baseload power, Joint Petitioners have asserted on the face of their petition that a dispute exists with the ER on a material issue — whether wind power can serve as baseload power replacement for Davis-Besse’s 910 MWe by 2017. However, bare assertions alone do not “suffice to allow the admission of a proffered contention.” *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-07-03, 65 NRC 237, 253 (2007). Under 10 C.F.R. 2.309(f)(1)(vi), Joint Petitioners must provide sufficient information to support their assertions in order to demonstrate that a genuine, material dispute actually exists. This Joint Petitioners have not done. Although the petition is accompanied by a large volume of

exhibits and excerpted passages from these documents, none of the information Joint Petitioners provide in their stated bases or exhibits, separately or taken together, amounts to a material dispute of the ER's conclusion that wind cannot provide 910 MWe of baseload power by 2017.

As discussed above, the Commission has held that an ER's alternatives analysis "need only consider the range of alternatives that are capable of achieving the goals of the proposed action."⁴⁶ Again, the stated purpose of the present relicensing action is to generate approximately 910 MWe of baseload power. ER at 7.1-3; 7.2-1. One of the criteria the ER used to assess each power generation alternative was whether the alternative could "provide generation of approximately 910 MWe of electricity as a base-load supply." ER at 7.2-7. Joint Petitioners in this case do not dispute the ER's determination that a reasonable alternative is one that provides baseload power.⁴⁷

Further, Joint Petitioners recognize that wind as a baseload power alternative is currently limited by its intermittency. See Joint Petition at 38; 40; 41; 42; 43. For Contention 1, Joint Petitioners cite approximately 50 studies in support of their claim that wind power is a reasonable alternative to relicensing Davis-Besse. Of these, only four⁴⁸ provide information

⁴⁶ *Hydro Res., Inc.* (P.O. Box 15910, Rio Rancho, New Mexico 87174), CLI-01-4, 53 NRC 31, 55 (2001); *Rancho Seco*, CLI-93-3, 37 NRC at 144-45.

⁴⁷ The Petition quotes from *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190 (D.C. Cir. 1991) for the proposition that "outcome-controlled 'rigging' of purpose and need violates NEPA," but does not go further to allege a dispute with the ER's stated purpose of use of baseload as a factor in assessing the reasonableness of an energy alternative. See Petition at 56.

⁴⁸ Exhibits 11, 43 and 48 are not included in this figure. Exhibit 48, an article in *Scientific American*, pertains to solar power, not wind power. See Exhibit 48 at 64; see also Joint Petition at 38 (apparently citing the article for the proposition that solutions to baseload wind power will be available for the 2017 to 2037 timeframe). Exhibit 43, a U.S. Department of Energy (DOE) study entitled "20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply," is simply listed after a statement accusing FENOC of choosing not to include the study in its ER. See Joint Petition at 62. Exhibit 11, a book by Arjun Makhijani entitled *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy*, is cited for the proposition that compressed air storage technology has enabled wind power to surmount intermittency challenges. See Joint Petition at 28. However, Joint Petitioners have not identified any page or specific portion of the book that provides support for such a statement. Nor have they explained how the exhibit supports their contention, stating only that "Dr. Makhijani has made

relating to wind power's ability to overcome baseload and intermittency issues.⁴⁹ None of these documents stand for the proposition that wind power can reasonably be expected to serve as a source of 910 MWe of baseload power within the next six years.

First, Exhibit 20 provides a one-page conceptual description of a hypothetical baseload wind power system. The document notes that “[t]he large-scale deployment of wind energy is ultimately limited by its intermittent output...” and concludes by stating that the “[d]evelopment of the ‘baseload’ wind concept will require a greater understanding of the local geologic compatibility of air storage, and additional work will be required to examine the feasibility of advanced wind/[compressed air energy storage] concepts described here.” Exhibit 20 at 1. Second, Exhibit 21 provides an analysis of the technical feasibility of overcoming intermittency issues by interconnecting wind farms through the transmission grid. Exhibit 21 at 1701 (“Abstract”). The study acknowledges that, in contrast to alternatives like coal power, wind is

such points in [his book] and his related public presentations and writings since then.” *Id.* at 28. Simply attaching or referring to these documents, without explanation of their significance, is not adequate support for a contention. *USEC, Inc.* (American Centrifuge Plant), CLI-06-10, 63 NRC 451, 472, 478 (2006); *Vogtle*, LBP-07-3, 65 NRC at 253-54 (citing *Fansteel, Inc.* (Muskogee, Oklahoma Site), CLI-03-13, 58 NRC 195, 204-05 (2003)).

Nevertheless, a search of the Makhijani book revealed a section entitled “Wind Energy,” which describes the state of wind energy potential in the U.S. as of approximately 2005, and notes, “The wind energy resource is quite sufficient to supply the entire electricity requirement of the country for some time to come under any scenario, if total potential were the only consideration. Of course, it is not. Intermittency is a critical issue.” Exhibit 11 at 31. The book indicates that the variability of wind energy requires the addition of reserve capacity other than wind that can be tapped when wind output cannot match demand. *Id.* at 31 and graph at 32. Finally, the book does state that compressed air storage can be used to store off-peak wind energy and displace the use of natural gas. *Id.* at 70. However, it goes on to state, “A great deal of optimization of large-scale wind, solar, and storage systems, including, possibly, compressed air systems would be necessary to arrive at a sound estimate of an economical combination of generation capacity ... and compressed air storage.” *Id.*

A search of the EERE study's table of contents did not readily indicate a discussion on overcoming intermittency issues to meet baseload requirements. See *generally* Exhibit 43 at i-v.

⁴⁹ Exhibit 20, National Renewable Energy Laboratory, United States Department of Energy, “Creating Baseload Wind Power Systems” (Oct. 3, 2006); Cristina L. Archer and Mark Z. Jacobsen, *Supplying Baseload Power and Reducing Transmission Requirements by Interconnecting Wind Farms*, 46 *J. Applied Meteorology & Climatology* 1701 (2007); Willett Kempton et al, *Electric Power from Offshore Wind Via Synoptic-Scale Interconnection*, Proceedings of the National Academy of Sciences (2010); and National Renewable Energy Laboratory, United States Department of Energy, “Eastern Wind Integration and Transmission Study” (Jan. 2010).

not used to supply baseload electric power today. *Id.* The study concludes that interconnected wind power might contribute to a portion of baseload energy, *id.* at 1702-03, but does not indicate a timeframe in which this might occur.⁵⁰ Third, Exhibit 25 offers a hypothetical Atlantic Transmission Grid as a solution to the problem of wind fluctuation. Exhibit 25 at 1.⁵¹ The study hypothesizes that the intermittency of wind power generation “might be smoothed and leveled” by combining the output of generating stations “at distances more than 750-1,300 km,” *id.* at 3, and concludes such a grid could enable offshore wind to serve as a higher fraction of electric generation. *Id.* at 6 (emphasis added). However, the study does not hypothesize a timeframe in which the construction of such an offshore transmission grid might occur, and suggests that institutions will need to be developed to create and manage the power system it describes. *Id.* at 1, 6.⁵² Finally, Exhibit 26 describes hypothetical scenarios for achieving a scenario in which wind power, through an offshore transmission grid, provides 20% of electric power for the Eastern Interconnection by 2024, seven years after Davis-Besse’s license renewal period would commence. Exhibit 26 at 22. The study explicitly states that the scenarios envisioned “do not in any way constitute a plan,” and that “the transition over time from the current state of the bulk power system to any one of the scenarios would require additional technical and economic evaluation” *Id.* at 28. Furthermore, the study notes that high penetrations of wind generation are technically feasible only with significant capital investments and expansion of the transmission infrastructure. *Id.* at 27; 29. Indeed, Joint Petitioners acknowledge in their petition

⁵⁰ See *generally* Exhibit 21. Significantly, the study, published in 2007, identifies itself as the first to examine the ability of interconnected wind farms to provide baseload power. Exhibit 21 at 1702. This fact further suggests that baseload wind power is still an emerging technology that is not yet fully developed.

⁵¹ This study never explicitly addresses the concept of baseload wind power, but it does address the underlying issue, wind intermittency.

⁵² The study also casts doubt on the economic viability of storage as a means to level wind power variability, stating, “Transmission is far more economically effective than utility-scale electric storage ... whose capital costs are approximately equal to generation.” Exhibit 25 at 6.

that key barriers exist to the development of offshore wind as a baseload energy source, including unresolved technical, financial and permitting barriers. Joint Petition at 58.

Based on the information provided by Joint Petitioners, a wind power alternative does not appear to be a reasonable replacement for Davis-Besse. Contrary to Joint Petitioners' assertion that the barriers to baseload wind power can be overcome by the relicensing period, see Joint Petition at 38; 59, each of the exhibits described above either implicitly or explicitly treats baseload wind power as an emerging concept, and none indicates that the problem of intermittency will be realistically addressed by 2017. Therefore, despite the volume of information provided by Joint Petitioners in support of this contention, they have not provided any piece of information that demonstrates a genuine, material dispute with the application. See 10 C.F.R. 2.309(f)(1)(vi).

Joint Petitioners present a number of additional arguments with the ER's analyses and conclusions regarding the wind power alternative, but these arguments also do not amount to a material dispute with the application. First, Joint Petitioners disagree with the ER's characterization of the region of interest's wind power potential, including the ER's description of Ohio's coastal region. *Id.* at 22-27; 36-37; 61. Second, Joint Petitioners disagree with the ER's determination that storage is a cost-prohibitive impediment to the development wind as a baseload alternative. *Id.* at 28-30; 36-37. Third, Joint Petitioners disagree with the ER's statements regarding aesthetic and visual impacts. *Id.* at 27-28; 36-27. Finally, they disagree with the ER's statements regarding wind power's impacts on wildlife and impacts from noise. *Id.* at 30; 31; 36-37. Even assuming that Joint Petitioners demonstrate a genuine dispute with the ER on each of these issues, however, they have not established that such a dispute could be material. The inability to provide baseload generating power, standing alone, renders wind power an unreasonable alternative to nuclear power in light of the purpose and need of the proposed action. See ER at 7.2-7.

Joint Petitioners assert that the wind power potential and installed wind power capacity for the region is greater than that cited in the ER and therefore demonstrates that wind is a reasonable alternative to Davis-Besse. See Petition at 61. They have provided alternative figures on wind power potential and installed wind power capacity for both onshore and offshore wind. See, e.g., Joint Petition at 61 (stating that “up to 250 gigawatts” of developable wind power potential exists on the Great Lakes (no authority cited)); Joint Petition at 35 (stating that, even accounting for a 30% capacity factor, the wind power potential of Ohio, Pennsylvania, West Virginia and New Jersey together amounts to approximately 18,000 MW⁵³). Taking Joint Petitioners’ figures as a true indication of growing momentum in the development of wind power as an energy source in the Applicant’s region, this information nevertheless does not express a dispute with the ER’s fundamental conclusion that a commercial wind power project generating 910 MWe of power – even accounting for capacity factors – cannot yet establish baseload availability. See ER at 7.2-9.

Joint Petitioners also assert that storage is not a cost-prohibitive impediment to the development of wind as a baseload alternative. *Id.* at 28-30; 36-37. As in Contention 2, discussed above, Joint Petitioners refer to FENOC’s purchase of the Norton Energy Storage Project, a cavern that will be used to develop compressed-air energy storage, as support for their assertion that storage of wind power is not cost-prohibitive. *Id.* And, as in Contention 2, the press release cited by the Joint Petitioners does not establish that an investment in this storage facility will render the storage of energy equal to the amount required to produce 910 MWe of baseload power cost-effective. The press release is noncommittal with respect to the scope and timing of any use to which it may be put, stating that FENOC is “evaluating its options related to the project, but has not yet committed to development scope or timing.” See

⁵³ The “installed capacity” figures proffered by Joint Petitioners show the potential megawatts of capacity that could be installed on available windy land area. See Exhibit 16 at 1.

Exhibit 54 at 2.⁵⁴ Furthermore, the petition acknowledges that there are only two commercial-scale compressed air electric generating facilities in the world, neither of which store electricity at amounts near the level required to replace Davis-Besse. See Joint Petition at 29; Exhibit 11 at 70. Although the technology has been in place since 1978, no further facilities have been implemented. See Joint Petition at 29; Exhibit 54 at 2.

Finally, Joint Petitioners claim that FENOC must make “reasonable forecasts of the future” in order to comply with NEPA. Joint Petition at 18. The cases Joint Petitioners cite, however, are inapposite. Both *Prairie Island* and *HRI* discuss the applicant’s duty to make “reasonable forecasts of the future” with regard to the environmental *effects* of proposed actions, and not with regard to what alternatives may or may not be technologically available. See *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 & 2), ALAB-455, 7 NRC 41, 48 (1978); *HRI*, LBP-04-23, 60 NRC at 447-48. Petitioners do not cite to any regulations or case law that supports the argument that FENOC’s ER must look beyond what is presently available in formulating its evaluation of *alternatives*. Indeed, the Supreme Court has held that an EIS, and thus the alternatives analysis required therein, must be prepared when a project is proposed. *Kleppe v. Sierra Club*, 427 U.S. 390, 405-06 (1976). Accordingly, the environmental documents that are required to be prepared by Part 51 and NEPA must be prepared now because the license renewal decision is being made now, not six years from now. While a certain level of prediction on the part of an agency is implicit in NEPA, only alternatives that are not considered “remote and speculative possibilities” need be analyzed.⁵⁵

However, even allowing for a “reasonable forecast,” Joint Petitioners do not allege sufficient information to dispute the ER’s conclusion that wind power cannot provide 910 MWe

⁵⁴ Moreover, FENOC’s press release notes that the information it contains involves estimates, assumptions, risks and uncertainties that could cause actual results to differ materially from the future results projected in the release. The press release lists many possible uncertainties that might impact FENOC’s future activities. See Exhibit 49 at 3-4 (“Forward-Looking Statements”).

⁵⁵ *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 551 (1978).

of baseload power by 2017. Joint Petitioners repeatedly assert without support that solutions to intermittency will be in place by “the requested relicensing action period of 2017 to 2037.” Joint Petition at 59; see *a/so* Joint Petition at 38; 41; 55; 57; 59. Exhibit 26, a DOE paper cited for the proposition that offshore wind could provide up to 30% of electricity, describes its study as a possible roadmap for 2024. Petition at 45. Exhibit 42, a DOE strategic work plan for achieving specific offshore wind generating scenarios, expresses its timeline in terms of intermediate 2020 milestones and 2030 milestones. Petition at 59. Exhibit 36, the webpage of the Ohio Wind Working Group, anticipates that by 2030 approximately \$7.6 billion of wind power revenue could accrue to Ohio. Petition at 55. Exhibit 44, a DOE paper cited for the proposition that offshore wind could achieve penetration of up to 89 GW, projects a timeframe of 2030. Petition at 63. Joint Petitioners themselves characterize these solutions as “state of the art and science,” and state only that solutions to intermittency will be “arguably implemented within the foreseeable future” for the period 2017-2037. Joint Petition at 39; 41.⁵⁶ Individually and as a whole, the supporting information cited for this proposition fails to indicate that these solutions will be available at the time that this licensing action would require them to be in place – 2017, the beginning of the relicensing period. Rather, contrary to the Joint Petitioners’ assertions, the information provided tends to suggest that “baseload wind” for the region of interest is still a remote and speculative concept.

⁵⁶ In support of its arguments that such technology will be available “within the proposed Davis-Besse license renewal,” Joint Petition at 51, Joint Petitioners also point to numerous sources documenting technology and policy developments in Europe. However, while such studies suggest that the use of wind power is increasing in many areas of the world, they do not undermine the ER’s conclusion that wind farm transmission grids are still speculative for the ROI. See, e.g., Joint Petition at 50-51; 63. It is beyond the requirements of Part 51 to insist that FENOC’s analysis of alternatives include a study of wind power projects and policies planned for regions outside the ROI because an applicant is only required to analyze alternatives to the extent that they are capable of achieving the goals of the proposed action – which, as stated before, is replacing Davis-Besse’s generating capacity of 910 MWe of baseload power for the ROI. See *HRI*, CLI-01-4, 53 NRC at 55; *Rancho Seco*, CLI-93-3, 37 NRC at 144-45.

Ultimately, whether solutions to wind power's intermittency problems are beginning to be addressed, whether FENOC is investing in storage facilities, and even whether additional wind power projects are in rapid development in the region of interest, are not material to the issue of whether wind power is a reasonable alternative because Joint Petitioners have not provided information suggesting that these developments can address the limitations of large-scale, baseload wind power for the region of interest by 2017. This is equally true even if Joint Petitioners have adequately demonstrated that noise, aesthetic, and environmental effects would be less than as portrayed in the ER,⁵⁷ because even a complete absence of environmental or aesthetic impacts does not surmount the essential obstacle to wind power's potential as a baseload power source, its inability to provide 910 MWe of energy on demand.⁵⁸ All told, Joint Petitioners' assertions do not amount to a genuine, material dispute of the ER's conclusion that a utility-scale commercial wind power project is not a reasonable alternative to license renewal. Therefore, Joint Petitioners have not met the requirements of 10 C.F.R § 2.309(f)(1)(vi) to demonstrate that a genuine, material dispute exists with the application.

b. The Applicant's Discussion of Wind Power in the ER Is Legally Sufficient

Joint Petitioners have not demonstrated that the ER's discussion of wind power is legally inadequate. The discussion of wind power in the ER meets the agency's requirements under its regulations implementing NEPA and comports with the GEIS. Petitioners argue that FENOC has failed to provide a "reasonable forecast' with sufficiently 'high quality,' 'accurate scientific analysis' . . . for rigorously and objectively discussing a very reasonable alternative, wind energy, for the Region of Interest in the requested relicensing period of 2017 to 2037." Joint Petition at 18, 58; *see also* Joint Petition at 19; Joint Petition at 42, 51. The Joint Petitioners

⁵⁷ Joint Petitioners' assertions that impacts on aesthetics and the environment are not insurmountable challenges to a wind power alternative are found on pages 27 to 31 of the petition.

⁵⁸ Furthermore, Joint Petitioners have not challenged the ER's conclusion that the installation of a utility-scale commercial wind power project would still require a land commitment estimated at 214 square miles. See ER at 7.2-9

have not shown, however, that FENOC is required to include an alternatives analysis in its ER beyond that which was already provided.

Because Joint Petitioners bring an environmental challenge at this stage of the proceeding, NRC regulations require them to file contentions based on information available at the time the petition is filed, which in this case is FENOC's ER. See 10 C.F.R. § 2.309(f)(2); *Levy*, CLI-10-02, 71 NRC ___ (slip op. at 3-4). The legal basis for Contention 1 appears to be that the ER violates NEPA. See Joint Petition at 11-12. Because NEPA imposes obligations only upon the federal agency, not the applicant, FENOC's ER can only be said to violate NRC's regulations implementing NEPA. *Id.* These regulations, codified at 10 C.F.R. Part 51, require an applicant to file an ER that includes a discussion of alternatives that is "sufficiently complete to aid the Commission in developing and exploring, pursuant to section 102(2)(E) of NEPA, appropriate alternatives" to the proposed action. 10 C.F.R. § 51.45(c). However, because the ER is the foundation upon which NRC's EIS is prepared, the adequacy of an ER has been examined under the auspices of NEPA.⁵⁹

Generally, NEPA requires that an environmental review provide a sufficient discussion of alternatives to "enable the decisionmaker to take a 'hard look' at environmental factors and to make a reasoned decision." *Tongass Conservation Society v. Cheney*, 924 F.2d 1137, 1140 (D.C. Cir. 1991). The Supreme Court has recognized that the concept of "alternatives" evolves, and agencies must explore alternatives as they become better known and understood. *Vermont Yankee v. NRDC*, 435 U.S. 519, 553 (1978). However, these procedural requirements are subject to "a practical rule of reason," which operates to relieve agencies of the potential for an alternatives analysis to demand "virtually infinite study and resources." *Pilgrim*, CLI-10-11, 71

⁵⁹ See *Levy*, CLI-10-02, 71 NRC at ___ (slip op. at 3-4); *Detroit Edison Co.* (Fermi Nuclear Power Plant, Unit 3), LBP-09-16, 70 NRC 227, 258-59 (2009) (citing *Calvert Cliffs 3 Nuclear Project, LLC & Unistar Nuclear Operating Servs., LLC* (Combined License Application for Calvert Cliffs, Unit 3), LBP-09-4, 69 NRC 170, 225-26 (2009)); see also *Entergy Nuclear Generation Co. & Entergy Nuclear Operations* (Pilgrim Nuclear Power Station), LBP-06-23, 64 N.R.C. 257, 278 (2006).

NRC at ___ (Mar. 26, 2010)(slip. op. at 37). As the Commission has stated, an environmental impact statement is not intended to be a “‘research document,’ reflecting the frontiers of scientific methodology, studies and data.” *Id.* “[W]hile there will always be more data that could be gathered, agencies must have some discretion to draw the line and move forward with decisionmaking.” *Id.* (internal quotations omitted).

The requirements under NEPA and applicable regulations are even less stringent for alternatives that have been dismissed as unreasonable. If an alternative is eliminated from consideration, NEPA does not require a detailed discussion of the rejected alternative’s environmental impacts. Pursuant to CEQ regulations,⁶⁰ an EIS must “[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, *briefly discuss* the reasons for their having been eliminated.” 40 C.F.R. § 1502.14 (emphasis added).

Here, Joint Petitioners have not established that the ER is required by law to provide an analysis beyond a brief discussion of why certain alternatives – such as wind power generation – were eliminated from consideration. In Contention 1, the petitioners present a number of claims relating to the sufficiency of the ER’s wind power analysis. In broad terms, the Joint Petition asserts that (1) the ER contains inaccurate or outdated information because new figures on wind power potential and installed wind power capacity have been released since the studies on which the ER relied were made;⁶¹ (2) the ER omits meaningful discussions of Great Lakes, Atlantic seaboard, and European offshore wind initiatives;⁶² (3) the ER omits discussion of long-

⁶⁰ The Council on Environmental Quality’s (CEQ’s) regulations providing guidance on compliance with NEPA are not binding on the NRC when the agency has not expressly adopted them, but are entitled to considerable deference. *Southern Nuclear Operating Co. (Early Site Permit for Vogtle ESP Site)*, LBP-09-7, 69 NRC 613, 631 (2009) (citing *Limerick Ecology Action, Inc. v. NRC*, 869 F.2d 719, 725, 743 (3d Cir. 1989)).

⁶¹ Joint Petition at 22-27; 46; 48-53; 60-65.

⁶² Joint Petition at 31-35; 48-65.

distance transmission as a solution to baseload intermittency issues;⁶³ (4) the ER fails to discuss specific authorities and developments cited by Joint Petitioners and is therefore deficient;⁶⁴ and (5) the development of wind energy is a legally binding requirement for FENOC.⁶⁵

As described above, however, although Joint Petitioners supply a quantity of information regarding the development of on-shore and off-shore wind power, the information supplied does not ultimately dispute the ER's conclusion that wind power cannot provide 910 MWe of baseload power by 2017 so as to render wind a reasonable alternative to the proposed action. Because Joint Petitioners have not effectively challenged the ER's dismissal of wind power as unreasonable, they have not established that more than a brief discussion of the reason for wind power's elimination as an alternative is required. See 40 C.F.R. § 1502.14. Here, the ER offers a variety of reasons for eliminating wind power as a reasonable alternative: intermittency/variability of wind power; expense of energy storage technologies; large land requirements; and environmental and aesthetic concerns. ER at 7.2-9. In doing so, the ER complies with NRC regulations implementing NEPA and comports with the GEIS. Therefore, although Joint Petitioners disagree with most aspects of the ER's treatment of wind power, they have not provided sufficient information to show that a genuine, material dispute with the ER exists, as required by 10 C.F.R. § 2.309(f)(1)(vi).

⁶³ Joint Petition at 38-46.

⁶⁴ Joint Petition at 50 ("The Applicant's ER has not cited such institutions as the European Wind Energy Association"); 52 ("FENOC must update its ER to recognize a major Obama administration event promoting offshore wind power in the Great Lakes"); 53 ("FENOC must update its ER to reflect . . . such major support from the White House and the Department of Energy" for the development of wind energy in the Great Lakes); 55 ("FENOC does not provide a complete discussion and evaluation of significant State and Federal sponsored activities . . ."); 57 ("significant State, Federal, private industry, and non-governmental environmental support for numerous projects . . . must be included" in the ER); 60 ("FENOC certainly must update the ER by including current data reflecting the dramatic growth of wind power, both on and offshore"); 62 (the ER's assertions "continue to be superseded by current events and expert documents so as to render" the ER's conclusion "incomplete, insufficient and unsupported").

⁶⁵ Joint Petition at 65-66. Joint Petitioners neglect to refer to the portion of the ER that discusses FENOC's obligations under Ohio Senate Bill 221. See ER at 7.2-5.

4. Contention 3 Does Not Raise a Genuine Dispute with the ER and is Outside the Scope of this Proceeding

Contention 3 reads:

The Relicensing GEIS Is Stale, Dated and NEPA Non-Compliant; Commercial Wind And Solar Photovoltaic Baseload Power Should Be Considered Under NEPA as a Single, Combined-Source Alternative[.]

Petition at 93.

The Staff opposes the admission of Contention 3 because it does not raise a genuine dispute with the application and therefore does not meet the contention admissibility requirements of 10 C.F.R. § 2.309(f)(1)(vi). Furthermore, Petitioners' challenge to the Generic Environmental Impact Statement (NUREG-1437) ("GEIS") is outside the scope of this proceeding. Therefore, Contention 3 should not be admitted because it does not meet the contention admissibility requirements of 10 C.F.R. § 2.309(f)(1)(iii) and (vi).

a. Contention 3 Does Not Raise a Genuine Dispute with the Application Because the Allegedly Omitted Information is Included in the ER

Joint Petitioners allege that FENOC has not included in its ER a discussion of solar and wind power in combination as an alternative to Davis-Besse's license renewal. This allegation does not raise a genuine dispute with FENOC's Application, however, because the information Joint Petitioners allege as omitted is in fact included in the Application. FENOC includes a discussion of a combination alternatives in its ER, including a discussion of wind and solar power combined with other renewable energy resources. In Section 7.2 of the ER, FENOC states that combinations of energy resources capable of generating the 910 MWe baseload power of Davis-Besse "still fail to be reasonable alternatives to renewal of Davis-Besse's operating license." ER at 7.2-12. Specifically, FENOC concludes that solar and wind combinations "would result in an increased uncertainty in energy output due to the fluctuation of wind and solar resources" and that land resources and air quality impacts associated with wind

and solar energy would “greatly exceed those associated with continued operation of Davis-Besse.” *Id.* at 7.2-13.

Thus, Contention 3 does not meet the requirement for a contention of omission because the LRA contains the information that Joint Petitioners allege is omitted. Furthermore, Joint Petitioners fail to take issue with the analysis or conclusions regarding solar and wind power in combination contained in the ER, thereby failing to raise a genuine dispute with FENOC’s Application. The Board should therefore dismiss Contention 3 because it does not meet the contention admissibility requirements of 10 C.F.R. § 2.309(f)(1)(vi).

b. Contention 3 Does Not Establish a Genuine Dispute with the Application Because It Does Not Show That a Combination Alternatives Analysis is Required by Law

Joint Petitioners argue that NEPA and Part 51 of NRC’s regulations require wind and solar power to be considered as a single, combined source in the ER’s alternatives analysis as a replacement for Davis-Besse’s baseload generating capacity. Joint Petition at 93, 94. However, Joint Petitioners do not show that, even if the combination analysis was omitted, that it is required by law to be included in FENOC’s ER. Petitioners have therefore failed to meet the contention admissibility requirements of 10 C.F.R. § 2.309(f)(1)(vi) by failing to raise a genuine dispute with FENOC’s Application. Contention 3 should therefore not be admitted.

Part 51, which constitutes NRC’s regulations implementing NEPA, requires an applicant/licensee to include in its ER “an analysis that considers and balances ... the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects.” 10 C.F.R. § 51.45(c). An applicant’s alternatives analysis is not required to discuss every conceivable alternative to the proposed action. Rather, the alternatives analysis must discuss alternatives that are reasonably

feasible.⁶⁶ NEPA does not require an alternatives analysis “to look at every conceivable alternative, but rather requires only consideration of feasible, nonspeculative, and reasonable alternatives.”⁶⁷

c. Contention 3 Does Not Show that a Combination of Wind and Solar Can Generate 910 MWe of Baseload Energy

In defining the scope of alternatives that must be considered by an applicant, the Commission has held that an ER “need only consider the range of alternatives that are capable of achieving the goals of the proposed action,”⁶⁸ which, in the present case, is the generation of approximately 910 MWe of baseload power.⁶⁹ FENOC has concluded in its alternatives analysis that a combination of renewable energies, such as wind and solar, are not reliable sources of 910 MWe of baseload power and therefore not reasonable alternatives to Davis-Besse’s license renewal.⁷⁰ As such, they are not required to be discussed at length in the ER.⁷¹

Furthermore, Joint Petitioners have not provided adequate support for their claim that wind and solar technologies in combination can provide 910 MWe of baseload power by 2017. Petitioners cite to an unpublished study done by a university student on mixed-renewable generation systems to support this contention. They state that the study draws the conclusion

⁶⁶ *Vermont Yankee Nuclear Power Corp. v. Natural Res. Def. Council*, 435 U.S. 519, 551 (1978); *Westlands Water District v. U.S. Dep’t of Interior*, 376 F.3d 853, 868 (9th Cir. 2004); *City of Bridgeton v. Fed. Aviation Admin.*, 212 F.3d 448, 458 (8th Cir. 2000).

⁶⁷ *Indian Point*, LBP-08-13, 68 NRC at 95. See also *Nuclear Mgmt. Co., LLC* (Monticello Nuclear Generating Plant), LBP-05-31, 62 NRC 735, 753 (2005) (citing *Vermont Yankee*, 435 U.S. at 551); *City of Carmel-by-the-Sea v. Dep’t of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1997); *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), CLI-91-2, 33 NRC 61, 65 (1991).

⁶⁸ *Hydro Res., Inc.* (P.O. Box 15910, Rio Rancho, New Mexico 87174), CLI-01-4, 53 NRC 31, 55 (2001); *Rancho Seco*, CLI-93-3, 37 NRC at 144-45.

⁶⁹ Davis-Besse License Renewal Application at 1.2-1. The Seventh Circuit has upheld the designation of baseload generation as the purpose behind a proposed action for NEPA purposes. See *Envtl. Law & Policy Ctr.*, 470 F.3d at 684.

⁷⁰ ER at 7.2-13.

⁷¹ Other Boards have held that such analyses are sufficient. See *Detroit Edison Co.* (Fermi Nuclear Power Plant, Unit 3), LBP-09-16, 70 NRC 227, 298-99 (2009); *Summer*, LBP-09-02, 69 NRC at 110, *aff’d*, CLI-10-01, 71 NRC __ (Jan. 7, 2010)(slip op.).

that baseload power from a combination of wind and solar energies can be provided by 2017. Joint Petition at 98. However, the study does not draw this conclusion. The study neither makes the allegation nor supports the inference that a wind and solar combination can replace 910 MWe baseload power. The student's narrow focus studied the effects of combining the output of one wind turbine and one solar panel to draw the conclusion that, under optimal conditions, a "more stable and predictable [energy] output can be obtained" from solar and wind combinations than from either alone. See Exh. 67 at 2. But, there is no conclusion drawn that use of wind and solar farms in conjunction can provide 910 MWe of baseload power. In fact, the researcher specifically caveats her conclusion's applicability to solar or wind farms. The student states that the study "is only based on two specific systems and not a complete representation of a solar or wind farm." *Id.* at 4. Joint Petitioners have therefore not provided adequate support for their assertion that a wind and solar combination is able to replace Davis-Besse's as a baseload power source.⁷²

d. Applicants are Only Required to Discuss Discrete Sources of Power in their Alternatives Analysis

Section 2.309(f)(1)(vi) of 10 C.F.R. requires a showing that, if a petitioner believes information was omitted from an applicant's ER, this information is required by law to be included in the application. Previous Licensing Board case law, and the Commission's GEIS, established that applicants for license renewal are not required to discuss a combination of generation sources in their alternatives analyses. Instead, only single, discrete sources that are technically feasible and commercially viable to provide baseload power must be discussed. Joint Petitioners have not demonstrated that a combination alternatives analysis is legally required. Therefore, they have not met the contention admissibility requirements of 10 C.F.R. § 2.309(f)(1)(vi).

⁷² Joint Petitioners incorporate into Contention 3 by reference "the facts, arguments, legal points and authorities and rationales contained in Contentions 1 and 2" of their Petition. Joint Petition at 93.

The Board in *Indian Point* dealt with a substantially similar contention as the proffered Contention 3. The petitioner in *Indian Point* argued that the applicant unreasonably “eliminate[ed] analysis of all alternatives in the ER except natural gas or coal plants as being unreasonable” *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3) LBP-08-13, 68 NRC 43, 93 (2008). There, petitioners alleged that a combination of renewable energy sources were available and that the applicant erred in not considering these alternatives in its ER. *Id.* The Board noted that “NEPA does not require [an applicant] to look at every conceivable alternative, but rather requires only consideration of feasible, non-speculative, and reasonable alternatives.” *Id.* at 95 (citations omitted). Accordingly, the Board held that “the reasonable alternatives for license renewal proceedings [are] limited to discrete electric generation sources that are feasible technically and available commercially” and that “there is no legal requirement ... for the Applicant to analyze in detail options that are not discrete, feasible sources for base-load [power].” *Indian Point*, LB-08-13, 68 NRC at 95-96.

Further, the Board held that, even if a petitioner asserts and supports the allegation that a combination of sources could provide the amount of baseload power necessary to replace the reactor at issue, an applicant is nonetheless required only to analyze discrete energy sources as alternatives. *Id.* at 96.⁷³ Petitioners have not even gone that far here, as they did not allege or support the idea that a combination of wind and solar power could provide 910 MWe baseload generating power.

Finally, Joint Petitioners assert that 10 C.F.R. § 51.45(b)(3) requires FENOC “to combine solar and wind alternatives into a single renewable power generation source for

⁷³ “NYS presents several different alternatives that it asserts should have been analyzed by Entergy in the ER. However, NYS fails to show that any one of these alternatives would produce the base-load supply of electricity that would equal that produced by the relicensing of IP2 and IP3. The evidence offered by NYS suggests that it would be possible for a comprehensive system, combining the various energy sources offered and incorporating greater energy efficiency, to make up for the loss of 2158 MWe of electricity that would occur if Indian Point were not relicensed. Nonetheless, the Applicant is required to analyze only discrete energy sources as alternatives — a claim that cannot be made for any of the alternatives provided by NYS.” *Id.* (internal citations omitted).

consideration under NEPA” Joint Petition at 95. However, Joint Petitioners do not point to any case law, nor could the Staff identify any, to support this proposition.⁷⁴

e. Contention 3’s Challenge to the GEIS is Outside the Scope of the Licensing Proceeding

Joint Petitioners also argue that the GEIS is legally void under NEPA because NEPA requires that “every significant aspect of environmental impact’ [sic] be considered.”⁷⁵ Joint Petitioners believe that a solar and wind combination alternative constitutes a “significant impact” to environmental consequences and that the GEIS’s determination that discrete electrical sources need only be considered is contrary to NEPA. *Id.* See also GEIS § 8.1. Further, Joint Petitioners take issue with the fact that the GEIS has not been updated since 1996. *Id.*

As discussed above, the Board in *Indian Point* held that the GEIS’s determination that discrete energy sources need only be considered in an alternatives analysis was consistent with NEPA. *Indian Point*, LBP-08-13, 68 NRC at 93. Joint Petitioners have not provided sufficient support to justify the Board in this case finding differently.

With regard to Joint Petitioners’ argument that the GEIS has not been updated since 1996, thereby rendering it somewhat obsolete, Joint Petitioners have not demonstrated that this argument falls within the scope of the current licensing proceeding. Section 2.309(f)(1)(iii)

⁷⁴ Two recent Licensing Boards admitted contentions that dealt with an analysis of a combination of power sources in the applicant’s ER. The Staff recognizes this and maintains that, though sometimes included in ERs, a combination analysis is not required under Part 51 and NEPA. The contention admitted in *Calvert Cliffs* COL proceeding challenged the analysis presented that dealt with combination resources and argued that these analyses were “inadequate and faulty.” This is not the case here. Unlike the petitioners in *Calvert Cliffs*, Petitioners do not challenge the analysis in FENOC’s ER, but only assert that a combination of wind and solar resources to replace Davis-Besse’s baseload power should be included. As such an analysis is in fact included in the ER, Petitioners have not raised a genuine dispute with the application here as the previous Licensing Boards found that petitioners had in *Calvert Cliffs*. Furthermore, the Board in *Comanche Peak* determined that a contention challenging the omission of a wind and solar combination alternative was admissible. Unlike in *Comanche Peak*, however, Joint Petitioners in this case have not shown that a wind and solar combination alternative can feasibly provide baseload power to replace Davis-Besse.

⁷⁵ Joint Petition at 95 (citing *Baltimore Gas & Elec. Co. v. Natural Res. Def. Counsel, Inc.*, 462 U.S. 87, 97 (1983)).

requires the petitioner to demonstrate that its contention is within the scope of the proceeding. Contentions that are not within the scope of the proceeding must be rejected. *Millstone*, CLI-05-24, 62 NRC at 567 (2005). Contrary to § 2.309(f)(1)(iii), Joint Petitioners do not demonstrate that Contention 3 is within the scope of the license renewal proceeding. The scope of license renewal review is intentionally limited, and the scope of admissible contentions is limited to the scope of license renewal review. See *Turkey Point*, CLI-01-17, 54 NRC at 10. Contentions raising environmental issues in a license renewal proceeding are similarly limited to those issues which are affected by license renewal and have not been addressed by rulemaking or on a generic basis. *Turkey Point*, CLI-01-17, 54 NRC at 11-12. Dissatisfaction with the fact that an updated GEIS has not been published as of the date of this filing is not a matter appropriate for litigation before the Licensing Board.

In sum, Contention 3 is inadmissible because it fails to raise a genuine dispute with FENOC's application and raises issues outside the scope of the licensing hearing in violation of 10 C.F.R. § 2.309(f)(1)(iii) and (vi). Petitioners have alleged that FENOC omitted an analysis that was clearly included in the ER, and fails to provide a genuine dispute with that analysis. Moreover, Petitioners have not shown that a combination alternatives analysis is required within the context of a license renewal. Finally, Petitioners' challenge to the GEIS is outside the scope of the licensing proceeding. Therefore, Contention 3 is inadmissible because it does not meet the contention admissibility requirements of 10 C.F.R. § 2.309(f)(1)(iii) and (vi).

C. Joint Petitioners' Contention 4 Regarding Severe Accident Mitigation Alternatives Analysis Fails to Raise a Material Issue

Contention 4 states:

The Environmental Report (ER) is Inadequate Because It Underestimates the True Costs of a Severe Accident at Davis-Besse in Violation of 10 C.F.R. 51.53(C)(3)(II)(L) and Further Analysis by the Applicant, FENOC, Is Called For.

Joint Petition at 100 ¶ 173 (capitalization in original). Pursuant to 10 C.F.R. § 51.53(c)(3)(ii)(L), the ER must provide "a consideration of alternatives to mitigate severe accidents." "Mitigation

alternatives or 'SAMAs' refer to safety enhancements such as a new hardware item or procedure intended to reduce the risk of severe accidents." *Pilgrim*, CLI-10-11, 71 NRC ___ (slip op. at 3). The SAMA review ensures "that any plant changes – in hardware, procedures, or training – that have a potential for significantly improving severe accident safety performance are identified and assessed." *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-02-17, 56 NRC 1, 5 (2002).

In explaining another SAMA contention, the Commission noted that it has "long stressed that NRC adjudicatory hearings are not EIS editing sessions." *Entergy Nuclear Generation Co. & Entergy Nuclear Operations* (Pilgrim Nuclear Power Station), CLI-09-11, 69 NRC 529, 533 (2009) (quotations omitted). "Under NEPA, mitigation (and the SAMA issue is one of mitigation) need only be discussed in 'sufficient detail to ensure that environmental consequences [of the proposed project] have been fairly evaluated.'" *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2, Catawba Nuclear Station, Units 1 & 2), CLI-03-17, 58 NRC 419, 431 (2003) (quoting *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 353 (1989) (alteration in original)). Thus, the Commission has stated that the "ultimate concern" for a SAMA analysis "is whether any additional SAMA should have been identified as potentially cost beneficial, not whether further analysis may refine the details in the SAMA NEPA analysis." *Pilgrim*, CLI-09-11, 69 NRC at 533.

The SAMA analysis "evaluates a number of potential accident progression sequences (scenarios) and the possible safety enhancements that may reduce the risk of those accident scenarios." *Pilgrim*, CLI-10-11, 71 NRC ___ (slip op. at 3). The analysis determines "whether particular SAMAs would sufficiently reduce risk – e.g., by reducing frequency of core damage or frequency of containment failure – for the SAMA to be cost-effective to implement." *Id.* Thus, the analysis is inherently probabilistic. *Id.* "If the cost of implementing a particular SAMA is greater than its estimated benefit, the SAMA is not considered cost-beneficial to implement." *Id.*

In *Pilgrim*, the Board explained, “The underlying analyses require modeling of extremely complex time and physical condition dependent phenomena, which all those familiar with the field know are generally not amenable to accurate modeling. Therefore, this Agency has wisely determined that these effects and potential benefits of mitigation be examined using ‘probability weighted consequences.’” *Entergy Nuclear Generation Co. (Pilgrim Nuclear Power Station)*, LBP-07-13, 66 NRC 131, 142 & n.12 (2007). In this approach, the SAMA analysis “compute[s] hundreds of scenarios which [a]re then weighted according to their probabilities[,] and then [develops] a distribution of probabilities of the consequences and risks.” *Id.* The “wide variation in code input [leads to] a set of results with statistical significance.” *Id.* at n.12.

After the SAMA analysis, “The NRC Staff’s obligation regarding SAMAs under NEPA and Part 51 is met by taking a hard look at those SAMAs identified as potentially cost beneficial.” *Entergy Nuclear Operations Inc. (Indian Point Nuclear Generating Units 2 & 3)*, LBP-10-13, 71 NRC __ (Jun. 30, 2010) (slip op. at 5). Only those SAMAs that are cost-beneficial and “bear on adequately managing the effects of aging” “need be implemented as part of the license renewal safety review, pursuant to 10 C.F.R. Part 54.” *Pilgrim*, CLI-10-11, 71 NRC __ (slip op. at 7 n.28).

Therefore, the NRC’s SAMA analysis does not need to predict the results of any single incidence of a severe accident with absolute accuracy. That exercise would be of limited value given the wide range of possible conditions that may accompany a severe accident. *Pilgrim*, LBP-07-13, 66 NRC at 142 n.12. Rather, because the analysis rests on the statistically-significant consequences of thousands of varied scenarios, the SAMA analysis for any given set of scenarios provides a reasonable and sufficient model to satisfy NEPA’s hard look requirement. *Id.* This is especially true in light of the limited purpose of the SAMA analysis: to identify potentially cost-beneficial SAMAs. Consequently, only errors in the SAMA analysis that could impact the aggregate computation with sufficient magnitude to result in a potential SAMA becoming cost-beneficial will raise a material dispute with the application and hence support an

admissible contention. See *Pilgrim*, CLI-10-11, 71 NRC __ (slip op. at 39) (“Unless it looks genuinely plausible that inclusion of an additional factor or use of other assumptions or models may change the cost-benefit conclusions for the SAMA candidates evaluated, no purpose would be served to further refine the SAMA analysis, whose goal is only to determine what safety enhancements are cost-effective to implement.”).

1. Joint Petitioners’ Contention Fails to Raise a Material Issue

Contention 4’s alleged bases consist of several discrete challenges to the SAMA analysis. The NRC Staff will respond to each challenge in turn. But, all of these challenges share a common defect: none raise a material issue. To meet the requirements of 10 C.F.R. § 2.309(f)(1)(iv) and (vi), Joint Petitioners must “demonstrate that the issue raised is material to the findings the NRC must make to support the action” and “provide sufficient information to show that a genuine dispute exists with the applicant/licensee on a material issue of law or fact.” As discussed above, the Commission has indicated that the limited purpose of the SAMA analysis is to identify potentially cost-beneficial SAMAs. *Pilgrim*, CLI-09-11, 69 NRC at 533; *Pilgrim*, CLI-10-11, 71 NRC __ (slip op. at 39). Thus, to raise a material issue, Joint Petitioners must demonstrate that their challenges to the SAMA analysis would be likely to result in identification of an additional potentially cost-beneficial SAMA. Joint Petitioners cannot simply claim that “further analysis may refine the details in the SAMA NEPA analysis.” *Id.*

Other intervenors that have sponsored admitted contentions have provided at least some support for concluding that, if proven, their contention could result in the identification of a potentially cost-beneficial SAMA. For example, in *McGuire/Catawba*, the petitioner produced information that showed a significantly greater possibility of containment failure than that assumed in the applicant’s SAMA analysis. *McGuire/Catawba*, CLI-02-17, 56 NRC at 6-8. This information demonstrated that the SAMA analysis underestimated the potential benefit at “possibly a large enough magnitude to justify one or more of these [SAMA] alternatives.” *Id.* at 8. Likewise, in *Pilgrim*, the intervenor specifically challenged whether a particular SAMA,

installation of a torus vent filter, would be cost beneficial. Request for Hearing and Petition to Intervene by Pilgrim Watch, 45-48 (May 25, 2006) (ADAMS Accession No. ML061630125).⁷⁶

In this case, Joint Petitioners claim that “[b]y underestimating the cost of a severe accident in its SAMA analysis Davis-Besse incorrectly discounts possible mitigation alternatives.” Joint Petition at 111. However, Joint Petitioners concede that they “do not offer examples of how this cost benefit equation might have been skewed in favor of no mitigation.” *Id.* at 124. Instead, Joint Petitioners only assert, “The dramatic minimization of costs by FENOC are such that it should be obvious that *many* SAMAs would be cost effective if the described defects in the analysis were addressed.” *Id.* at 125 (emphasis in original).

This mere assertion that it should be “obvious” that the contention is material does not satisfy the requirements of the regulations that a would-be-intervenor “[d]emonstrate that the issue raised in the contention is material” and “provide sufficient information to show that a genuine dispute exists with the applicant/license on a material issue.” 10 C.F.R. §§ 2.309(f)(1)(iv) and (vi). Instead, contrary to Commission precedent discussing SAMA contentions, this contention seeks to use this hearing as a fishing expedition in hope that the Staff’s review will uncover some bit on information that will show a genuine dispute with the application.⁷⁷ Indeed, the petitioners hope to be able to identify an expert on these issues in the future but presently have no expert or factual evidence to demonstrate that the errors they have allegedly identified in the SAMA analysis could result in the identification of an additional cost-beneficial SAMA.⁷⁸ The requested hearing would serve as no more than an “EIS editing

⁷⁶ While other Boards have admitted SAMA contentions that did not explicitly address whether they would result in identification of an additional cost-beneficial SAMA, e.g. *Indian Point*, LBP-08-13, 68 NRC at 102; *Prairie Island*, LBP-08-26, 68 NRC at 926, these Boards ruled before the Commission’s pronouncement in *Pilgrim* that refinement of a SAMA analysis for its own sake is not a valid subject for a contention. *Pilgrim*, CLI-09-11, 69 NRC at 533; *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip op. at 37-39).

⁷⁷ *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, & 3), CLI-99-11, 49 NRC 328, 334 (1999).

⁷⁸ *Id.* at 342.

session” to further refine a SAMA analysis without any demonstration that such refinement is needed to identify cost-beneficial SAMAs. *Pilgrim*, CLI-09-11, 69 NRC at 533. Consequently, Joint Petitioners’ Contention 4 is inadmissible because they have not made any demonstration, beyond pure assertion and speculation, that it is material to the findings the NRC must make.

Joint Petitioners note that the Commission rejected an argument in *McGuire/Catawba* that a SAMA contention was not material because the only remedy available would be more analysis under NEPA. Joint Petition at 123 (*citing McGuire/Catawba*, CLI-02-17, 56 NRC at 10). The Commission found that “further analysis ... is a valid and meaningful remedy under NEPA.” *McGuire/Catawba*, CLI-02-17, 56 NRC at 10. The Staff agrees that further analysis can be a meaningful remedy under NEPA, but with respect to a SAMA analysis, the Commission has stated that an analysis that is adequate to identify potential cost-beneficial SAMAs is sufficiently meaningful to satisfy NEPA. *Pilgrim*, CLI-09-11, 69 NRC at 532-33. Joint Petitioners’ Contention 4 essentially asks the Board to undertake precisely the type of “EIS editing session” the Commission found would not meaningfully add to the NRC’s NEPA review and SAMA analysis in *Pilgrim* because it would simply refine the analysis without any potential to alter the conclusions. *Id.*

2. Joint Petitioners Raise Numerous Discrete Challenges to the SAMA Analysis Based on Issues Outside the Scope of this Proceeding

Joint Petitioners assert four deficiencies in the SAMA analysis, which are outside the scope of this proceeding and are, thus, inadmissible. These four assertions are that the SAMA analysis failed to adequately address: (1) spent fuel pool accidents; (2) terrorism; (3) transport and disposal capacity for radioactive waste; and (4) the GEIS conclusion that impact of severe accidents for all reactors is small.

a. Spent Fuel Pool Accidents Are Outside the Scope of this Proceeding

First, Joint Petitioners argue that “FENOC’s SAMA analysis minimized the potential amount of radioactive releases in a potential severe accident at Davis-Besse by ... not

considering a severe accident in the irradiated nuclear fuel pool, either alone or in combination with a reactor core accident.” Joint Petition at 108. In support of this argument, Joint Petitioners assert that “SAMAs designed to avoid or mitigate conventional accidents may be different than SAMAs designed to avoid or mitigate spent fuel accidents [and] the radiological consequences of a spent-fuel-pool fire are significantly different from the consequences of a core-damage accident.” *Id.* at 109. This argument is outside the scope of this proceeding. Pursuant to 10 C.F.R. § 51.53(c)(2), FENOC is not required to provide information regarding the storage and disposal of spent fuel, and the Commission has clearly stated that SAMA considerations apply only to the active fuel in the reactor core, not the SFPs. *Pilgrim*, CLI-10-14, 71 NRC __ (slip op. at 32); *Turkey Point*, CLI-01-17, 54 NRC at 21-22. Therefore, this portion of Joint Petitioners’ argument is inadmissible because it is contrary to Commission precedent and a direct attack on the Commission’s regulations.⁷⁹

Joint Petitioners also argue that FENOC’s SAMA analysis should have considered a severe accident in the SFP in combination with a reactor core accident. Joint Petition at 110. Specifically, Joint Petitioners assert that FENOC should have considered “the potential interactions between the pool and the reactor in the context of severe accidents at Davis-Besse [because] the [SFP] is located outside but immediately adjacent to the reactor’s containment and shares some essential support systems with the reactor.” *Id.* at 109. To the extent this argument asserts that a SAMA analysis should include SFPs, it is outside the scope of this proceeding. *Turkey Point*, CLI-01-17, 54 NRC at 6. As discussed above, Part 51’s reference to SAMAs applies to nuclear *reactor* accidents, not spent fuel storage accidents. *Id.* at 21-22.

⁷⁹ Notably, Joint Petitioners have not sought a waiver of the Commission’s generally applicable rules, petitioned for a rulemaking, or pointed to any new and significant information that calls into question the Commission’s generic findings regarding SFPs. See 10 C.F.R. §§ 2.335, 2.802, and 51.53(c)(iv), respectively.

In arguing that FENOC must examine interactions between the reactor and the SFP in its SAMA analysis, Joint Petitioners cite to a report by Dr. Gordon Thompson.⁸⁰ Joint Petition at 109. But, in affirming the NRC's findings of low environmental impact from SFP fires, in response to a petition for rulemaking, the Commission explicitly considered both the Thompson report and the Shearon Harris proceeding.⁸¹ The Commission held that the information in the Thompson report and the Shearon Harris proceeding did not undermine the generic conclusions in the GEIS. 73 Fed. Reg. at 46,208. Moreover, the Commission outlined how the Shearon Harris proceeding supported the Commission's environmental finding of low impacts from SFP fires. *Id.* at 46,208-10. The Commission held that these findings, which support the GEIS and Waste Confidence findings, "remain valid." *Id.* at 46,212. Therefore, this portion of the argument amounts to an impermissible challenge of the Commission's regulations. *Pilgrim*, CLI-07-03, 65 NRC at 19-20.

Finally, Joint Petitioners argue that the definition of "severe accidents" includes SFP accidents and, thus, SFPs are within the scope of SAMA analyses for purposes of license renewal. Specifically, Joint Petitioners argue that Section 6 of the GEIS, which supports the Category 1 finding for onsite spent fuel storage during the period of extended operation,⁸² only addresses "normal operations [of SFPs]."⁸³ In contrast, Joint Petitioners note that "[n]othing in Section 5 [of the GEIS, discussing severe accidents], excludes severe accidents involving ...

⁸⁰ Joint Petition at 109 (citing to Dr. Gordon Thompson, Risks of Pool Storage of Spent Fuel at Pilgrim Nuclear Power Station and Vermont Yankee, A Report for the Massachusetts Attorney General by IRSS, at 12, 16 (May 2006) (ADAMS Accession No. ML061630088) ("Thompson report")).

⁸¹ 73 Fed. Reg. at 46,208 (citing Gordon R. Thompson, "Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants," May 25, 2006, as an alleged source of new and significant information); *Id.* at 46,209-46,210 (citing the *Shearon Harris* proceeding).

⁸² See *Pilgrim*, CLI-10-14, 71 NRC ___ (slip op. at 34).

⁸³ Joint Petition at 110-12. In particular, Joint Petitioners cite two sentences in Section 6.1 of the GEIS: "Accidental releases ... could conceivabl[y] result in releases that would cause moderate or large radiological impacts. *Such conditions are beyond the scope of regulations controlling normal operations ...*" Joint Petition at 112 (emphasis added).

the spent fuel pool.”⁸⁴ Joint Petitioners appear to claim that “because only the environmental impacts of ‘normal [spent fuel pool] operations’ have been found in the GEIS to be a Category 1 issue, license renewal applicants must provide a SAMA analysis encompassing beyond design basis SFP accidents.”⁸⁵

Notably, this argument was raised in the Pilgrim license renewal proceeding⁸⁶ and subsequently rejected by the Commission. *Pilgrim*, CLI-10-14, 71 NRC __ (slip op. at 34-35). In rejecting the argument, the Commission provided the following clarification as to Section 6 of the GEIS and the insignificant impact a consideration of SFPs would have on a SAMA:

Chapter six clearly is not limited to discussing only “normal operations,” but also discusses potential accidents and other non-routine events. For onsite spent fuel pool storage, the GEIS analysis addresses concerns related to expanded spent fuel pool capacity and the risk that “plant life extension could possibly increase the likelihood of criticality through dense-racking or spent fuel handling accidents.” It specifically addresses spent fuel pool accidents and abnormal incidents, both actual events that occurred and the “worst probable cause of a loss of spent-fuel pool coolant (a severe seismic-generated accident causing a catastrophic failure of the pool),” concluding that “the likelihood of a fuel-cladding fire is highly remote,” and that “[i]nadvertent criticality and acute occupational exposure are remote risks of dense-racking.”

The Category 1 finding for onsite spent fuel storage (and chapter six of the GEIS upon which the finding is based) is not limited to routine or “normal operations.” As specified in the Environmental SRP, there are “no Category 2 issues related to the uranium fuel cycle and solid waste management.” The NRC recently reiterated that a “SAMA that addresses [spent fuel pool] accidents would not be expected to have a significant impact on total risk for the site” because the spent fuel pool accident “risk level is less than that for a reactor accident.”

⁸⁴ *Id.* at 112. Joint Petitioners assert that “Davis-Besse confused Section 6 of the GEIS with Section 5.” *Id.*

⁸⁵ *Pilgrim*, CLI-10-14, 71 NRC at __ (slip op. at 32).

⁸⁶ See Pilgrim Watch’s Petition for Review of LBP-06-848, LBP-07-13, LBP-06-23 and the Interlocutory Decisions in the Pilgrim Nuclear Power Station Proceeding, Nov. 12, 2008 (ADAMS Accession No. ML0832405990).

Id. (internal citations omitted).

Thus, Joint Petitioners' argument regarding Section 5 of the GEIS is contrary to Commission precedent and does not support the admissibility of this aspect of Contention 4. Moreover, the Commission's decision in *Turkey Point* remains valid: SAMA analyses must only consider reactor accidents. See generally *Pilgrim*, CLI-10-14, 71 NRC at ___. As discussed, Joint Petitioners have not sought a waiver of the Commission's generally applicable rules. Thus, this part of Joint Petitioners' argument is contrary to Commission precedent and a direct challenge to the generic environmental findings in Table B-1.⁸⁷

b. Terrorism is Outside the Scope of this Proceeding

Additionally, Joint Petitioners argue that FENOC's SAMA analysis did not accurately reflect the consequences of a severe accident at Davis-Besse because "FENOC failed to model intentional acts of [terrorism] in [the ER's] analysis of external events."⁸⁸ This argument is outside the scope of the proceeding. Commission precedent clearly states that FENOC is not required to model intentional malevolent acts in its ER for license renewal, nor is the NRC staff required to do so in its site-specific environmental impact statement.⁸⁹ The Commission noted that "it is sensible not to devote resources to the likely impact of terrorism during the license renewal period, but instead to concentrate on how to prevent a terrorist attack in the near term at the already licensed facilities." *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-02-26, 56 NRC 358, 365 (2002). Further, NEPA "imposes no duty on the NRC to consider intentional malevolent attacks in conjunction with

⁸⁷ *Pilgrim*, CLI-07-03, 65 NRC at 19-20.

⁸⁸ Joint Petition at 107-08 (citing to a report by Dr. Edwin S. Lyman, *Chernobyl on the Hudson? The Health and Economic Impacts of a Terrorist Attack at the Indian Point Nuclear Plant*, Union of Concerned Scientists, p.16 (Sept. 2004), for the proposition that intentional acts should not be considered using probabilistic methods).

⁸⁹ See *Amergen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-07-08, 65 NRC 124 (2007), *aff'd*, *N.J. Dept. of Env'tl. Prot. v. NRC*, 561 F.3d 132 (3rd Cir. 2009).

commercial power reactor license renewal applications.” *Oyster Creek*, CLI-07-08, 65 NRC at 129 (internal citation omitted).

Notwithstanding the Commission’s view that NEPA does not impose a duty to consider the environmental effects of intentional malevolent acts, there is a discretionary generic analysis of terrorism in the GEIS.⁹⁰ Section 5.3.3.1 of the GEIS specifically discusses the issue raised by this aspect of Contention 4 in “Review of Existing Impact Assessments,” which considered the risk from sabotage and beyond design basis earthquakes at existing nuclear power plants and concluded that it is small and that the risks from these and other external events are adequately addressed by a generic consideration of internally initiated severe accidents. In *Oyster Creek*, which involved a SAMA claim,⁹¹ the Commission affirmed that the environmental impact of intentional acts of terrorism has already been given adequate NEPA consideration in the GEIS.⁹² Thus, Davis-Besse is not required to evaluate terrorism in its ER.

Further, this argument is not material to the findings the NRC must make to support license renewal. Specifically, the Commission stated that “license renewals are not related to any change in the risk of terrorist attack, and the terrorism issue is therefore not material to the decision the Board must make in this proceeding.”⁹³ Therefore, this argument is inadmissible under 10 C.F.R. § 2.309(f)(1)(iv). For both of the reasons outlined above, this argument does not support the admissibility of this aspect of Contention 4.

⁹⁰ See *Pilgrim*, CLI-10-14, 71 NRC at ___ (slip op. at 37-38) (reaffirming the Commission’s position in *Oyster Creek*, CLI-07-08, 68 NRC 124 (2007)).

⁹¹ See *Oyster Creek*, CLI-06-24, 64 NRC 111 (2007) (noting that in the petitioner’s view, the NRC Staff’s environmental analysis ought to have included a more elaborate examination of SAMAs at *Oyster Creek*, including an inquiry into the consequences of a potential aircraft attack on the reactor, the vulnerability of the spent fuel pool to terrorist attack and to “design basis” threats, and long-term compensatory measures to defend against terrorism).

⁹² See *Oyster Creek*, CLI-07-08, 65 NRC at 128, 131-32.

⁹³ *Oyster Creek*, CLI-07-08, 65 NRC at 130; *Indian Point*, LBP-08-13, 68 NRC at 186.

c. Capacity for the Transport and Disposal of Waste is Outside the Scope of this Proceeding

Joint Petitioners claim that FENOC's SAMA analysis improperly "ignored radioactive waste disposal." Joint Petition at 137–38. This argument is outside the scope of the proceeding as it directly challenges the generic determinations in Table B-1 of Appendix B to Part 51 concerning uranium fuel cycle and waste management. Absent a waiver, a generic challenge to the NRC's generically applicable regulations is impermissible. 10 C.F.R. § 2.335(a). As noted above, Joint Petitioners did not petition the Commission for a waiver. Table B-1 codifies the Commission's determination, supported by the GEIS that all uranium fuel cycle and waste management issues, including low-level waste storage and disposal, mixed waste storage and disposal, on-site spent fuel storage, and transportation are Category 1 issues with a small impact. Thus, FENOC's ER can incorporate the GEIS's analysis into its ER and not offer any additional analysis on these issues.⁹⁴ FENOC did not identify any new and significant information regarding these Category 1 issues and Joint Petitioners have not contradicted this conclusion. ER, App. E at 4-3. Thus, FENOC's ER did not need to include additional analysis of radiological waste disposal.

d. Joint Petitioners' Challenge to the GEIS is Outside the Scope of this Proceeding

Joint Petitioners argue that the "small" impact finding for societal and economic impacts in Table B-1 of Appendix B of Part 51, Subpart A ("Table B-1"), as supported by the GEIS, is inaccurate. Joint Petition at 104–05. Specifically, Joint Petitioners argue that the societal and economic impacts from severe accidents only appear small "by the use of methods that minimize consequences." *Id.* at 105. This argument is a direct challenge to the Commission's regulations in Table B-1 and is therefore not within the scope of this licensing proceeding. 10 C.F.R. § 2.309(f)(1)(iii).

⁹⁴ *Turkey Point*, CLI-01-17, 54 NRC at 12. See also Part 51, Subpart. A, App. B.

The Commission has limited contentions raising environmental issues in license renewal proceedings to those issues that are affected by license renewal and have not been addressed by rulemaking or on a generic basis. *Turkey Point*, CLI-01-17, 54 NRC at 11, 16. While “severe accident mitigation alternatives” is a Category 2 issue,⁹⁵ the impact finding of “small” for societal and economic impacts from severe accidents is a generic determination for all plants. See Table B-1. This generic finding, codified in NRC’s regulations, is not subject to challenge absent a waiver. See 10 C.F.R. § 2.335(a). Joint Petitioners have not petitioned the Commission for a waiver. Therefore, this argument is outside the scope of the proceeding and does not support the admissibility of this aspect of Contention 4.

3. Joint Petitioners’ Challenge to the Use of MACCS2 Code and Its Meteorological Modeling Would Not Impact the Conclusions of the SAMA Analysis
 - a. Joint Petitioners Failed to Provide a Basic Showing that MACCS2 Code is Old or Outdated

Joint Petitioners state that “[t]he SAMA analysis for Davis-Besse uses an outdated and inaccurate proxy to perform its SAMA analysis, the MACCS2 computer program.” Joint Petition at 115. Joint Petitioners assert that FENOC’s use of the MACCS2 code in conducting its SAMA analysis was the “wrong choice” and may “underestimate the costs likely to be incurred as a result of a severe accident.” *Id.* at 115-16. As discussed above, because Joint Petitioners have not demonstrated that use of a different code could result in the identification of an additional potentially cost-beneficial SAMA, Joint Petitioners have not shown that this aspect of Contention 4 is material to a finding the NRC Staff must make. Additionally, this aspect of Contention 4 lacks an adequate factual basis. As a result, the Board should not admit this aspect of Contention 4 pursuant to 10 C.F.R. § 2.309(f)(1)(iv), (v), and (vi).

⁹⁵ See Table B-1 (citing 10 C.F.R. § 51.53(c)(3)(ii)(L)) and noting that alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives). See also *Pilgrim*, CLI-10-11, 71 NRC at __ (slip op. at 37, 39).

Joint Petitioners provide several reasons to support its argument that the MACCS2 code is inaccurate and outdated, but none of those are adequately supported. In support of this assertion, Joint Petitioners rely on an article from David Chanin that describes the development of the MACCS2 code. Joint Petition at 115 (*citing* David Chanin, “The Development of the MACCS2: Lessons Learned,” (Dec. 17, 2009) at <http://chaninconsulting.com> (“MACCS2: Lessons Learned”)). In light of that article, Joint Petitioners state that the MACCS2 code was held to lesser quality assurance requirements, the ANSI/ANS 10.4 standard, when it was developed, rather than the higher NQA-a standard. *Id.* But, the author of the article states that the higher quality assurance requirements in the NQA-a standard would be appropriate for a code used to support a “deterministic authorization basis analyses.” MACCS2: Lessons Learned at 2 (emphasis removed). As discussed above, the SAMA analysis is part of the NRC’s NEPA consideration and is a screening tool. It is not a deterministic authorization basis analysis. Consequently, the article does not support Joint Petitioners’ assertion that the MACCS2 code is not appropriate for the Davis-Besse SAMA analysis because it was not developed using the NQA-a quality assurance standard.

Moreover, the article actually suggests that Davis-Besse appropriately selected the MACCS2 code for the Davis-Besse SAMA analysis. The developers of the MACCS2 code utilized the ANSI/ANS 10.4 standard for quality assurance. The user’s guide for the code recommends,

When MACCS2 is used for authorization basis studies, it is very important to carefully review the code’s phenomenological models and input parameter values to ensure that they conform to applicable guidance and are appropriate for the accident scenario being modeled. The identification of deficiencies in these areas could bring into question the safety basis of the facility.

MACCS2: Lessons Learned at 3 (quotations omitted and emphasis removed). But, the SAMA review is not an authorization basis study – it is a NEPA analysis and screening tool. The article notes that for NEPA studies, “the chosen ANSI/ANS 10.4 would be an applicable QA standard.”

Id. at 4. Thus, the article implies that the MACCS2 code was appropriate for the Davis-Besse SAMA analysis and NEPA review.

Furthermore, even if the SAMA analysis were considered an authorization basis study, the article acknowledges that the MACCS2 code may produce acceptable results provided the user employs sufficient caution in selecting phenomenological models and input parameter values. The article does not suggest that FENOC misused the MACCS2 in such a way. In fact, this statement indicates that, if used properly, the MACCS2 code could provide an adequate SAMA analysis. The validity of FENOC's inputs to the MACCS2 code is the subject of other aspects of this contention.

Finally, the article ends on a note that implies that the utilities that have employed the MACCS2 code for SAMA analyses in license renewals have ignored "the code's [quality assurance] shortcomings and lack of input justifications." *Id.* at 5. But this article does not indicate how those applicants have misused the code or that FENOC did so in this case. Indeed, because the article was published more than half a year before FENOC submitted the Davis-Besse LRA, the article could not address the details of FENOC's Davis-Besse SAMA analysis. Rather, the article only stands for the unremarkable proposition that if the MACCS2 code is used improperly, it will produce unreliable results. But, this is hardly a reason to forego use of the MACCS2 code altogether.

Joint Petitioners also claim that the MACCS2 code is defective because "there is no explanation of exactly how it works." Joint Petition at 116. But, the ER contains a nearly-200 page discussion of how the MACCS2 code works. Joint Petitioners claim that the ER does not describe how the code interacts with long term dose accumulation models. *Id.* at 116. But Joint Petitioners admit that the CHRONC model evaluates dose from seven days to thirty years – certainly a long term dose model. *Id.* at 116. Consequently, this portion of Joint Petitioners' claim is unsupported.

Last, Joint Petitioners assert that the MACCS2 code is deficient because it “incorrectly models doses in the code’s EARLY and CHRONC modules.” *Id.* Joint Petitioners assert that the code incorrectly assumes an indoor dose of zero when it should be equivalent to the outdoor dose. According to Joint Petitioners, if properly modeled, the indoor dose would increase by a factor of 2-4. *Id.* But, Joint Petitioners provide no alleged facts or expert opinion to support this claim. The voluminous materials the petition to intervene references do not appear to discuss the indoor dose during the EARLY or CHRONC module. Thus, this statement is precisely the type of unsupported assertion that the Commission has indicated will not support admission of a contention under 10 C.F.R. § 2.309(f)(1)(v), as discussed above.

While NRC regulations do not require applicants to use the MACCS2 code to undertake the SAMA analysis, “NRC guidance documents conclude that the MACCS2 code ... is acceptable for performing SAMA analyses.” *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip. op at 4) (*citing* Staff Guidance for Preparing Severe Accident Mitigation Alternative Analyses, 72 Fed. Reg. 45,466 (Aug. 14, 2007)). The Board in *Pilgrim* noted that, “it is necessary for the Staff to take a uniform approach to its review of [SAMA] analyses by license applicants and for performance of its own analyses, and it would be imprudent for the Staff to do otherwise without sound technical justification.” *Pilgrim*, LBP-07-13, 66 NRC at 142. In light of the routine use of the MACCS2 code in SAMA preparation, the Board stated, “the Staff is fully justified in finding, after due consideration of the manner in which the code has been used, that analysis using this code is an acceptable method for performance of SAMA analysis.” *Id.* Consequently, the Board should reject this unsupported contention pursuant to 10 C.F.R. § 2.309(f)(1)(v).

b. The Use of Alternative Meteorological Models Like the Ones Suggested by Joint Petitioners Would Not Materially Alter the SAMA Analysis Conclusions

Joint Petitioners also argue the ATMOS module of the MACCS2 code is “an inappropriate air dispersion model, the straight-line Gaussian plume, and meteorological data inputs that did not accurately predict the geographic dispersion and deposition of radionuclides

at Davis-Besse's Great Lakes Shoreline location." Joint Petition at 104. This aspect of Contention 4 challenges FENOC's use of the ATMOS atmospheric dispersion model within the MACCS2 code. *Id.* at 116. Joint Petitioners challenge the ATMOS model because it assumes a "steady-state, straight-line Gaussian plume" that "functions much like a beam from a flashlight." *Id.* at 118. In light of meteorological research, Joint Petitioners contend that FENOC should have used a "variable plume model such as AERMOD or CALPUFF."⁹⁶ *Id.* at 116-17. In support of this contention, Joint Petitioners offer a number of arguments, of which all lack an adequate basis under 10 C.F.R. § 2.309(f)(1)(v).

Specifically, to the extent Joint Petitioners have alleged that the use of the ATMOS model is categorically inapplicable to the Davis-Besse site, Joint Petitioners have not adequately supported its claim. Joint Petitioners cite studies that indicate that a straight-line Gaussian plume model may be inappropriate in other contexts, such as source permitting or emergency planning, or that suggest a user should employ caution when relying on a Gaussian plume model in areas with complex or varied terrain. But none of these studies support Joint Petitioners' larger claim that a Gaussian plume model would not produce adequate results for a SAMA analysis at Davis-Besse. Joint Petitioners have failed to demonstrate that many of these studies would even apply to Davis-Besse because Joint Petitioners have not shown that Davis-Besse is surrounded by complex terrain.

Joint Petitioners, here, have not adequately supported their assertions that some identified features of the Davis-Besse site could impact the ATMOS module and that the ER has not accounted for specific meteorological phenomena, such as the lake breeze effect, the varied

⁹⁶ CALPUFF and AERMOD are not credible suggestions to replace the ATMOS module of the MACCS2 code because both models are unable to model more than a single radionuclide, which is important to being able to reasonably analyze the economic impacts from dose and contamination. See, e.g., NRC Staff Testimony of Nathan E. Bixler and S. Tina Ghosh Concerning the Impact of Alternative Meteorological Models on the Severe Accident Mitigation Alternatives Analysis, at 20-21 (Jan. 3, 2011) (ADAMS Accession No. ML110030966).

terrain at Davis-Besse, and the possibility of hot spots. However, even assuming that Joint Petitioners adequately supported their assertions, none of their arguments demonstrate a material dispute with the application because Joint Petitioners have not shown that any of these asserted errors in the SAMA analysis could conceivably lead to the identification of another cost-beneficial SAMA. Therefore the Board should not admit this aspect of Contention 4.

i. Use of the Gaussian Plume Model Is Appropriate for a SAMA Analysis

First, Joint Petitioners argue that the use of the ATMOS model in the MACCS2 code is inappropriate because it relies on a “straight-line, steady-state” Gaussian plume. *Id.* at 118-19. But, Joint Petitioners do not produce an adequate factual basis for this claim. Joint Petitioners allege that site specific research for Davis-Besse demonstrates that the use of ATMOS is inappropriate because “winds are variable and dose will be more concentrated than modeled and extend over a larger area.”⁹⁷ *Id.* at 118. Joint Petitioners cite to a number of studies that discuss the meteorological conditions on New England’s Atlantic coast, *id.* at 119-21, but Joint Petitioners do not cite to any support that shows that these studies have any applicability to Davis-Besse’s SAMA analysis. Joint Petitioners do not cite any support for its assertion that these studies of the New England sea coast indicate that the use of ATMOS will necessarily lead to a faulty SAMA analysis for the Davis-Besse license renewal. Joint Petitioners do not provide any exhibits supporting their discussion of the lake breeze effect, the Great Lakes, or the meteorology of Davis-Besse. Instead, Joint Petitioners cite to two websites.⁹⁸ Neither of these websites provides evidence of the lake breeze effect at Davis Besse or its potential

⁹⁷ Joint Petitioners provide no authority for their assertion. *Id.* at 118.

⁹⁸ One of the websites, hosted by the National Weather Service, contains a single sentence referencing the Great Lakes. Joint Petition at 118. It merely describes the conditions for developing a sea breeze but has no discussion of the prevalence of a lake breeze around Davis-Besse or along the Great Lakes in general. The second website contains a more through description of the lake breeze effect but provides no credible evidence regarding any lake breeze effect for Davis-Besse or its potential impact on the SAMA analysis. *Id.*

impact on the SAMA analysis. Moreover, Joint Petitioners do not provide any basis for its puzzling claim that use of a different atmospheric dispersion model than ATMOS will lead to a finding that doses will be both more concentrated and spread out over a larger area.

Regardless of the atmospheric transport model chosen, the area modeled remains identical.

Second, Joint Petitioners contend that “[FENOC’s] use of the ATMOS model to predict dispersion in a 50-mile radius of the plant” is unacceptable because the accuracy of the ATMOS model decreases at greater distances. *Id.* at 118. To support this portion of the contention, Joint Petitioners rely on an EPA guideline for calculating dispersion of air pollutants. Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, 70 Fed. Reg. 68,218 (Nov. 9, 2005). This document does state, “The maximum distance for refined steady-state Gaussian plume model application for regulatory purposes is generally considered to be 50 km [(roughly 31 miles)].” *Id.* at 68,249. But the purpose of the guideline is to conduct a very different inquiry than a SAMA analysis. The EPA relies on the guideline to evaluate modeling of the environmental impacts of air emissions when it prepares and reviews source permits. *Id.* at 68,218. Here, unlike the EPA’s use of the guideline, the ATMOS module is not being used to prepare and review source permits, it is being used as a screening tool to identify changes to the plant’s configuration that could reduce the likelihood and impact of a severe accident.

In preparing models to assess the impacts of air emissions, the EPA has noted that “[t]he greater the detail with which a model considers the spatial and temporal variations in emissions and meteorological conditions, the greater the ability to evaluate the source impact and to distinguish the effects of various control strategies.” 40 C.F.R. Part 51, Appx. W § 2.1.a. Thus, an estimate of a pollutant’s actual path is critical for an EPA emissions analysis. In contrast, as discussed above, a SAMA analysis does not rely on precise predictions of how releases will travel in the event of a severe accident. Rather, the purpose of the SAMA analysis is to fulfill the agency’s obligation to take a “hard look” at mitigation alternatives under NEPA by

evaluating whether any potential SAMAs would be cost-beneficial. *Pilgrim*, LBP-07-13, 66 NRC at 142. Consequently, the EPA's limitations on a steady-state Gaussian plume in the regulatory context do not imply that the use of a steady-state Gaussian plume model is inappropriate in the SAMA context.⁹⁹

In fact, Joint Petitioners rely on another study specifically undertaken by the NRC to address concerns regarding the use of the Gaussian plume in the MACCS2 code for SAMA analysis, NUREG/CR-6853 Comparison of Average Transport and Dispersion Among a Gaussian, a Two-Dimensional, and a Three-Dimensional Model, at xi, 41 (Oct. 2004) (ADAMS Accession No. ML043240034) ("NUREG/CR-6853"). NUREG/CR-6853 concluded that the MACCS2 code with the ATMOS model is accurate at distances up to 200 miles and often outperforms more complicated models allowing for temporal and spatial variability. *Id.* at 72. Consequently, within the context of the SAMA analysis, Joint Petitioners' evidence does not indicate that the ATMOS model is inaccurate at distances over 31 miles. Rather, the documents cited by Joint Petitioners conclude that the ATMOS model may be used at much greater distances for SAMA analyses.¹⁰⁰

Next, Joint Petitioners assert that ATMOS cannot produce an appropriate SAMA analysis for Davis-Besse in light of meteorological conditions at the site. Joint Petition at 119.

⁹⁹ Joint Petitioners also note that the MACCS2 guidance report states that the "code should be applied with caution at distances greater than ten to fifteen miles." Joint Petition at 124 (citing MACCS2 Computer Code: Application Guidance for Documented Safety Analysis, Final Report, at 3:8 (June 2004) (ADAMS Accession No. ML092640174)). But this document does not indicate that the code cannot model releases at greater distances.

In addition, Joint Petitioners assert that the MACCS2 guidance report indicates that because the "code does not model dispersion" within 100 meters of the source, the code ignores "resuspension of contamination." *Id.* But, Joint Petitioners have not supported this inference, or made any showing of how it would have any material effect on the SAMA analysis.

¹⁰⁰ The Board in *Indian Point* admitted a similar aspect of a SAMA contention, which alleged that in light of the EPA guideline, the ATMOS model could not accurately model doses at greater distances. *Indian Point*, LBP-08-13, 68 NRC at 110-12. But, that contention, supported by an expert affidavit, did not cite NUREG/CR-6853, which undermines this assertion as discussed above. NYS Petition at 167.

As discussed above, Joint Petitioners have not produced sufficient facts to demonstrate that unique meteorological conditions exist at Davis-Besse that could impact the SAMA analysis. Moreover, Joint Petitioners have not produced adequate evidence for the much larger claim that the ATMOS module of the MACCS2 code is fundamentally incapable of adequately accounting for such characteristics. *Compare id.* at 119 *with id.* at 119–21.

First, Joint Petitioners rely on a string of government studies to support the claim that the use of a steady-state, straight-line Gaussian plume model, such as ATMOS, is automatically inappropriate for a site with complex terrain. But, the Joint Petitioners do not contradict FENOC's statement that the "vicinity is flat with marsh areas bordering the lake and the upland area rising to only 10 to 15 feet above the lake low water datum level in the general surrounding area."¹⁰¹ Consequently, Joint Petitioners have not demonstrated that these studies would have any applicability to Davis-Besse, because they have not established that areas surrounding Davis-Besse feature complex terrain. Even if Davis-Besse was situated amidst complex terrain none of these studies support Joint Petitioners' claim that ATMOS is categorically inapplicable to the Davis-Besse site. Rather, the studies either relate to emergency planning, which requires a very different type of analysis than a SAMA analysis, or like the MACCS2: Lessons Learned article, simply recommend that a user exercise caution in selecting inputs for the MACCS2 code. Significantly, none of these studies specifically address whether ATMOS is appropriate for a SAMA analysis of Davis-Besse.

Joint Petitioners cite several NRC documents that point to the limitations of straight-line Gaussian plume models for predicting air dispersion in the context of emergency planning.¹⁰²

¹⁰¹ Joint Petition at 124–25. Joint Petitioners also point to river valleys and forested hills as evidence of the complex terrain but they fail to dispute that change in elevation in the vicinity of the site varies by less than 15 feet. *But see id.*

¹⁰² Joint Petition to Intervene at 126–29 (citing NUREG-0737, Supplement 1, Clarification of TMI Action Plan Requirements, 13 (Jan. 1983) (ADAMS Accession No. ML102560009); RTM-96: Response Technical Manual (NUREG/BR-0150, Vol. 1, Rev. 4), Appx. Q (Mar. 1996) (ADAMS Accession No. ML062560259) ("RTM-96"); What's in the Black Box Known as Emergency Dose Assessment, Part 2,

But, these documents indicate that the purpose of emergency planning is very different from the purpose of the probabilistic risk assessment behind the SAMA analysis. These emergency planning documents are meant to estimate the possible consequences of radiological accidents in order to prevent adverse early and delayed health effects. U.S. NRC Response Technical Manual, RTM-96, March 1996, Before You Begin. Consequently, in calculating potential exposures, these documents rely on actual data of where a plume has traveled, or is likely to travel, in order to best inform the public of how to limit exposure. *Id.* at Section F: Early Phase Dose Projections. In contrast, as discussed above, a SAMA analysis considers many scenarios to determine the overall risk of a severe accident occurring under unknown conditions in the future. Therefore, prior critiques of the steady-state Gaussian plume model in the emergency planning context do not necessarily suggest that the Gaussian plume model will not produce reasonable results in the SAMA context.

A number of other NRC studies cited by Joint Petitioners do not reject using a steady-state Gaussian plume model for SAMA analysis at a site with varied terrain. These studies advance more modest claims. One study suggests that, at some sites with complex terrain, additional monitoring equipment “may be necessary.” Safety Guide 23: Onsite Meteorological Programs, at 23.4 (Feb. 17, 2002) (ADAMS Accession No. ML020360030); *see also* Reg. Guide 1.23, Meteorological Monitoring Programs for Nuclear Power Plants, Rev. 1, 11 (March 2007) (ADAMS Accession No. ML070180736) (noting that at complex sites, additional monitoring equipment or programs “may be necessary”). Another study indicates that adjustments to an air-dispersion equation “may be necessary to prevent misrepresentation of actual atmospheric transport and diffusion characteristics.” Reg. Guide 1.111, Rev. 1, Draft for Comment, Methods

Slide 28 (Apr. 2009) (ADAMS Accession No. ML091050257)). Joint Petitioners also rely on an EPA guideline for effluent modeling. Joint Petition at 131–32 (citing 70 Fed. Reg. at 68,218). But, as discussed above, the conclusions related to the EPA’s effluent modeling do not apply to the NRC’s SAMA analysis.

for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors, at 1.111-9-1.111-10. (Jul. 1977) (ADAMS Accession No. ML003740354). Another report cited by Joint Petitioners states that when applying the ATMOS model to areas with complex terrain “caution should be used.” NUREG/CR-6853 Comparison of Average Transport and Dispersion Among a Gaussian, a Two-Dimensional, and a Three-Dimensional Model, at 72 (Oct. 2004) (ADAMS Accession No. ML043240034). Last, one study indicates that in areas of complex terrain, “more detailed dispersion models may have to be considered.” NUREG/CR-6572, Rev. 1, Kalinin VVER-1000 Nuclear Power Station Unit 1 PRA, at 3-114 (Dec. 2005) (ADAMS Accession No. ML060450618).

Joint Petitioners also rely on a number of studies prepared by entities other than the NRC, but none of these demonstrate that application of the ATMOS model to a site with minimally varying terrain, such as Davis-Besse, will necessarily result in an inadequate SAMA analysis. A report from the Department of Energy states that Gaussian models “perform best” over regions with “minimal variation in terrain.” MACCS2 Computer Code: Application Guidance for Documented Safety Analysis, Final Report, at 3:8 (June 2004) (ADAMS Accession No. ML092640174). The terrain surrounding Davis-Besse, as Joint Petitioners do not dispute has limited variation in elevation. Joint Petition at 124-25. Likewise, a report from the National Research Council, cited by Joint Petitioners, describes the history of air-dispersion models, including models developed after those incorporating the Gaussian plume, but it does not suggest that the Gaussian plume is an inappropriate tool for probabilistic analyses, such as the SAMA analysis for Davis-Besse. Tracking and Predicting the Atmospheric Dispersion of Hazardous Material Releases: Implications for Homeland Security (2003), 33-54 (available at [http://dels.nas.edu/ Report/Tracking-Predicting-Atmospheric-Dispersion/10716](http://dels.nas.edu/Report/Tracking-Predicting-Atmospheric-Dispersion/10716)). Last, Joint Petitioners cite several textbooks in environmental science and engineering, but these sources do not demonstrate that a Gaussian plume model is categorically ineffective in an area of complex terrain. Joint Petition at 134-35.

Therefore, these studies certainly indicate that complex terrain may have an effect on a steady-state Gaussian plume model. The selection of a model depends greatly on the purpose of the model; the purpose here is as a screening tool and not an emergency planning decision tool or air pollution permitting tool. Importantly, none of these documents supports Joint Petitioners' bare assertion that a Gaussian plume model does not "model the impacts of terrain effects," or that the ATMOS Module of the MACCS2 code is inappropriate for use for Davis-Besse's SAMA analysis to determine the potential area of impact and deposition in a severe accident." Joint Petition at 124. Although ATMOS assumes a flat terrain, a licensee that selected appropriate input parameters could create a sufficiently reliable SAMA analysis to satisfy NEPA. The documents Joint Petitioners cite do not suggest otherwise. Thus, Joint Petitioners have not provided a sufficient basis for its categorical challenge to FENOC's use of a steady-state Gaussian plume in the Davis-Besse SAMA analysis. As the Commission has noted, "The question is not whether there are 'plainly better' atmospheric dispersion models or whether the SAMA analysis can be refined further." *Pilgrim*, CLI-10-11, 71 NRC ___ (slip op. at 37). The question is whether the SAMA analysis "resulted in erroneous conclusions." *Id.*

ii. *The Lake Breeze Effect, Behavior of Plumes Over Water, and Terrain Effects*

Next, Joint Petitioners contend that FENOC's SAMA analysis is inadequate because it does not adequately account for the lake breeze effect, the behavior of plumes over open water, or the impacts of the terrain at Davis-Besse on the SAMA analysis. Joint Petition at 116-25. As discussed above, Joint Petitioners have not shown that these features of the Davis-Besse SAMA analysis are material, in that they would be likely to result in the identification of a cost beneficial SAMA. Therefore, this aspect of the contention is inadmissible. Moreover, Joint Petitioners have not provided adequate factual support for this aspect of the contention.

Lake breezes result when uneven heating between the land and water causes a landward flow of cool air. *Id.*, Exhibit 72 at 1. Joint Petitioners point out that the sea breeze

effect can have an important impact on diffusion studies at seaside locations but fail to show that this is also true for lake breezes at Davis-Besse. *Id.* (citing Slade, *Meteorology and Atomic Energy*, § 2-3.5 (1968)). Joint Petitioners have produced several studies that indicate that the sea breeze effect plays an important role at New England sites but not at Davis-Besse. *Id.* at 120 (citing, *e.g.*, Exhibit 72 at 2, Samuel Miller et al., *Synoptic-Scale Controls on the Sea Breeze of the Central New England Coast*, 18 *WEATHER & FORECASTING* 236 (2003)). Likewise, Joint Petitioners argue that the SAMA analysis is inadequate because it assumes that a radioactive plume blown out to sea will not have a further impact when the plume blown may remain tightly concentrated and create a “hot spot” if subsequently blown back to land. *Id.* at 122 (citing Jan Beyea, Ph.D., Report to the Massachusetts Attorney General on the Potential Consequences of a Spent Fuel-Pool Fire at the Pilgrim or Vermont Yankee Nuclear Plant, at 11 (May 25, 2006) (ADAMS Accession No. ML071840568)). Oddly, Joint Petitioners also claim that plumes blowing “out to sea” (or, more correctly for Davis-Besse, offshore over Lake Erie) would have no impact according the Davis-Besse SAMA analysis. Joint Petition at 121. Joint Petitioners appear to discount the impacts of plume travelling across Lake Erie into Michigan and Canada. ER at E-49. Finally, Joint Petitioners have produced numerous documents that indicate that the MACCS2 assumes flat terrain and that the MACCS2 code should be used with caution at sites with varied terrain. *Id.* at 122-25. But Joint Petitioners do not dispute the description of the terrain for the vicinity surround Davis-Besse as relatively flat with little variation. Moreover, Joint Petitioners seem to discount the statements from the ER that indicate that the terrain at Davis-Besse is fairly flat with little variation and assert without any basis that “even slight variations in ... topography ... make overly simplistic meteorological radiation plume dispersion models inappropriate.” *Id.* at 125.

In *Pilgrim*, the petitioners proffered a similar contention that was admitted. In that case, the petitioner raised a challenge to the MACCS2 code’s treatment of the meteorological effects, including the sea breeze effect. Request for Hearing and Petition to Intervene by Pilgrim Watch,

at 35-36 (citing J.D. Spengler and G.J. Keeler, *Feasibility of Exposure Assessment for the Pilgrim Nuclear Power Plant*, Prepared for the Massachusetts Department of Public Health (May 12, 1988)). The petitioner in *Pilgrim* also challenged the MACCS2 code's treatment of terrain effects. *Id.* at 35. The Board admitted the contention as a challenge to the "meteorological patterns" at the site. *Pilgrim*, LBP-06-23, 64 NRC at 341. On appeal from the Board's ruling granting a motion for summary disposition, the Commission concluded that the sea breeze effect, the "hot spots" claim, and the terrain effects claim were within the scope of the admitted contention.¹⁰³ *Pilgrim*, CLI-10-11, 71 NRC __ (slip. op. at 5, 14, 25).

Likewise, in this case, Davis-Besse's SAMA analysis does not indicate how it accounts for the lake breeze effect at Davis-Besse, the possibility of a "hot spot," or terrain effects. But here, unlike in *Pilgrim*, Joint Petitioners provide no evidence that studies of the New England sea coast are applicable to Lake Erie and the Davis-Besse site. Similarly, the two websites cited by Joint Petitioners do not any provide any credible evidence of the lake breeze effect for Davis-Besse, Lake Erie, or its potential to impact a SAMA analysis. In addition and to the extent that Joint Petitioners allege that the methods chosen by FENOC for the SAMA analysis could never produce adequate results for SAMA purposes, that allegation is unsupported. Moreover, because Joint Petitioners have not shown that any part of Contention 4 would lead to the identification of an additional cost-beneficial SAMA, the Board should reject it in its entirety because it does not have an adequate factual basis and is not material to conclusions that the Staff will have to make.

¹⁰³ Recently, Pilgrim Watch, the intervenor in *Pilgrim*, stated, "It is not possible for either Pilgrim Watch, or anyone else, to show that meteorology, in and of itself, would result in a significantly different SAMA analysis.... [N]either Pilgrim Watch nor anyone else, regardless of how much time and money they might spend, can prove that —meteorological patterns/issues ... could, on its own, credibly alter the Pilgrim SAMA analysis/issues of concern." Pilgrim Watch SAMA Remand Pre-Filed Testimony at 2, 4 (Jan. 3, 2010).

iii. Additional Monitoring Stations

Finally, Joint Petitioners allege that the SAMA analysis is deficient because it relies on meteorological inputs recorded by one anemometer for one year. Joint Petition at 125. Joint Petitioners claim, “[M]easurement data, from one meteorological station, will definitely not suffice to define the Great Lakes ‘sea breeze’ or capture variability.” Joint Petition at 125. But Joint Petitioners have not provided any citation or expert testimony to support this claim. Consequently, this portion of Joint Petitioners’ contention is unsupported and therefore fails to meet the requirement of 10 C.F.R. § 2.309(f)(1)(v).

4. Joint Petitioners’ Challenge to the Inputs Used by the MACCS2 Code Would Not Alter the Conclusions of the SAMA Analysis

Joint Petitioners assert a number of deficiencies based on information and data used by the SAMA analysis or input into the MACCS2 code. Joint Petition at 135-48. They argue that the data used to estimate (1) the costs for decontamination and clean-up; (2) the costs to public health from increased dose; (3) evacuation timing; and (4) the source term and release fractions result in severely underestimating the actual costs of a severe accident. *Id.*

a. Decontamination and Clean Up Costs

i. *Joint Petitioners’ Cost Formula Argument Does Not Raise a Material Issue*

Joint Petitioners argue that FENOC’s SAMA analysis is insufficient because “the cost formula used in the MACCS2 underestimates costs likely to be incurred as a result of a dispersion of radiation.” Joint Petition at 136. Joint Petitioners argue that a nuclear reactor release will result in the dispersion of small-sized radionuclides that are more expensive to remove and clean up than large sized radionuclides, which are assumed in FENOC’s cost-formula. *Id.* at 136-37 (citing to WASH-1400). However, Joint Petitioners have not demonstrated a material issue with the application. Specifically, Joint Petitioners have not shown that a different cost formula or consideration of economic infrastructure and “multiplier

effects” could result in another cost-beneficial SAMA.¹⁰⁴ As discussed above, a SAMA contention that does not demonstrate that its challenge could lead to the identification of another cost-beneficial SAMA has not raised a material dispute with the application. *Pilgrim*, CLI-10-11, 71 NRC ___ at 39. Thus, this contention is not admissible pursuant to 10 C.F.R. § 2.309(f)(1)(vi).

ii. Joint Petitioners’ Ecological Restoration Claims Lack an Adequate Basis

Joint Petitioners argue that FENOC’s analysis should have considered “forests, wetlands and shorelines [which] cannot realistically be clean[ed] and decontaminated.” Joint Petition at 138. Notably, Joint Petitioners provide no facts, expert opinion, or citations for its assertion that these types of land cannot be cleaned and decontaminated. It is well settled that “the Commission will not accept the filing of a vague, unparticularized [contention], unsupported by alleged fact or expert opinion and documentary support.”¹⁰⁵ Therefore, this general and unsupported assertion is inadmissible. *Fansteel, Inc.* CLI-03-13, 58 NRC at 203.

iii. Joint Petitioners’ Claims Regarding Urban Areas, Cleanup Standards, and Evacuation Costs Do Not Raise a Material Issue and Lack Basis

Next, Joint Petitioners argue that “urban areas will be considerably more expensive and time consuming to decontaminate and clean than rural areas.” Joint Petition at 138. In support of this argument, Joint Petitioners point to the 1996 Sandia National laboratories report concerning site restoration costs and two studies which considered intentional attacks. *Id.* at 138-40 (citing to Site Restoration: Estimation of Attributable Costs from Plutonium-Dispersal Accidents, SAND96-0957, David Chanin, Walt Murfin, UC-502, (May 1996)), *available at* <http://chaninconsulting.com/index.php?resume>) (“Sandia report”); Barbara Reichmuth et al.,

¹⁰⁴ Joint Petition at 141-42. See Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Regarding Pilgrim Nuclear Power Station – Final Report (NUREG-1437, Supplement 29) (noting NRC Staff’s determination that accounting for these things will not change SAMA analyses).

¹⁰⁵ *Palisades*, CLI-07-18, 65 NRC at 414 (quoting *Port Authority of the State of New York* (James A. FitzPatrick Nuclear Power Plant; Indian Point, Unit 3), CLI-00-22, 52 NRC 266, 295 (2000)).

Economic Consequences of a Rad/Nuc attack: Cleanup Standards Significantly Affect Cost; Robert Luna, Survey of Costs Arising from Potential Radionuclide Scattering Events, Sandia National laboratories, WM2008 Conference, Feb. 24-28, 2008, Phoenix AZ).

Based on these studies, Joint Petitioners argue that FENOC should have incorporated the analytical framework in the Sandia report, *id.* at 140, and accounted for the fact that “current EPA and NRC cleanup standards differ [as] these differences have implications for both the pace and ultimate cost of cleanup.” *Id.* at 138-39. The Staff recognizes that Joint Petitioners have provided minimal support necessary for its assertion that smaller particles will create higher cleanup costs, and that urban areas are more costly to clean up than rural areas. However, Joint Petitioners have not adequately supported its claims that the “economic losses stemming from the stigma effects of a severe accident [at Davis-Besse] would be staggering,” Joint Petition at 141, given that Davis-Besse is located near “industrial, tourist, educational, transportation, port, and financial centers.” *Id.* Likewise, Joint Petitioners have not provided any factual or expert support for its claim that FENOC’s ER should have discussed “multiplier effects” or “the loss of, and costs to remediate the economic infrastructure that make business, tourism and other economic activity possible.” *Id.* at 141-42. Because Joint Petitioners have not made any demonstration, beyond pure assertion, for these claims, they lack the basis required by 10 C.F.R. § 2.309(f)(1)(v). Moreover, as discussed above, Joint Petitioners do not demonstrate that using a different analytical framework or considering the differences in EPA and NRC cleanup standards or economic losses or “multiplier effects” would identify any additional SAMA as potentially cost beneficial. *Pilgrim*, CLI-09-11, 69 NRC at 533. Therefore, this argument does not raise a material issue.

b. Health Costs

i. Joint Petitioners' Challenge of the \$2000/person-rem Factor Lacks Basis and Does Not Raise a Material Issue

Joint Petitioners argue that “[t]he population dose conversion factor of \$2000/person-rem used by FENOC to estimate the cost of the health effects generated by radiation exposure is based on a deeply flawed analysis and seriously underestimates the cost of the health consequences of severe accidents.” Joint Petition at 142-43. Joint Petitioners argue that the \$2000/person-rem conversion factor is inappropriate for two reasons. *Id.*

First, Joint Petitioners argue that “it is inappropriate to use a conversion factor that does not include deterministic effects.” *Id.* at 143. Specifically, Joint Petitioners assert that it expects that a large number of early fatalities could occur for some of the severe accident scenarios evaluated by FENOC at Davis-Besse. *Id.* Joint Petitioners argue that this assertion is “consistent with the findings of [Table 5.5 of] the [GEIS].” *Id.* at 144.

However, FENOC’s use of the \$2000/person-rem factor is consistent with standard NRC practice and existing NRC guidance, NUREG/BR-0184, Regulatory Analysis Technical Handbook, Final Report., at 5, 26 (June 1997).¹⁰⁶ As Joint Petitioners point out, “the NRC believes that regulatory issues involving deterministic effects and/or early fatalities would be very rare, and can be addressed on a case-specific basis, as the need arises.”¹⁰⁷ While Joint Petitioners assert that they estimate a large number of early fatalities, they offer no estimate, much less an estimate challenging the estimates in Table 5.5 of the GEIS. Therefore, this

¹⁰⁶ See also NUREG-1530. In accordance with guidance in NUREG-1530, the NRC has begun a review of the \$2000/person-rem factor. If the review results in an updated factor, new guidance will be provided to the licensees. Until this occurs, licensees can continue to follow the current guidance in NUREG-1530, NUREG/BR-0184, and NUREG/BR-0058, Rev. 4 and use the \$2000/person-rem factor in their ER analyses.

¹⁰⁷ Joint Petition at 144 (citing U.S. NRC “Reassessment of NRC’s Dollar Per Person-Rem Conversion Factor Policy (1995), op cit., p. 13).

argument lacks an adequate basis, as it offers only an unsupported assertion. 10 C.F.R. § 2.309(f)(1)(v).

Moreover, this argument does not raise a material issue of law or fact, as it does not indicate how FENOC's ER analysis failed to meet a regulatory or statutory requirement.¹⁰⁸ The mere fact that other calculations are possible does not invalidate FENOC's analyses. The material issue in a SAMA contention is whether a different analysis would be likely to result in identification of an additional potentially cost-beneficial SAMA. *Pilgrim*, CLI-09-11, 69 NRC at 533. For these reasons, another Board rejected a similar challenge to the \$2000/person-rem standard. *Indian Point*, LBP-08-13, 68 NRC at 187.

Joint Petitioners also argue that "for certain severe accident scenarios at Davis-Besse evaluated by FENOC, we estimate that considerable numbers of people would receive doses high enough so that the [dose- and dose-rate reduction effectiveness factor ("DDREF")] should not be applied." Joint Petition at 145. Therefore, Joint Petitioners assert that:

the \$2000/person-rem factor, as derived by NRC, also underestimates the total cost of the latent cancer fatalities that would result from a given population dose because it assumes that all exposed persons receive dose commitments below the threshold at which the [DDREF] (typically a factor of 2) should be applied.

Id. at 144–45. Joint Petitioners argue that a "single cost conversion factor, based on a DDREF of 2, is not appropriate because for some individuals, a "one-rem dose would be worth 'more' because it would be more effective at cancer induction than for individuals receiving doses below the threshold." *Id.* at 145. Joint Petitioners provide an alternative way "to evaluate the cost equivalent of the health consequences resulting from a severe accident." *Id.* at 145–46.

Specifically, Joint Petitioners argues FENOC should "simply ... sum the total number of early fatalities and latent cancer fatalities, as computed by the MACCS2 code, and multiply by

¹⁰⁸ See *Indian Point*, LBP-08-13, 68 NRC at 187.

the [NRC's value of a statistical life figure of 3 million]." *Id.* at 145. However, Joint Petitioners do not indicate which severe accident scenarios at Davis-Besse raise these concerns, or provide factual or expert support for its alternative method.¹⁰⁹ Therefore, this argument lacks an adequate basis. As discussed above, this argument also does not raise a material issue of law or fact.¹¹⁰

ii. *Joint Petitioners Have Not Established the Relevancy of the 1982 Sandia National Lab Report or Supported its Claims About the Report*

Next, Joint Petitioners argue that a 1982 Sandia National Lab Report explains "why FENOC's estimates of how many lives might be lost are too low." Joint Petition at 146 (citing Calculation of Reactor Accident Consequences, U.S. Nuclear Power Plants (CRAC-2), Sandia National Laboratory, 1982). Joint Petitioners refer to peak fatality and peak injury estimates by CRAC-2, but argues that those estimates are "based on old, and now outdated dose response models." *Id.* However, Joint Petitioners have not provided any link between CRAC-2 and the Davis-Besse SAMA analysis. Therefore, Joint Petitioners have not shown why the report is relevant. Moreover, Joint Petitioners provide no alleged facts or expert opinion to support its claim that the CRAC-2 dose response models are outdated. Thus, this is an unsupported assertion that will not support admission of a contention under 10 C.F.R. § 2.309(f)(1)(v).

¹⁰⁹ It appears that this is the same approach recommended by Dr. Lyman in the Indian Point license renewal proceeding, where a similar challenge to the \$2000/person-rem factor was raised. See Riverkeeper, Inc.'s Request for Hearing and Petition to Intervene in Indian Point License Renewal Proceeding and attached Exhibits, at 73 (Nov. 30, 2007) (ADAMS Accession No. ML0734100931). Notably, the Indian Point Board found the challenge inadmissible, noting that it failed to raise a material issue of fact or law. *Indian Point*, LBP-08-13, 68 NRC 43 at 187-88.

¹¹⁰ *Indian Point*, LBP-08-13, 68 NRC 54, 187 (2008).

iii. *Joint Petitioners' Claim that FENOC Did Not Consider Cancer Incidence or Other Health Effects Lacks an Adequate Factual Basis*

Joint Petitioners also argue that FENOC did not consider cancer incidence or “many other potential health effects from exposure in a severe radiological event.”¹¹¹ However, the \$2000/person-rem factor implicitly considers these effects as it represents “the cost associated with the harm caused by radiation exposure with respect to the causation of ‘stochastic health effects,’ that is, fatal cancers, nonfatal cancers, and hereditary effects.”¹¹² As discussed above, Joint Petitioners have not demonstrated that use of this factor is inappropriate. Therefore, this argument lacks the factual basis required by 10 C.F.R. § 2.309(f)(1)(v).¹¹³

c. *Joint Petitioners Do Not Demonstrate a Deficiency in FENOC's Evacuation Analysis*

Joint Petitioners claim that FENOC's “evacuation time input data into the [MACCS2] code were unrealistically low and unsubstantiated; and that if correct evacuation times and assumptions regarding evacuation had been used, the analysis would show far fewer [people] will evacuate in a timely manner, increasing health related costs.” Joint Petition at 147.

Specifically, Joint Petitioners have not established that FENOC's use of the evacuation time input data was inadequate or was used improperly by FENOC.¹¹⁴ Instead, Joint Petitioners only argue that alternative inputs should have been used. This type of unsupported assertion lacks the basis required under 10 C.F.R. § 2.309(f)(1)(v). Therefore, this argument

¹¹¹ Joint Petition at 146 (citing National Academy of Sciences, BEIR VII Report, (2005)).

¹¹² NUREG-1530, Reassessment of NRC's Dollar Per Person-Rem Conversion Factor Policy (1995) (ADAMS Accession No. ML0619100650) (“NUREG-1530”).

¹¹³ To the extent that this argument attempts to challenge the Commission's generic determination in App. B to Subpt. A of Part 51 concerning radiation exposure to the public during the license renewal term, it is outside the scope of the proceeding. See Table B-1; 10 C.F.R. § 2.335.

¹¹⁴ *McGuire/Catawba*, LBP-03-17, 58 NRC at 240.

does not demonstrate a genuine dispute of law or fact with the application. 10 C.F.R. § 2.309(f)(1)(vi).

d. Joint Petitioners' Claim that FENOC Underestimated or Totally Ignored a Myriad of Other Economic Costs Lacks an Adequate Factual Basis

Finally, Joint Petitioners argue that FENOC underestimated or totally ignored a myriad of other economic costs that “when added together would in all likelihood add up collectively to a significant amount.” Joint Petition at 148. Joint Petitioners provide no facts, expert opinion, or citation for its assertion. It is well settled that “the Commission will not accept the filing of a vague, unparticularized [contention], unsupported by alleged fact or expert opinion and documentary support.”¹¹⁵ Therefore, this general and unsupported assertion is inadmissible. *Fansteel*, CLI-03-13, 58 NRC at 203.

i. Joint Petitioners' Claim that MAAP is Inappropriate Does Not Raise a Material Issue

Finally, Joint Petitioners argue that FENOC's SAMA analysis minimizes the potential amount of radioactive release in a severe accident because of FENOC's use of the MAAP code. Joint Petition at 112. Specifically, Joint Petitioners argue that the “source terms used by FENOC to estimate the consequences of severe accidents (radionuclide release fractions generated by the [MAAP] code), has not been validated by [the] NRC,” *id.*, and “leads to anomalously low consequences when compared to source terms generated by NRC Staff.” *Id.* at 114. Joint Petitioners then, appear to argue that FENOC should have used the release fractions and release durations in NUREG-1465.¹¹⁶

¹¹⁵ *Palisades*, CLI-07-18, 65 NRC at 414 (quoting *Port Authority of the State of New York (James A. FitzPatrick Nuclear Power Plant; Indian Point, Unit 3)*, CLI-00-22, 52 NRC 266, 295 (2000)).

¹¹⁶ Joint Petition at 112. Notably, Joint Petitioners did not directly state that the Source Term Code Package (STCP) and MELCOR codes (used in NRC studies that formed the basis for the regulatory source term presented in NUREG-1465) should have been used. Instead, Joint Petitioners argued that NUREG-1465 has source terms generated by NRC staff that had been reviewed by an expert panel and that FENOC should not have used a MAAP-generated source terms. *Id.* at 114.

The Staff recognizes that Joint Petitioners have provided some support for the argument that MAAP may lead to lower consequences when compared to source terms generated by NRC Staff. *Id.* at 114. Specifically, the studies Joint Petitioners reference indicate that MAAP may lead to lower consequences when compared to the source terms in NUREG-1465. *Id.* Joint Petitioners also note that “[i]t has been previously observed that MAAP generates lower release fractions than those derived and used by NRC in studies such as NUREG-1150,” *id.* at 113, which uses “the Source Term Code Package [NRC’s state-of the art methodology for source term analysis at the time of NUREG-1150] and MELCOR.” *Id.* at 113 (quoting a Brookhaven National Laboratory study that independently analyzed the costs and benefits of one SAMA in the Catawba and McGuire license renewal proceeding).

However, Joint Petitioners have not demonstrated that the use of MAAP is unreasonable or inappropriate in this case. Joint Petitioners are correct that the MAAP code has not been formally reviewed and approved by the NRC. But, the NRC Staff has previously found the use of MAAP reasonable and appropriate for the purposes of the SAMA analysis.¹¹⁷ Moreover, Joint Petitioners’ reliance on NUREG-1465 is unavailing. At issue here is the adequacy of FENOC’s analysis of the release of radionuclides to the environment in a severe accident. In contrast, NUREG-1465’s source term only addresses the release of radionuclides into containment; it assumes a “release resulting from ‘substantial meltdown’ of the core into the containment ... and [assumes] *that the containment remains intact but leaks at its maximum allowable leak rate.*” NUREG-1465, at 1 (emphasis added). Releases into containment and releases into the environment are very different events, with significant differences in sequence progression, release pathways, and fission product deposition and removal mechanisms.¹¹⁸ Thus, these

¹¹⁷ See, e.g., Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Regarding Palisades Nuclear Plant - Final Report (NUREG-1437, Supplement 27), Appendix G at G-11.

¹¹⁸ NUREG-1150, “Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants,” Dec. 1990, Vol. 2, Sections C-10.1 and C-13.4.1.

events naturally result in different source terms; the disparity between FENOC's MAAP-based probabilistic source term and the NUREG-1465 source term does not show that FENOC's source term is deficient.

In rejecting a similar challenge to the MAAP code,¹¹⁹ the *Indian Point* Board noted that the “[p]resentation of an alternative analysis is, without more, insufficient to support a contention alleging that the original analysis failed to meet applicable requirements.”¹²⁰ Here, Joint Petitioners have not established that the use of the MAAP is inadequate or was used improperly by FENOC,¹²¹ or that the use of another source term would identify additional cost beneficial SAMAs. *Pilgrim*, CLI-09-11, 69 NRC at 533. Instead, Joint Petitioners only argue that an alternative analysis, using different source terms, should have been completed.¹²² Therefore, in this case, as in the *Indian Point* proceeding, the Board should reject this argument for not demonstrating a genuine dispute of law or fact with the application.¹²³

5. Joint Petitioners' Assertion that Use of PRA and the Mean for the SAMA Analysis are Outside the Scope of this Proceeding and Not Material and Lack an Adequate Basis

a. Joint Petitioners' Claims Challenging Probabilistic Modeling Are Outside the Scope of the Proceeding

Joint Petitioners argues that FENOC underestimated the true consequences of a severe accident by following standard industry and NRC practice by using “the Probabilistic Safety

¹¹⁹ See *Riverkeeper, Inc.'s Request for Hearing and Petition to Intervene in Indian Point License Renewal Proceeding* and attached Exhibits, Nov. 30, 2007, at 68-69 (ADAMS Accession No. ML0734100931); *Riverkeeper, Inc.'s Response to Atomic Safety and Licensing Board Questions Regarding Contention EC-2*, Apr. 7, 2008 (ADAMS Accession No. ML0810804220).

¹²⁰ See *Indian Point*, LBP-08-13, 68 NRC at 187.

¹²¹ *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), LBP-03-17, 58 NRC 221, 240 (2003).

¹²² See Joint Petition at 44-46 (citing NUREG-1465 and NUREG-1150 and noting that FENOC should not have used a MAAP-generated source terms in its SAMA analysis).

¹²³ 10 C.F.R. § 2.309(f)(1)(vi).

Analysis (PSA) Model and a Level 3 model developed by the MACCS2 code”¹²⁴ in their SAMA analysis.¹²⁵ While NRC regulations do not require applicants to use a PSA model developed by the MACCS2 code, the Commission has stated that “NRC guidance documents conclude that the MACCS2 code ... is acceptable for performing SAMA analyses.”¹²⁶ Moreover, the Commission noted that the SAMA analysis requires an examination of the “probability-weighted consequences of the analyzed severe accident [scenarios].” *Pilgrim*, CLI-10-11, 71 NRC__ (slip op. at 3). Quite simply, the Commission has unequivocally stated that SAMA analysis “is a probabilistic risk assessment analysis.” *Id.*

Moreover, the NRC’s regulations note that “the probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to ground water, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives.” 10 C.F.R. Part 51, Appendix B, Table B-1 (emphasis added). Consequently, the NRC regulations specifically envision consideration of severe accident mitigation in a probabilistic manner. The NRC performs SAMA analyses in response to a mandate of the Third Circuit in *Limerick Ecology Action*, 869 F.2d 719. The *Limerick* Court explained that a SAMA analysis necessarily centers on the evaluation of risk (“the likelihood of occurrence times the severity of the consequences”). 869 F.2d at 738 (3d Cir. 1989). Any serious evaluation of the costs and benefits of proposed alternatives to mitigate severe accidents must account for risk.

¹²⁴ Joint Petition at 105.

¹²⁵ See NEI 05-01, Severe Accident Mitigation Alternatives Analysis, Guidance Document, Rev. A (Nov. 2005) (ADAMS Accession No. ML060530203). See also NRC Supplement I to Regulatory Guide 4.2. The MACCS2 computer code calculates the “probability-weighted” cumulative dose and economic impacts from a severe accident for a 50-mile radial region over a 30-year period. The ATMOS module is integral to this model, and is used to predict atmospheric transport and dispersion of radionuclides released by a postulated severe accident. Like the entire MACCS2 model, ATMOS analyzes scores of data points to assess risks based on *average* impacts to a 50-mile region over a 30-year period.

¹²⁶ *Pilgrim*, CLI-10-11, 71 NRC at __ (slip op. at 4) (citing Staff Guidance for Preparing Severe Accident Mitigation Alternative Analyses, 72 Fed. Reg. 45,466 (Aug. 14, 2007)).

See *id.* at 738-39. Every SAMA described in the ER is an alternative to mitigate severe accidents, but whether those SAMAs would have any real benefit necessarily requires consideration of risk. See *Catawba/McGuire*, CLI-02-17, 56 NRC at 9. Thus, Joint Petitioners' challenge to FENOC's probabilistic approach in computing SAMAs is contrary to Commission precedent and outside the scope of the proceeding.

b. Joint Petitioners' Claims Regarding FENOC's Risk Definition and PRA Uncertainties Lack an Adequate Factual Basis

Joint Petitioners argue that probabilistic modeling underestimates the consequences of a severe accident because it defines risk as "the product of consequence and frequency of accidental release."¹²⁷ However, this argument lacks the basis required by 10 C.F.R. § 2.309(f)(1)(v). In support of this argument, Joint Petitioners cites a decision in *Indian Point* for the proposition that "the Commission should not ignore the potential consequences of severe-consequence accidents by always multiplying those consequences by low probability values." Joint Petition at 106. But, Joint Petitioners' discussion of this case is incorrect.

Specifically, the quotation cited from the decision does not reflect the holding in that case. The Board was merely recognizing that due to the high population density near Indian Point, "a low-probability accident at Indian Point may result in greater consequences than the same accident at another site."¹²⁸ As such, *Indian Point* is inapposite. In *Indian Point*, the Commission instructed the Board to consider serious accidents with "equal attention" to both probabilities and consequences.¹²⁹ This instruction supports the validity of the definition of risk used by FENOC, which considers both probability and consequences and mirrors the definition

¹²⁷ Joint Petition at 105 (citing ER at 4.20).

¹²⁸ *Consolidated Edison Co. of N.Y.* (Indian Point, Unit 2), *Power Auth. of the State of N.Y.* (Indian Point, Unit 3), CLI-85-06, 21 NRC 1043, 1054 (1985).

¹²⁹ See *Consolidated Edison Co. of N.Y.* (Indian Point, Unit 2), *Power Auth. of the State of N.Y.* (Indian Point, Unit 3), LBP-83-68, 18 NRC 811 (1983), *aff'd*, CLI-85-6, 21 NRC 1043 (1985).

the Commission uses in its analyses.¹³⁰ Therefore, there is no basis for the challenge to FENOC's risk definition and this argument does not support the admission of this aspect of Contention 4.

Joint Petitioners also point to an article for the proposition that “[probabilistic risk analysis (“PRA”)] uncertainties are so large and so unknowable that it is a huge mistake to use a single number coming from them for any decision regarding adequate protection.”¹³¹ However, for several reasons, this article does not support the admissibility of this aspect of Contention 4, either.

First, the NRC does not use the SAMA analysis to make decisions on adequate protection.¹³² Instead, the SAMA analysis is done pursuant to NRC's Part 51 regulations implementing NEPA.¹³³ Second, as discussed above, under NEPA, the consideration of mitigation alternatives is governed by a “rule of reason.”¹³⁴ This “rule of reason” requires a

¹³⁰ See Attorney General of Massachusetts, Attorney General of California; Denial of Petitions for Rulemaking, 73 Fed. Reg. 46,204, 46,207-08, 46,211-12 (Aug. 8, 2008).

¹³¹ Joint Petition at 149 (citing Kamiar Jamali, *Use of Risk Measures in Design and Licensing Future Reactors*, 95 RELIABILITY ENGINEERING & SYSTEM SAFETY 935-43 (2010) (“Jamali Article”).

¹³² The Jamali Article appears to recognize this in noting that “operating reactors have primarily deterministic licensing basis already in place, which means that the plants were already determined to be safe before applying the results of plant-specific PRAs.” Jamali Article at 936. “NRC regulations require that nuclear reactors be designed to withstand certain postulated events or accidents, called ‘design basis accidents’ or DBAs.” *Progress Energy Florida, Inc.* (Levy County Nuclear Power Plant, Units 1 & 2), LBP-09-10, 70 NRC 51, 91 (2009). “Design basis accidents are not intended to be actual event sequences, but instead ‘surrogates to enable deterministic evaluations of a facility's engineered safety features.’” *Dominion Nuclear Connecticut, Inc.*, CLI-03-14, 58 NRC 207, 209 n.1 (2003) (quoting Regulatory Guide 1.183, “Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors” at 1.183-2 (July 2000)). Thus, existing plants have already undergone a deterministic evaluation to ensure that they will operate safely.

¹³³ See 10 C.F.R. § 51.53(c)(3)(ii)(L). See also *Pilgrim*, CLI-10-22, 72 NRC at ___ (slip op. at 9-10); *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip op. at 38) (“... the SAMA analysis is a site-specific mitigation analysis. For a mitigation analysis, NEPA ‘demands ‘no fully developed plan’ or ‘detailed examination of specific measures which will be employed’ to mitigate adverse environmental effects’”).

¹³⁴ See *Methow Valley*, 490 U.S. at 346. See also *Hydro Res., Inc.* (P.O. Box 777, Crownpoint, New Mexico, 87313), LBP-04-23, 60 NRC 441, 447-48 (2004) (stating that the “‘hard look’ at environmental consequences mandated by NEPA is subject to a ‘rule of reason,’ meaning that the assessment need not include every environmental effect that could potentially result from the action, but rather may be limited to effects which are shown to have some likelihood of occurring.”).

“reasonably complete discussion of possible mitigation measures,” but does not require “that a complete mitigation plan be actually formulated and adopted.”¹³⁵ Instead, a SAMA analysis need only be discussed in “sufficient detail to ensure that environmental consequences [of the proposed project] have been fairly evaluated.”¹³⁶ FENOC’s SAMA analysis, which considered 167 potential SAMAs, is such an evaluation. ER at E-63. Moreover, as Joint Petitioners recognize, FENOC’s analysis did account for uncertainties.¹³⁷

Third, Joint Petitioners appears to cite the Jamali Article for the proposition that a deterministic SAMA analysis should have been done. But, NRC regulations contemplate “the use of probabilistic (as opposed to deterministic) methodology”¹³⁸ for SAMA analyses. Thus, this argument is contrary to Commission precedent, and outside the scope of this proceeding. As a result, it is inadmissible. 10 C.F.R. § 2.309(f)(1)(iii).

c. Joint Petitioners’ Challenge to the Use of the Mean from the MACCS2 Code Lacks an Adequate Factual Basis

Last, Joint Petitioners claims that “FENOC fails to consider the uncertainties in its consequence calculation resulting from meteorological variation by using only mean values for population dose and offsite economic cost estimates.” Joint Petition at 148. But, Joint

¹³⁵ See *Methow Valley*, 490 U.S. at 352. *Methow Valley* also explains that NEPA is intended to “generate information and discussion on those consequences of greatest concern to the public and of greatest relevance to the agency’s decision, rather than distorting the decisionmaking process by overemphasizing highly speculative harms.” *Id.* at 356.

¹³⁶ *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-03-17, 58 NRC 419, 431 (2003) (quoting *Methow Valley*, 490 U.S. at 352).

¹³⁷ Joint Petition at 149; ER at 4-40; Attachment F at F-45; F-158. Specifically, FENOC’s ER notes: “because the inputs to PRA cannot be known with complete certainty, there is the possibility that the actual plant risk is greater than the mean values used in the evaluation of the SAMA described in the previous sections. To consider this uncertainty, a sensitivity analysis was performed in which an uncertainty factor was applied to the frequencies calculated by the PRA.” *Id.* at F-158.

¹³⁸ *Pilgrim*, LBP-07-13, 66 NRC 141; *Pilgrim* CLI-10-11, 71 NRC at ___ (slip op. at 3) (SAMA analysis is a probabilistic risk assessment analysis). This approach in Part 51 is consistent with NRC policies concerning safety goals and risk assessment. In its Safety Goal Policy Statement, the Commission adopted the use of mean estimates for implementing the quantitative objectives of its safety goal policy. See *Safety Goals for the Operation of Nuclear Power Plants; Policy Statement; Correction and Republication*, 51 Fed. Reg. 30,028 (Aug. 21, 1986).

Petitioners have not provided sufficient factual support for this aspect of Contention 4 either. Moreover, Joint Petitioners have not shown that this aspect of Contention 4 would result in identifying a cost-beneficial SAMA. Consequently, it does not meet the admissibility requirements of 10 C.F.R. §§ 2.309(f)(1)(iv), (v) or (vi).

Joint Petitioners state that FENOC “unconvincingly performed suspect sensitivity analyses, inadequately dealing with such ‘Uncertainty’ in its ER.” Joint Petition at 149. But, Joint Petitioners have not produced any alleged facts, identified any errors, or presented any expert opinions on the multiple sensitivity and uncertainty analyses performed by FENOC. Moreover, Joint Petitioners have not pointed to any particular part of FENOC’s uncertainty analysis that it finds unconvincing or even suspect.

Instead, Joint Petitioners cite to a number of sources to support their claim that the Davis-Besse SAMA analysis does not appropriately account for uncertainty. But, Joint Petitioners take many of these citations out of context, and none of them support the claim that the Davis-Besse SAMA analysis has inappropriately accounted for uncertainty. First, Joint Petitioners rely on a report filed in the Indian Point license renewal proceeding that found that if the SAMA analysis for that plant had used the 95th percentile for meteorological data, instead of the mean value, the potential benefits of SAMAs may have been three to four times greater. Joint Petition at 148 (citing Edwin S. Lyman, A Critique of the Radiological Consequence Assessment Conducted in Support of the Indian Point Severe Accident Mitigation Alternatives Analysis, at 4 (Nov. 2007) (ADAMS Accession No. ML073410093). But, Joint Petitioners have not demonstrated that the results of this report apply to Davis-Besse. More importantly, this report does not explain how a sensitivity analysis based on the CDF is inadequate for SAMA purposes. It only states that one that assumed a 95th percentile value for meteorological data would be more conservative. This may be true, but neither Joint Petitioners nor the report upon which they rely, have made any demonstration that such an assumption is needed for an

adequate SAMA analysis at Davis-Besse.¹³⁹ Indeed, the Board rejected the contention this report supported in *Indian Point*. *Indian Point*, LBP-08-13, 68 NRC at 185-88.

Next Joint Petitioners cite to an article for the proposition that “quantitative results of PRAs, in particular, are subject to various types of uncertainties.” *Id.* at 149 (*citing* Jamali Article at 935). But, as discussed above, FENOC has already conducted an analysis to account for uncertainties. Thus, this article, which primarily addresses new reactor licensing, does not support Joint Petitioners’ claim.

In *Pilgrim*, the Commission explicitly noted that it “is NRC practice to utilize the *mean* values of the consequence distributions for each postulated release scenario or category.” *Pilgrim*, CLI-10-11, 71 NRC __ (slip op. at 38). The Commission continued,

As a policy matter, license renewal applicants are not required to base their SAMA analysis upon consequence values at the 95th percentile consequence level (the level used for the GEIS severe accident environmental impacts analysis). Unless it looks genuinely plausible that inclusion of an additional factor or use of other assumptions or models may change the cost-benefit conclusions for the SAMA candidates evaluated, no purpose would be served to further refine the SAMA analysis, whose goal is only to determine what safety enhancements are cost-effective to implement.

Id. As discussed above, Joint Petitioners have not attempted to show that their proposed refinement to FENOC’s SAMA analysis would identify an additional cost-beneficial SAMA. Consequently, this is precisely the type of challenge to a SAMA analysis that the Commission has previously cautioned should not form the basis for a hearing.¹⁴⁰

As a result, Joint Petitioners have not produced a sufficient basis for its claim that the ER inadequately accounts for uncertainty in the PRA underlying the SAMA analysis. The support

¹³⁹ It is important to remember that NEPA does not require a worst case analysis and that Joint Petitioners singular focus on using outliers presents a worst-case analysis but not a NEPA analysis or even a very realistic analysis.

¹⁴⁰ Although the Commission did find that it would be reasonable for the Board to consider this issue on remand, the Commission did not find that the petitioner had necessarily proffered an admissible contention on this ground. *Pilgrim*, CLI-10-22, 72 NRC at __ (slip op. at 8 n. 34).

Joint Petitioners have produced for this contention discusses uncertainty in PRAs generically but does not provide any indication that the allotment for uncertainty in the Davis-Besse SAMA analysis is deficient. Consequently, Joint Petitioners have not produced a sufficient basis for this part of its claim under 10 C.F.R. § 2.309(f)(1)(v) or (vi). As a result, the Board should not admit this challenge to the Davis-Besse SAMA analysis.

CONCLUSION

To be admitted as a party to an NRC proceeding, a petitioner must demonstrate standing and proffer at least one admissible contention. 10 C.F.R. § 2.309(a). Except for Ontario Citizens Alliance, Joint Petitioners have established standing. 10 C.F.R. § 2.309(d). But, they have not submitted an admissible contention. Contentions 1, 2, and 3 are not supported by sufficient documentation and do not to raise a genuine dispute with the application. Contention 4 does not raise a material issue because it does not demonstrate that the challenges it raises to FENOC's SAMA analysis would likely result in the identification of an additional cost-beneficial SAMA. As a result, the Board should deny the request for hearing.

Respectfully submitted,

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
FIRSTENERGY NUCLEAR OPERATING CO.) Docket No. 50-346-LRA
)
(Davis-Besse Nuclear Power Station, Unit 1))
)

CERTIFICATE OF SERVICE

I hereby certify that copies of the "NRC STAFF'S ANSWER TO JOINT PETITIONERS' REQUEST FOR A HEARING AND PETITION FOR LEAVE TO INTERVENE" in the above-captioned proceeding have been served on the following by Electronic Information Exchange this 21st day of January, 2011.

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