UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Gregory B. Jaczko, Chairman
Kristine L. Svinicki
George Apostolakis
William D. Magwood, IV
William C. Ostendorff

In the Matter of	)	
ENTERGY NUCLEAR GENERATION COMPANY and ENTERGY NUCLEAR OPERATIONS, INC.	)	Docket No. 50-293-LR
(Pilgrim Nuclear Power Station)	)	

CLI-12-15

MEMORANDUM AND ORDER

Before us is intervenor Pilgrim Watch's petition for review of Atomic Safety and Licensing Board decision LBP-12-1.[1] The Board's decision denied Pilgrim Watch's request for a hearing on a new contention based on the Fukushima Dai-ichi accident. Both the NRC Staff and the applicants, Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc. (together, Entergy), oppose the petition for review.[2] We deny review for the reasons provided below.

[1] *Pilgrim Watch's Petition for Review of Memorandum and Order (Denying Pilgrim Watch's Requests for Hearing on New Contentions Relating to Fukushima Accident) LBP-12-01 January 11, 2012* (Jan. 26, 2012) (Petition); LBP-12-1, 75 NRC ___ (Jan. 11, 2012) (slip op.).

[2] *See Entergy's Answer Opposing Pilgrim Watch's Petition for Review of LBP-12-1* (Feb. 6, 2012) (Entergy Answer); *NRC Staff's Answer to Pilgrim Watch's Petition for Review of Memorandum and Order (Denying Pilgrim Watch's Request for Hearing on a New Contention Relating to Fukushima Accident)* (Feb. 6, 2012) (Staff Answer).

I. BACKGROUND

This proceeding stems from Entergy's application to renew its operating license for the Pilgrim Nuclear Power Station for an additional 20 year period beyond the current license expiration date of June 8, 2012. Entergy submitted its license renewal application to the NRC in January 2006, and the Board admitted Pilgrim Watch as an intervenor in October 2006.[3] Extensive motions, petitions, and memoranda have been filed before both the Board and the Commission, and a number of new contentions have been submitted after the established deadline for contentions. The Board in LBP-12-1 outlines the main points in the proceeding's procedural history, and we need not repeat that history here.[4] Our decision today focuses on the matters directly relevant to Pilgrim Watch's petition for review of LBP-12-1.

In LBP-12-1, the Board rejected a Pilgrim Watch contention challenging the Pilgrim Severe Accident Mitigation Alternatives (SAMA) analysis. While we have previously explained the nature of the SAMA analysis and its role in the NRC staff's review, a brief overview is warranted here, given the complexity of this subject area.

The SAMA analysis is not part of the agency's safety review for license renewal under the Atomic Energy Act (AEA), but is instead a mitigation alternatives analysis conducted pursuant to the National Environmental Policy Act (NEPA).[5] The analysis examines a variety of potential severe accident progression sequences or scenarios. In particular, the analysis evaluates the degree to which specific additional mitigation measures (e.g., new plant procedures or new hardware) may reduce the risk—by reducing the probability or the consequences—of the accident scenarios evaluated. A specific mitigation alternative might

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[3] *See* Notice of Acceptance for Docketing of the Application and Notice of Opportunity for Hearing, 71 Fed. Reg. 15,222 (Mar. 27, 2006); LBP-06-23, 64 NRC 257 (2006).

[4] *See* LBP-12-1, 75 NRC at ___ (slip op. at 2-3); *see also* CLI-12-3, 75 NRC ___, ___ (Feb. 22, 2012) (slip op. at 1-3).

[5] *See* 10 C.F.R. § 51.53(c)(3)(ii)(L); CLI-10-14, 71 NRC 449, 453-56 (2010) (describing scope of license renewal safety review); *see also generally* 10 C.F.R. Part 54.

reduce risk by, for example, reducing the estimated frequency of core damage or estimated frequency of containment failure in a particular accident sequence. By NRC practice to date, the SAMA analysis has been a quantitative cost-benefit analysis, assessing whether the cost of implementing a specific enhancement outweighs its benefit. Because the SAMA analysis is a site-specific analysis, site-specific inputs (e.g., weather data, estimated reactor core radionuclide inventory, population data) are used in the accident modeling.

The SAMA analysis also is a probabilistic risk assessment (PRA), which means that the probability of particular accident scenarios occurring is taken into account. The analysis "assesses whether and to what extent the probability-weighted consequences of the analyzed severe accident sequences would decrease" if a specific mitigation alternative were implemented.[6] Probabilities and consequences are calculated with the use of various computer codes, including codes that perform a PRA of accident sequences leading to core damage (Level 1 PRA), and of accident progression leading to containment failure and release of radionuclides to the environment (Level 2 PRA).

The last stage of the computer modeling for the SAMA analysis is the offsite consequence calculation (Level 3 PRA). Output of the Level 1 PRA is used in the Level 2 PRA, which in turn is a basis for the Level 3 PRA offsite consequence cost calculation. The NRC has endorsed use of the MACCS2 Accident Consequence Analysis (MACCS2) code to calculate estimated offsite consequences—which include both radiological doses and economic losses (e.g., decontamination costs, evacuation and relocation costs, banned contaminated food, interdicted and/or condemned farm and non-farm land and property).[7] Accident consequences

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[6] *See* CLI-10-11, 71 NRC 287, 291 (2010), *reconsideration denied*, CLI-10-15, 71 NRC 479 (2010).

[7] *See* NEI 05-01, Rev. A, "Severe Accident Mitigation Alternatives (SAMA) Analysis, Guidance Document" (Nov. 2005) (endorsed by "Final License Renewal Interim Staff Guidance LR-ISG-2006-03: Staff Guidance for Preparing Severe Accident Mitigation Alternatives Analyses," 72 Fed. Reg. 45,466 (Aug. 14, 2007)).
(continued . . .)

at a particular site will vary depending upon weather patterns, and the MACCS2 code calculates potential offsite consequences over an extensive array of potential weather scenarios in a 50-mile radius around the nuclear power plant. In a recent decision in this proceeding, we provided additional detail on the nature of the NEPA SAMA analysis.[8]

While the limited focus of our license renewal safety review does not encompass a SAMA analysis, safety matters pertaining to severe accident mitigation are assessed on an ongoing basis through the NRC's regulatory oversight functions, which include both generic and plant-specific issues. If at any time new information suggests that additional severe accident mitigation measures are warranted or otherwise require evaluation, the NRC can take action through various means, including plant inspections, enforcement orders, or rulemaking. The NRC's ongoing oversight over the safety of reactor operation occurs regardless of a nuclear power station's license renewal status. Our ongoing reactor oversight, pursuant to the AEA, helps to assure that any additional mitigation measures that may be warranted to protect public health and safety will be assessed and, where called for, implemented.

Pursuant to our AEA authority, we can—and recently did—order licensees and construction permit holders to "increase the capability of nuclear power plants to mitigate beyond-design-basis external events."[9] This order stemmed from findings of the NRC's Task Force that reviewed the Fukushima accident. We issued this order without conducting plant-specific probabilistic risk assessments or quantitative cost-benefit analyses, but instead "consistent with the overall defense-in-depth philosophy," to provide even "greater assurance

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[8] *See* CLI-12-1, 75 NRC ___, ___ (Feb. 9, 2012) (slip op. at 2-5, 22, 24-25).

[9] *See* EA-12-049, "Order Modifying Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Effective Immediately)," at 4 (Order), attached to Leeds, Eric J., Director, Office of Nuclear Reactor Regulation; Johnson, Michael R., Director, Office of New Reactors, letter to All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status (Mar. 12, 2012).

that the challenges posed by beyond-design-basis external events to power reactors do not pose an undue risk to public health and safety," particularly at sites where there may be multiple reactor units.[10] Based on events at Fukushima, we similarly issued other orders requiring safety enhancements to further strengthen the severe accident "prevention, mitigation, and emergency preparedness defense-in-depth layers."[11]

In contrast to these recent orders, the Pilgrim SAMA analysis is a probability-weighted analysis carried out for the limited purpose of identifying mitigation alternatives that meet a defined benefit-cost criterion. As such, it examines the probability of various hypothesized accident scenarios, spanning a spectrum of potential initiating events, accident sequences, and severity of consequences. As a NEPA mitigation analysis, the SAMA analysis is not based on either the best-case or the worst-case accident scenarios, but on mean accident consequence values, averaged over the many hypothetical severe accident scenarios (with an additional uncertainty analysis also performed).[12]

The Pilgrim SAMA analysis must also be understood against the backdrop of our Generic Environmental Impact Statement (GEIS), which contains a bounding, generic severe

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[10] *See id.* at 6.

[11] *See, e.g.*, EA-12-50, "Order to Modify Licenses With Regard to Reliable Hardened Containment Vents (Effective Immediately)," at 6, attached to Leeds, Eric. J., Director, Office of Nuclear Reactor Regulation, letter to All Boiling-Water Reactor Licensees with Mark I and Mark II Containments (Mar. 12, 2012).

[12] *See, e.g.,* CLI-12-1, 75 NRC at ___ (slip op. at 22 & n.73). The SAMA analysis uses the "mean values of the consequence distributions for each postulated release scenario or category—the mean estimated value for predicted total population dose and predicted offsite economic cost." *See* CLI-10-11, 71 NRC at 316. Although mean accident consequence values are used as a baseline in the cost-benefit analysis, an uncertainty analysis also is performed, and baseline results ultimately are "multiplied by an uncertainty factor." *See* CLI-12-1, 75 NRC at ___ (slip op. at 25). Final cost-benefit comparisons in the Pilgrim analysis were made on "revised results that take into account [the] uncertainty factor." *Id.*

accident impacts analysis, applicable to all plants.[13] Thus, although our rules require that potential severe accident mitigation alternatives be considered for license renewal, no site-specific severe accident impacts analysis need be done.[14] Mitigation measures assessed in the NEPA SAMA analysis are "*supplemental* to those we already require under our safety regulations for reasonable assurance of safe operation," and likewise supplemental to those that we may otherwise order or require under our ongoing regulatory oversight over reactor safety, pursuant to the AEA.[15]

Below we summarize relevant agency standards for adjudications, including our contention admissibility standard, and we also describe Pilgrim Watch's SAMA contention.

II. DISCUSSION

A. Applicable Standards

To be accepted for hearing, contentions must meet our strict contention standards under 10 C.F.R. § 2.309(f). The standards help assure that adjudicatory proceedings will be meaningful. Among other requirements, contentions must raise a genuine dispute with the license application, and further must have underlying factual or legal support.[16] The contention must "demonstrate that the issue raised . . . is material to the findings" that the NRC must make for the licensing action at issue.[17] Contentions filed after the deadline for initial intervention

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[13] *See* "Generic Environmental Impact Statement for License Renewal of Nuclear Plants—Main Report" (Final Report), NUREG-1437, Vol. 1 (May 1996), at 5-12 to 5-116 (GEIS).

[14] *See id.* at 5-114 to 5-116; 10 C.F.R. Part 51, Subpart A, Appendix B, Table B-1 (regarding "severe accidents").

[15] *See* CLI-12-1, 75 NRC at ___ (slip op. at 24) (emphasis added).

[16] *See* 10 C.F.R. § 2.309(f)(1)(v)-(vi).

[17] *See* 10 C.F.R. § 2.309(f)(1)(iv).

petitions also must satisfy the standards for late-filed contentions.[18] And where the Board already has closed the evidentiary record, intervenors seeking a new hearing on a new contention additionally must move to reopen the evidentiary record, a deliberately "higher" threshold standard than that "for an ordinary late-filed contention."[19]

We may grant a petition for review of a Board decision at our discretion, giving due weight to whether there is a "substantial question" regarding the following considerations:

> (1) A finding of material fact is clearly erroneous or in conflict with a finding as to the same fact in a different proceeding;
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> (2) A necessary legal conclusion is without governing precedent or is a departure from or contrary to established law;
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> (3) The conduct of the proceeding involved prejudicial procedural error; or
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> (4) Any other consideration which the Commission may deem to be in the public interest.[20]

We generally defer to Board threshold rulings on contention admissibility, unless we find an "error of law or abuse of discretion."[21]

B. Pilgrim Watch's Contention

In a new contention filed November 18, 2011, Pilgrim Watch claimed that the Pilgrim SAMA analysis was deficient because it did not "model and analyze aqueous transport and dispersion of radioactive materials[.]"[22] The contention read as follows:

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[18] *See* 10 C.F.R. § 2.309(f)(2).

[19] *AmerGen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-08-28, 68 NRC 658, 668 (2008) (citation omitted).

[20] *See* 10 C.F.R. § 2.341(b)(4)(i)-(v).

[21] *See, e.g., South Carolina Electric and Gas Co. & South Carolina Public Service Authority (also referred to as Santee Cooper)* (Virgil C. Summer Nuclear Station, Units 2 and 3), CLI-10-21, 72 NRC 197, 200 (2010) (citing *Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), CLI-09-9, 69 NRC 331, 336 (2009)).

> Based on new and significant information from Fukushima, the Environmental Report is inadequate post Fukushima Daiichi. Entergy's SAMA [Severe Accident Mitigation Alternatives] analysis ignores new and significant issues raised by Fukushima regarding the probability of both containment failure, and subsequent larger off-site consequences due, in part, to the need for flooding the reactor (vessel, containment, pool) with huge amounts of water in a severe accident, as in Fukushima. An important limitation of the MACCS2 code is that it does not currently model and analyze aqueous transport and dispersion of radioactive materials through the subsurface water, sediment, soils, and groundwater. As demonstrated by the recent events in Japan, certain accident scenarios can result in large volumes of contaminated water being generated by emergency measures to cool the reactor cores and SFPs [spent fuel pools], with yet to be determined offsite radiological consequences.[23]

The contention went on to argue the following:

> To determine the relative risk significance of these types of scenarios, (Pilgrim's) Level 3 PRA [the offsite consequence portion of the SAMA analysis] must []model and analyze[] the aqueous transport and dispersion of radioactive materials. Further, there is no provision within the Severe Accident Mitigation Guidelines (SAMGs) for processing the water post accident. This important technical gap in Entergy's SAMA needs to be addressed before closing this proceeding. As in Japan, enormous quantities of contaminated water are likely to enter Cape Cod Bay (adding to radioactive atmospheric fallout on the waters and contamination resulting from aqueous transport and contamination resulting from aqueous transport and dispersion of radioactive materials through subsurface water, sediments, soils and groundwater) and then flow to other water bodies and shores posing significant offsite consequences and costs, threatening the health of citizens and the ecosystem and damaging the economy.[24]

Pilgrim Watch argues that Entergy in the Pilgrim SAMA analysis failed to model "offsite marine economic costs," and that Entergy "must be required to do so."[25] Pilgrim Watch claims that the analysis must model "contaminated aqueous releases 'bled' into Cape Cod Bay from the large volumes of water needed to flood the reactor (vessel, containment, pool) in a severe accident extending over an extended period of time in the type of disaster we now know is

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[22] *See Pilgrim Watch Request for Hearing on a New Contention Regarding Inadequacy of Environmental Report, Post Fukushima* (Nov. 18, 2011), at 1 (Hearing Request).

[23] *See id.* (quotation omitted).

[24] *Id.* at 1-2 (quotation omitted).

[25] *Id.* at 22.

credible."[26] Pilgrim Watch argues that this additional analysis "could change the outcome of Pilgrim's SAMA [analysis]," leading "previously rejected or ignored SAMAs" to become cost-effective.[27]

In support of its contention, Pilgrim Watch provided a declaration by Mr. Arnold Gundersen. Mr. Gundersen states that "we know that the area impacted by the disaster at Fukushima is enormous," and "[t]herefore there is every reason to expect that a similarly large area would be affected by a similar accident at Pilgrim Station."[28] He provides his "opinion that the economic impacts would be significant in a similar accident scenario at Pilgrim."[29] Mr. Gundersen further states that in his "professional opinion," the contention "clearly addresses a significant safety and environmental issue by showing the effect of copious amounts of radioactive releases upon the marine environment, the area likely to be contaminated (or, as important, that will be believed by the public to be contaminated) and its resulting economic impact."[30] Mr. Gundersen claims that "[s]ince we know that millions of gallons of contaminated water bled into the ocean at Fukushima, it is reasonable to assume that the same would hold true at Pilgrim."[31]

C. Board Decision

In LBP-12-1, the Board rejected the contention on several grounds. In addressing threshold standards, the Board found that the contention did not meet our contention

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[26] *See id.* at 8-9.

[27] *See id.* at 6.

[28] *See* "Declaration of Arnold Gundersen Supporting Request By Pilgrim Watch for a New Contention Hearing Regarding the Inadequacy of Pilgrim Station's Environmental Report, Post Fukushima" (Nov. 17, 2011), at 10, attached to Hearing Request.

[29] *Id.* at 12.

[30] *Id.* at 6.

[31] *Id.* at 10.

admissibility rules because it did not point with support to a "genuine dispute" with the SAMA analysis.[32] The Board concluded that Pilgrim Watch and its expert presented merely "speculative assertions" that did not demonstrate a material issue for hearing.[33]

More specifically, the Board stated that Pilgrim Watch had not addressed "a single portion" of the SAMA analysis, but rested on generalized claims regarding the Fukushima accident.[34] The Board noted that neither Pilgrim Watch nor its expert challenged any "initiating event or equipment failure probability assumptions" in the SAMA analysis," or "otherwise [made] any attempt to relate the Fukushima accident (and its initiating events and equipment/system failures) to the Pilgrim plant."[35] Instead, the Board found, the only "linkage" made between the Fukushima accident and the Pilgrim plant was Pilgrim Watch's claim that the Pilgrim reactor has a similar Boiling Water Reactor (BWR) design, a BWR Mark I design.[36]

The Board went on to stress that Entergy's experts provided "uncontroverted testimony" describing why a consideration of potential aqueous releases would not materially "increase the [severe accident] costs" already estimated, given the nature of severe accident scenarios evaluated in the Pilgrim SAMA analysis.[37] The Board referenced the declaration of Entergy experts Dr. Kevin R. O'Kula and Mr. Joseph R. Lynch, who outlined various grounds for why the potential consequences from the atmospheric releases considered in the Pilgrim SAMA analysis "are far greater than potential consequences resulting from the aqueous releases at issue in

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[32] *See* LBP-12-1, 75 NRC at ___ (slip op. at 20).

[33] *Id.* at ___ (slip op. at 21).

[34] *Id.*

[35] *Id.*

[36] *Id.*

[37] *Id.* at ___ (slip op. at 20).

Pilgrim Watch's contention."[38] The Board found that, in contrast to Entergy and its experts' explanation, neither Pilgrim Watch nor Mr. Gundersen had provided any "facts" or "technical bases" indicating "how it could be expected" that the estimated severe accident consequences analyzed in the analysis—which span a "spectrum of accident scenarios"—"could be so altered as to make additional SAMAs cost-effective to implement."[39] In other words, the Board found no supported basis for the contention's premise that modeling aqueous releases to Cape Cod Bay might materially change the overall Pilgrim SAMA analysis results. The Board therefore found no material issue for hearing.[40]

In addition to finding that the contention lacked support, and failed to raise a material or genuine dispute for hearing—basic requirements under our contention admissibility rule—the Board also found that the contention was untimely, and did not meet the criteria for reopening the evidentiary record (under 10 C.F.R. § 2.326).[41]

To satisfy the standard for reopening the evidentiary record, a motion to reopen the record must (1) be timely (or, if untimely, raise an "exceptionally grave" matter); (2) address a significant safety or environmental issue; and (3) "demonstrate that a materially different result would be or would have been likely had the newly proffered evidence been considered

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[38] *See* "Declaration of Mr. Joseph R. Lynch and Dr. Kevin R. O'Kula in Support of Entergy's Answer Opposing Pilgrim Watch Request for Hearing on a New Contention Regarding Inadequacy of Environmental Report, Post-Fukushima," (Dec. 13, 2011), at 7-8, 11-12, 22-30, 36 (O'Kula/Lynch Declaration), attached to *Entergy's Answer Opposing Pilgrim Watch Request for Hearing on a New Contention Regarding Inadequacy of Environmental Report, Post-Fukushima* (Dec. 13, 2011).

[39] *See* LBP-12-1, 75 NRC at ___ (slip op. at 17-18, 20).

[40] *See id.* at ___ (slip op. at 20-21).

[41] *See id.* at ___ (slip op. at 11-19).

initially."[42] The motion must be supported by an affidavit written by an individual with knowledge of the facts alleged, and the affidavit must explain why each of the criteria "has been met."[43]

In LBP-12-1, the Board found that the contention failed to meet all of the reopening criteria.[44] The Board concluded that Mr. Gundersen's declaration presented "no facts or data to support its bald assertions," and had not set forth the required factual or technical bases indicating how each of the criteria in 10 C.F.R. § 2.326(a) were met.[45] The Board stressed that Mr. Gundersen's declaration nowhere provided a "factual or technical basis" to suggest how "other mitigative measures [might] become cost-effective" in light of the assumptions and considerations contained in the Pilgrim analysis.[46] Neither Pilgrim Watch nor its expert had "demonstrated that a materially different result would be, or would have been, likely had the newly proffered evidence been considered initially."[47]

The Board further found the contention untimely, whether evaluated under the criteria for reopening an evidentiary record (10 C.F.R. § 2.326(a)(1)) or for admission of late-filed contentions generally (10 C.F.R. § 2.309(c)).[48]

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[42] *See* 10 C.F.R. § 2.326(a)(1)-(3).

[43] *See* 10 C.F.R. § 2.326(b). As we explained in CLI-12-3, where we ruled that the Board had properly applied the reopening standards to Fukushima-related contentions, our existing procedural rules for seeking admission of new or amended contentions and filing motions to reopen are sufficient, and "[n]either new procedures nor a separate timetable for raising new issues related to the Fukushima events are . . . warranted." *See* CLI-12-3, 75 NRC at ___ (slip op. at 11) (quoting *Union Electric Co. d/b/a Ameren Missouri* (Callaway Plant, Unit 2), CLI-11-5, 74 NRC ___, ___ (Sept. 9, 2011) (slip op. at 35)). We continue to believe that our procedural rules can be applied effectively, and are aware of no new information that causes us to change our view.

[44] *See* LBP-12-1, 75 NRC at ___ (slip op. at 11-19).

[45] *See id.* at ___ (slip op. at 17-18).

[46] *See id.* at ___ (slip op. at 18).

[47] *See id.* at ___ (slip op. at 17).

[48] *See id.* at ___ (slip op. at 12-16, 19).
(continued . . .)

We carefully considered Pilgrim Watch's petition for review, but the petition points to no error or abuse warranting review of the Board's decision. Before turning to the petition, a few points bear mention.

As we stressed recently, the SAMA analysis involves a host of inputs and methodologies, and when determining whether a petitioner has raised a litigable challenge, the question is not whether more or different analysis can be done.[49] It will always be possible to envision and propose some alternate approach, some additional detail to include, some refinement. And one can always make different assumptions about the progression of severe accidents. But particularly in regard to the SAMA analysis, we have reiterated that our adjudicatory proceedings are not "EIS editing sessions."[50] Unless a contention, with support, raises a credible potential *material* deficiency in the analysis, there is no genuine dispute with the application, and therefore no demonstration of a material issue for hearing. Contentions challenging a SAMA analysis therefore must identify a deficiency that plausibly could alter the overall result of the analysis in a material way.

At the threshold contention admission stage, the burden for providing support for a contention is on the petitioner. And the *added* "burden of satisfying the reopening requirements" is, deliberately, "a heavy one."[51] "Bare assertions and speculation," even by an expert, are insufficient to trigger a full adjudicatory proceeding.[52] While we do not expect petitioners to prove their case at the contention admissibility stage, it is not enough for a contention merely to

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[49] CLI-12-1, 75 NRC at ___ (slip op. at 24).

[50] *Id.* (citation omitted).

[51] *Amergen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-09-7, 69 NRC 235, 287 (2009).

[52] *See, e.g., Oyster* Creek, CLI-08-28, 68 NRC at 674.

speculate that some input, some pathway, or some scenario left unconsidered may significantly alter the number and kinds of mitigation alternatives found cost-beneficial.

Finally, and just as fatal to Pilgrim Watch's claims here, a challenge to a NEPA SAMA analysis cannot ignore the probabilistic nature and other characteristics of the analysis. As we recently stated, "[w]hile we do not require petitioners to run their own computer models at the contention admissibility stage, a contention challenging a SAMA analysis nonetheless must be tethered to the computer modeling and mathematical aspects of the analysis."[53]

Here, contrary to Pilgrim Watch's claims, the Board did not insist upon a "detailed showing" of exactly "how much" the Pilgrim SAMA analysis would change if radionuclide releases to liquid pathways were modeled.[54] Instead, the Board insisted on some factual basis in the contention to suggest that the existing Pilgrim analysis results were not already sufficiently conservative for SAMA purposes, given the factors and scenarios considered in the analysis. It found no such supported basis. The Board also insisted that Pilgrim Watch satisfy the reopening rule criteria, which includes "demonstrat[ing]" the *likelihood* of a "materially different" result in the SAMA analysis if the newly proffered evidence were considered.[55] Again, the Board found no such demonstration. Nor do we, as outlined further below.

D. Pilgrim Watch's Petition for Review

Linkage of Fukushima Accident to SAMA Analysis

Before us, Pilgrim Watch first claims that the Board erred when it concluded that Pilgrim had not sufficiently "linked" its descriptions of the Fukushima accident to the Pilgrim SAMA

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[53] *FirstEnergy Nuclear Operating Co.* (Davis-Besse Nuclear Power Station, Unit 1), CLI-12-8, 75 NRC ___, ___ (Mar. 30, 2012) (slip op. at 29).

[54] Petition at 4.

[55] *See* 10 C.F.R. § 2.326(a)(3) (emphasis added); LBP-12-1, 74 NRC at ___ (slip op. at 16-17). We have already addressed and rejected Pilgrim Watch's argument that it need not meet the reopening rule criteria. *See* Petition at 4; CLI-12-3, 75 NRC at ___ (slip op. at 8-12); CLI-12-10, 75 NRC ___, ___ (Mar. 30, 2012) (slip op. at 20-22).

analysis.[56] Pilgrim Watch argues that "the Pilgrim Mark I BWR [Boiling Water Reactor] is essentially identical to the failed Mark I BWRs at Fukushima," and that "[t]his admitted essential identity of the BWRs shows that what happened at Fukushima could happen here and must be considered[.]"[57]

But Pilgrim Watch's generalized claim that the Pilgrim reactor is a Mark I BWR does not raise a genuine dispute with the application. The Pilgrim SAMA analysis does not ignore the nature of the Mark I BWR containment design. In reviewing the underlying accident progression analyses, the Staff found that they addressed "the most important severe accident phenomena normally associated with the Mark I containment type," and, further, that the analyses had been independently peer reviewed.[58] Pilgrim Watch does not identify any aspect of the SAMA analysis that may suggest inappropriate consideration of the reactor's design, such as any error in the portions of the analysis bearing on containment performance. The Pilgrim SAMA analysis encompasses events involving both early and late containment failure.[59]

Pilgrim Watch also essentially ignores that the SAMA analysis is a site-specific analysis. As such, the accident sequences evaluated and their assessed probabilities are specific to the features and location of the plant, including numerous factors extending far beyond the particular design of the reactor (e.g., reactor core radionuclide inventory, physical and climate features of the site, existing equipment or hardware, relevant plant procedures). If one could simply assume that all nuclear power stations would have the same estimated radionuclide

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[56] Petition at 4-5.

[57] *Id.* at 5.

[58] *See* "Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Pilgrim Nuclear Power Station, Supplement 29, Vol. 2—Appendices (Final Report), NUREG-1437 (July 2007) (ADAMS accession nos. ML071990020, ML071990027) at Appendix G, G-11 (Pilgrim EIS).

[59] *See, e.g.,* Ex. NRC000001, Entergy License Renewal Application, Environmental Report, Attachment E at E.1-29 to E.1-30 (Jan. 2006) (Environmental Report).

releases, caused by the same sequence of events, with the same frequency of occurrence, there would be little reason to do a site-specific probabilistic risk analysis. We agree with the Board that Pilgrim Watch's broad-brushed references to the Pilgrim reactor design do not identify any deficiency in, or dispute with, the Pilgrim SAMA analysis.

The Board similarly found in several other respects that Pilgrim Watch and its expert raised generalized, speculative claims regarding the Fukushima accident—claims that did not, in fact, place into question any of the specific considerations in the Pilgrim SAMA analysis. Pilgrim Watch does not identify any error in the Board's decision.

Pilgrim Watch claims, for example, that "lessons learned" from the Fukushima accident, particularly the "need for flooding the reactor[,]" showed that the probability of containment failure is "much higher than previously considered by Entergy."[60] But no support is provided for this probability-related argument. Entergy expert Dr. O'Kula described that the Pilgrim SAMA analysis considers severe accident events including those involving a breach of the reactor vessel or the containment structure, and included scenarios involving "failure to vent and early failure of containment."[61] Neither Pilgrim Watch nor its expert cite to or otherwise challenge any aspect of the Pilgrim SAMA analysis that goes to containment failure scenarios and their probabilities. There is no support for the containment failure claim, as the Board noted.[62]

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[60] *See* Hearing Request at 37.

[61] *See* O'Kula/Lynch Declaration at 23-24.

[62] *See* LBP-12-1, 75 NRC at ___ (slip op. at 6 n.26). Regarding the "probability of containment failure," Pilgrim Watch refers generally to one of its earlier-filed contentions, the Direct Torus Vent Contention, which claimed that the Pilgrim SAMA analysis was deficient for failure to account for an increased probability of vent failure and consequent containment failure. *See, e.g.*, Petition at 2 n.2. In CLI-12-3, we affirmed the Board's rejection of the Direct Torus Vent contention, noting that the SAMA analysis already encompasses events involving vent failure, as well as "pressure buildup," "operator error," "hydrogen explosions," "containment breach," and "large radioactive releases," and that Pilgrim Watch's general arguments about the Fukushima accident simply had not pointed to a deficiency in the Pilgrim analysis. *See* CLI-12-3, 75 NRC at ___ (slip op. at 19-23). Pilgrim Watch additionally refers generally to another of its contentions filed after the Fukushima accident, the Recriticality Contention. *See, e.g.*, Petition (continued . . .)

Further, Pilgrim Watch also appears to discount the role that the earthquake and tsunami played in initiating and exacerbating the severity of the Fukushima accident. Pilgrim Watch argues that "the proximate cause of what happened at Fukushima was the loss of AC [alternating current] and DC [direct current] power," stressing that "it does not take an earthquake or tsunami to cause a power loss."[63] But the extended duration of the loss of offsite power at Fukushima cannot be divorced from the vast and devastating effects of the major earthquake and tsunami, which occurred in a region susceptible to severe seismic activity. Significantly, the Fukushima accident involved a multi-reactor unit, with core damage to three of the reactors, and the challenges involved in addressing concurrent emergencies involving multiple reactors. In terms of the probabilities and probable consequences of severe accidents, Pilgrim Watch's generalized assertions about the Fukushima accident do not raise a genuine material dispute with the site-specific Pilgrim SAMA analysis.[64]

In any event, loss of offsite power, station blackout (SBO), loss of DC power buses, loss of AC power buses, and containment failure are key considerations in the Pilgrim SAMA analysis. Loss of offsite power events account for 20% of the core damage frequency assessment in the Pilgrim analysis.[65] Loss of DC power buses accounts for almost 48% of core damage frequency, and loss of AC power buses for approximately 14% of core damage

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at 2 n.2. In CLI-12-3, we also affirmed the Board's rejection of the Recriticality Contention, finding no error in the Board's conclusion that the contention lacked adequate support. *See* CLI-12-3, 75 NRC at ___ (slip op. at 16-19). To the extent that Pilgrim Watch relies on the Direct Torus Vent and Recriticalilty contentions as support for its aqueous modeling contention, we can discern no sufficient ground on which to admit the aqueous modeling contention.

[63] Petition at 6 (citation omitted).

[64] *See* LBP-12-1, 74 NRC at ___ (slip op. at 13-14, 21).

[65] *See, e.g.,* Pilgrim EIS, Appendix G at G-3.

frequency.[66] Station blackout is also considered to contribute to core damage frequency in the Pilgrim analysis.[67]

In short, the Pilgrim analysis includes extensive consideration of loss of power events, which were analyzed to assess their contribution to core damage, containment failure, and releases of radionuclides into the environment. Many of the particular events analyzed in the Pilgrim analysis bear similarity to events that may have contributed to the Fukushima accident (e.g., long-term steam and non-condensable gas generation, non-availability of containment decay heat removal systems, and ultimate over-pressurizing of the containment).[68] Pilgrim Watch nowhere addresses, let alone controverts, any of the accident events considered in the analysis, or their timing, probabilities, or source terms. Apart from general statements about the Fukushima accident, Pilgrim Watch does not support its claims of a material deficiency in the Pilgrim analysis, or raise a genuine dispute with the application.

Materiality of Asserted Aqueous Modeling Claims

Pilgrim Watch additionally argues that the Board erred in concluding that the aqueous modeling claims made in the contention failed to present a genuine and material dispute for hearing. Pilgrim Watch argues that "it is abundantly clear that any proper SAMA analysis" should "model aqueous discharges."[69] But Pilgrim Watch again fails to identify error in the Board's reasoning, as discussed below.

As we earlier noted, the offsite consequence analysis (Level 3 PRA) that Pilgrim Watch seeks to have redone is inextricably linked to the underlying analyses of accident events, accident progression, and radioactive source terms. Here, however, Pilgrim Watch's contention

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[66] *See id*.

[67] *Id.*

[68] *See, e.g.,* Environmental Report at E.1-28 to E.1-29.

[69] *See* Petition at 6.

does not challenge any details of the wide spectrum of severe accidents analyzed. It does not, for example, challenge the core inventory release fractions—the portion of the radionuclide core inventory that is actually released from the core and transported to the outside environment during the course of the accident.[70]

Without challenging any of the radionuclide releases assumed in the analysis, Pilgrim Watch instead merely insists that the offsite consequence calculation portion of the SAMA analysis is deficient because it does not "model contaminated aqueous releases 'bled' into Cape Cod Bay and adjacent waters[.]"[71] But here the Board found "uncontroverted" expert evidence that, even assuming some or all of the estimated radionuclide releases were to go into Cape Cod Bay and related aqueous pathways, such a scenario would not increase the current overall estimated severe accident costs, and therefore would not change the conclusions on the mitigation alternatives found cost-beneficial to implement.[72] Based on the severe accident scenarios and factors considered in the Pilgrim SAMA analysis, the Board found uncontested expert evidence that the estimated severe accident costs for the Pilgrim site effectively subsumed or bounded—for SAMA analysis purposes—the aqueous release scenario that Pilgrim Watch asserted could be material.

Pilgrim Watch does not identify any error in this conclusion. Pilgrim Watch calls the Entergy experts' declaration "mere speculation," but the declaration is rooted in specific aspects of the SAMA analysis, characteristics of radionuclides, principles of radioactivity decay and of dilution, and other information, none of which Pilgrim Watch or its expert specifically

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[70] To the extent that Pilgrim Watch's contention is intended to challenge underlying Level 1 and Level 2 PRA analyses going to radionuclide core inventory, release fractions, accident events, accident progression, and accident probabilities, we do not discern any specific argument, genuine dispute with the application, or support for any such challenges.

[71] Petition at 2.

[72] *See* LBP-12-1, 75 NRC at ___ (slip op. at 17, 20-21).

contested.[73] Again, at the contention admissibility stage, it is *Pilgrim Watch's burden* to provide support for why the further "analyses" or new computer modeling it seeks credibly could make a *material* difference to the SAMA analysis conclusions, not simply that the analysis might change in some fashion.[74] Further, to meet the reopening standards, Pilgrim Watch also needed to demonstrate a likelihood of *prevailing*—a likelihood that the aqueous modeling would lead to a "materially different" cost-benefit analysis conclusion.[75] We cannot say that the Board, having reviewed the expert declarations before it, erred in its conclusion to reject the contention as immaterial and insufficiently supported.[76]

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[73] Petition at 7; *see also* O'Kula/Lynch Declaration at 23-37 (addressing conservatism of the release pathways modeled in the Pilgrim SAMA analysis).

We note that Entergy expert Dr. O'Kula also described that, given the information to date from the Fukushima accident, the Pilgrim SAMA analysis "already considers postulated containment failure with atmospheric radiological releases much larger than the releases that have occurred at Fukushima—which involved core damage in three reactor units." *See* O'Kula/Lynch Declaration at 8; *see also id.* at 30-37. Although not necessary to the Board's conclusions on the materiality of the proffered contention, this comparison by Dr. O'Kula provides additional support for the Board's decision. While Pilgrim Watch in its reply before us claims that Dr. O'Kula's cited data on releases at Fukushima is "months old," and that "nobody . . . knows exactly how much radioactive contamination was, *and continues* to be released," Pilgrim Watch provided no data or other facts indicating error in Dr. O'Kula's overall comparison of radiological releases. *See Pilgrim Watch Reply to Entergy's and NRC Staff's Answers to Pilgrim Watch's Petition for Review of LBP-12-01* (Feb. 13, 2012), at 8 (emphasis in original) (Pilgrim Watch Reply). Pilgrim Watch also appears not to have directly challenged before the Board Dr. O'Kula's comparison of the Fukushima accident and the Pilgrim SAMA analysis releases, rendering its new claim on appeal improper. *See Entergy Motion to Strike Pilgrim Watch's Reply* (Feb. 23, 2012), at 2; *see also* CLI-12-1, 75 NRC at __ (slip op. at 27).

[74] *See* CLI-12-1, 75 NRC at ___ (slip op. at 25).

[75] *See* 10 C.F.R. § 2.326(a)(3).

[76] With no further substantiation and without addressing any of the relevant factors considered in the Pilgrim analysis, Pilgrim Watch merely proposes that significant amounts of additional radionuclide releases (greater than releases currently estimated in the Pilgrim analysis) must be assumed and simply *added* mathematically to the radionuclide releases outlined in the analysis. *See* Petition at 25. Pilgrim Watch provides insufficient support for its claim, given the pathways, accident events, and source terms considered in the site-specific analysis.

On appeal, Pilgrim Watch argues that it supported its claims regarding the need for—the materiality of—the aqueous modeling Pilgrim Watch seeks for the SAMA analysis. Specifically, Pilgrim Watch argues that it "*did* show that" severe accident costs associated with its claims of water-related contamination "far exceeded the cost of [the mitigation alternatives] that Entergy identified in its application."[77] Citing Judge Ann Marshall Young's separate dissenting opinion in LBP-12-1, Pilgrim Watch states that "Judge Young's Dissent did the math."[78] Judge Young concluded that Pilgrim Watch had identified a "genuine dispute" over whether its asserted economic costs of "aqueous contamination . . . being dispersed into Cape Cod Bay and the surrounding Atlantic Ocean . . . could lead to an additional cost-beneficial SAMA."[79]

But both Judge Young and Pilgrim Watch are comparing Pilgrim Watch's submitted "analysis of the economic value of the coastal and marine economies" for Massachusetts[80] with the cost of implementing one of the listed mitigation alternatives in the Pilgrim SAMA analysis. This is a flawed apples to oranges comparison that disregards a fundamental concept: the SAMA analysis is a probabilistic risk assessment that compares the cost of implementing a mitigation alternative with its reduction in *risk*. As Entergy describes, the dissent "does not multiply the asserted consequences by their frequency of occurrence."[81] In other words, the comparison effectively assumes a 100% chance of the presumed severe accident scenario occurring.[82] Because the economic consequences figure posited by the Dissent (and relied on

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[77] *See* Petition at 16-17 (emphasis in original).

[78] *See id.* at 17 (citing LBP-12-1, 75 NRC at ___ (slip. op. at 10 n.31) (Young, J., Dissenting Opinion)).

[79] *See* LBP-12-1, 75 NRC at ___ (slip op. at 10 & n.31) (Young, J., dissenting).

[80] *See* Contention at 23-30.

[81] *See* Entergy Answer at 15.

[82] We have explained that in a SAMA analysis, the "mean consequence values are multiplied by the estimated frequency of occurrence of specific accident scenarios to determine population

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by Pilgrim Watch) is not risk-informed, the Dissent's comparison with the cost of implementing particular mitigation measures is rendered meaningless.

In deferring to the Board's conclusion in LBP-12-1, we do not mean to suggest that modeling of radionuclide transport and dispersion through aqueous pathways could never prove useful or significant for any regulatory purpose, only that Pilgrim Watch nowhere indicates the necessary minimal support to show that it is material for the Pilgrim SAMA analysis. The NRC conducts severe accident modeling and related probability risk assessments in a wide variety of risk-informed contexts, not merely for a SAMA analysis. The issue before us, however, is not whether accident modeling can become more precise, or aqueous pathways modeling could prove of use in some regulatory decision-making, but whether for SAMA purposes the Pilgrim SAMA analysis is adequately conservative.

Here, for example, in support of its contention Pilgrim Watch highlights an NRC Staff SECY paper to the Commission, which discusses various potential ways to improve methods, models, and tools for conducting probabilistic risk assessments, including a recommendation for adding a capability to model aqueous transport and dispersion.[83] But as we explain below, the paper neither addresses SAMA analyses nor otherwise suggests any error in the Board's decision, which is specific to the Pilgrim SAMA analysis.

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dose risk and offsite economic cost risk for each type of accident sequence studied." *See* CLI-11-10, 71 NRC at 316.

An additional point regarding Judge Young's comparison merits comment. Judge Young inappropriately equates the reopening standards to a summary disposition standard, an error we recently highlighted. *See, e.g.,* CLI-12-10, 75 NRC at ___ (slip op. at 25). Our standard for reopening the evidentiary record requires an affidavit-based showing that a "materially different result . . . would have been *likely*" had the newly proffered evidence been considered initially. *See* 10 C.F.R. § 2.326(a)(3), (b) (emphasis added). "To meet the reopening standard . . . it is insufficient merely to point to disputed facts." *See id.* The Board must make a record-based judgment on the evidence presented by the parties, concluding that there is evidence "sufficiently compelling to suggest a likelihood of materially affecting the ultimate results." *Id.*

[83] *See* Petition at 9-11.

SECY-11-0089 addresses options for proceeding with future offsite consequence probabilistic risk assessments, including potential future agency uses for offsite consequence PRAs.[84] In addition to numerous other matters, the paper outlines what are described as current "gaps" in "existing PRA technology."[85] Among the PRA technology limitations outlined in the paper is the ability to "model[] and analyz[e] aqueous transport and dispersion of radioactive materials through surface water, sediments, soils, and groundwater."[86] The paper notes that "[e]xisting PRA analytical tools do not have this capability," and therefore "[r]esearch is . . . needed to identify or develop methods, models, and tools that can be used to simulate geochemical speciation and transport of dissolved radionuclides in surface water, sediments, soils, and groundwater."[87]

SECY-11-0089 gives the example of the Fukushima accident, with its "large volumes of contaminated water" that resulted from emergency measures to cool the multiple reactor cores and spent fuel pools, as a "type" of scenario that could be assessed for radiological consequences and risk, if the capability existed to model aqueous transport and dispersion of radioactive materials.[88] The paper therefore recommends further research to develop models and tools capable of simulating the transport of dissolved radionuclides through surface water, soils and groundwater.[89]

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[84] *See* "Options for Proceeding with Future Level 3 Probabilistic Risk Assessment Activities," Commission Paper SECY-11-0089 (July 7, 2011) (including Enclosures 1 and 2) (SECY-11-0089).

[85] *See, e.g., id.* at 6.

[86] *See* Enclosure 1 to SECY-11-0089, at 21.

[87] *Id.*

[88] *See id.* at 29; *see also* SECY-11-0089, at 6.

[89] *See* SECY-11-0089, at 6.

Pilgrim Watch claims that SECY-11-0089 demonstrates a modeling limitation that might affect the Pilgrim SAMA analysis. But as we have described, the Board found that given the accident scenarios, source terms, and atmospheric pathways considered in the Pilgrim analysis, the analysis already is more conservative—in effect, therefore, bounding—for SAMA purposes, than if some (or even much) of the estimated radionuclide releases were assumed instead to have entered Cape Cod Bay and related waters. In other words, while aqueous pathways modeling could add to the sophistication and precision of the consequence analysis, the Board found that Pilgrim Watch failed to support its claim that the aqueous modeling discussed in the SECY paper credibly could change the overall cost-benefit conclusions in the analysis. In short, the Board did not find the asserted modeling limitation to be material for the Pilgrim analysis. Applying both the contention admissibility and the reopening rule standards, the Board reached a technical judgment based on and supported by the record, and nothing in Pilgrim Watch's petition identifies error in the Board's reasoning or conclusion.[90]

Timeliness

The Board additionally found that Pilgrim Watch's arguments regarding a need for aqueous modeling were late under both the contention admissibility and reopening rules.[91] The Board concluded, in particular, that SECY-11-0089 did not present any genuinely new information on modeling limitations of the MACCS2 code, which have been "present for decades," and therefore the paper did not render timely Pilgrim Watch's contention.[92] We agree.

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[90] SECY-11-0089 in fact suggests that PRA-based severe accident modeling encompassing aqueous transport and dispersion of radionuclides *cannot be done* without further research and development. *See* SECY-11-0089 at 21. As we earlier stated, NEPA obligations are "tempered by a practical rule of reason," and an "environmental impact statement is not intended to be a 'research document.'" See CLI-10-22, 72 NRC 202, 208 (2010) (citations omitted).

[91] *See* LBP-12-1, 75 NRC at ___ (slip op. at 11-16, 19).

[92] *See id.* at ___ (slip op. at 13-14).
(continued . . .)

SECY-11-0089, written by members of the NRC's Office of Research, examined various potential improvements that could be made to severe accident modeling. While the paper highlighted the current inability to perform a full probabilistic risk analysis of the water contamination accident scenario involved in the Fukushima accident, the paper did not reveal any newly-discovered limitation in the capabilities of the MACCS2 code. The nature of the MACCS2 code as an atmospheric modeling code certainly has been well known since its inception. Pilgrim Watch itself has litigated in this proceeding the adequacy of the atmospheric transport and dispersion module in the MACCS2 code, appropriately called "ATMOS."[93] That Pilgrim Watch earlier did not know that the MACCS2 code does not fully model aqueous transport and dispersion through groundwater and soils does not make its contention timely.[94] Further, SECY-11-0089 was issued over four months before Pilgrim Watch filed its contention. Finally, the reactor flooding measures and related water contamination at Fukushima were publicly known well before issuance of the SECY paper.[95] Pilgrim Watch identifies no error in the Board's determination that the contention was untimely under both the contention admissibility and reopening rules.[96]

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[93] *See generally* CLI-12-1, 75 NRC at ___ (slip op. at 3-5, 10-21).

[94] *See* Petition at 10. Moreover, Pilgrim Watch's various arguments calling for calculations of maritime economic losses, including to "coastal tourism," "marine transportation," "marine related construction and infrastructure," "marine technology," "aquaculture," "commercial and recreational seafood," etc., could have been raised at the outset of the proceeding, and therefore are several years late. *See generally* Hearing Request at 23-37. The Environmental Report identified the Pilgrim plant's location on the western shore of Cape Cod Bay. *See* Environmental Report at 2-1.

[95] *See, e.g.*, LBP-12-1, 75 NRC at ___ (slip op. at 12) (noting that Pilgrim Watch itself cited "news articles from April 2011 that reference water being injected into and exiting from the Fukushima reactors").

[96] The standard for new or amended contentions involves a balancing of eight factors set forth in 10 C.F.R. § 2.309. The factor given the most weight is whether there is "good cause" for the failure to file on time. *See Tennessee Valley Authority* (Watts Bar Nuclear Plant, Unit 2), CLI-

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Post Accident Water Processing

Pilgrim Watch's contention also challenges the SAMA analysis with respect to water processing measures. Specifically, Pilgrim Watch claims that there is no "provision within the Severe Accident Mitigation Guidelines (SAMGs) for processing [contaminated] water post accident."[97] Pilgrim Watch argues that the failure to address post-accident water processing in the SAMGs is an "important technical gap in Entergy's SAMA" analysis.[98]

It is not clear, however, what Pilgrim Watch means by its reference to SAMGs. SAMGs are Severe Accident *Management* Guidelines, which do not fall within the scope of license renewal. At issue in the SAMA analysis are specific candidate Severe Accident *Mitigation Alternatives*, or SAMAs, which are assessed in the cost-benefit analysis.

Pilgrim Watch does not appear to be claiming that there are specific additional mitigation measures to prevent or mitigate water contamination that should have been considered in the

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10-12, 71 NRC 319, 322-23 (2010); 10 C.F.R. § 2.309(c)(1)(i). The Board found insufficient "good cause," and for the reasons outlined above, we see no error in that conclusion. A failure to demonstrate "good cause" for a late-filed contention requires a "compelling" showing on the remaining factors. *See, e.g., Watts Bar,* CLI-10-12, 71 NRC at 323; *Texas Utilities Electric Co.* (Comanche Peak Steam Electric Station, Unit 2), CLI-93-4, 37 NRC 156, 165 (1993). Pilgrim Watch's petition does not present a "compelling" showing weighing in favor of admitting the contention. *See* Petition at 23; Pilgrim Watch Reply at 9-10.

The Board additionally noted that to admit the contention would "cause a material delay in the proceeding" and therefore also weighed against admission of the contention, pursuant to 10 C.F.R. § 2.309(c)(1)(vii). *See* LBP-12-1, 75 NRC at ___ (slip op. at 19). Pilgrim Watch erroneously argues that delay is "legally irrelevant" under the standards for new contentions. *See* Petition at 23. The "introduction of a new contention," long after the evidentiary record is otherwise closed, would broaden and delay the proceeding and therefore tends to weigh against admission of a new contention. *See, e.g., Southern Nuclear Operating Co.* (Vogtle Electric Generating Plant, Units 3 and 4), CLI-11-8, 74 NRC ___ , ___ (Sept. 27, 2011) (slip op. at 18). And given the lack of support provided for the aqueous modeling contention and overall lack of familiarity demonstrated with the details of the Pilgrim SAMA analysis, we see no indication that Pilgrim Watch would "reasonably be expected to assist in developing a sound record" on the issue of aqueous modeling. *See* 10 C.F.R. § 2.309(c)(1)(viii).

[97] *See* Hearing Request at 2.

[98] *Id.*

Pilgrim SAMA analysis but were not.[99] Pilgrim Watch's general references to a lack of water processing methods appear merely to be part of its overall claim regarding the need for SAMA analysis aqueous pathways modeling. Even assuming, however, that Pilgrim Watch meant to propose that the SAMA analysis should have reviewed some particular technology for processing contaminated water, the contention is ill-supported. We have said that "[u]nder the rule of reason governing NEPA . . . the concept of alternatives must be bounded by some notion of feasibility."[100] To "trigger full adjudicatory proceedings" based upon a suggested SAMA, petitioners must provide some minimal support to suggest that the SAMA credibly could be cost-beneficial.[101] Here, however, Pilgrim Watch's hearing request appears to suggest that efforts to process and decontaminate water would *fail,* not that there is an effective, cost-beneficial mitigation alternative for processing contaminated water that should have been considered.[102]

On appeal, Pilgrim Watch claims that the Pilgrim station's "site-specific Severe Accident Mitigation Guidelines" are not available to the public.[103] But again, this apparent broad reference to SAMGs, which are voluntary *management* guidelines, does not suggest in any way a deficiency in the *mitigation* alternatives analyzed, which were made public in Entergy's ER and the Staff's SEIS. In short, Pilgrim Watch's references to post-accident water processing and SAMGs do not identify a genuine material dispute with the Pilgrim SAMA analysis.

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[99] *See, e.g., id.* at 3, 10.

[100] *See Duke Energy Corporation* (McGuire Nuclear Station, Units 1 & 2, Catawba Nuclear Station, Units 1 & 2), CLI-02-17, 56 NRC 1, 12 (2002) (internal citations omitted) (citing *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519, 551 (1978); *Citizens Against Burlington v. Busey*, 938 F.2d 190, 195 (D.C. Cir. 1991)).

[101] *Id.*

[102] *See* Hearing Request at 12-13; *see also* Pilgrim Watch Reply at 6 ("there are no currently available methods to successfully decontaminate the water").

[103] *See* Petition at 10.

Additional Challenges to SAMA Analysis Methodology

Pilgrim Watch also raises an array of challenges to the methodology of the SAMA analysis.[104] These arguments are both without foundation and late, such as the bare claim that the "95 percentile" level of potential accident consequences—nearly the worst accidents in the spectrum of accident scenarios assessed—must be used as the baseline in the NEPA SAMA analysis.[105] In a recent decision addressing another Pilgrim Watch contention, we explained at some length why this SAMA analysis challenge is both late and, in any event, unsupported.[106] Our earlier discussion is equally applicable here, and likewise supports the Board's ruling in LBP-12-1.

Pilgrim Watch also argues that the economic cost calculations in the SAMA analysis must consider not only costs stemming from actual contamination, but also any losses stemming from the public's potential "perception" that waters or fish may be contaminated, even if they in reality are not.[107] But NEPA is not intended to encompass every possible impact, and does not encompass potential losses due to individuals' "perception" of a risk.[108]

Claims of New and Significant Information Under NEPA

We turn last to Pilgrim Watch's claim that its contention presented "new, significant, and material information" regarding potential environmental effects at the Pilgrim facility.[109] Namely, Pilgrim Watch claims that the Board erred when it found that the contention did not "paint a

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[104] See, e.g., Petition at 15; Pilgrim Watch Reply at 7.

[105] *See id.* at 15; Pilgrim Watch Reply at 7.

[106] S*ee* CLI-12-1, 75 NRC at ___ (slip op. at 21-24).

[107] *See* Pilgrim Watch Reply at 7; Hearing Request at 18-19.

[108] *See Metropolitan Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 775-79 (1983); *New Jersey Dept. of Envt'l Protection v. NRC*, 561 F.3d 132, 138-39 (3d Cir. 2009).

[109] *See* Petition at 17.

seriously different picture of the environmental landscape" than that already depicted in the environmental analyses.[110] Pilgrim Watch argues that the Board's "picture" of the "environmental landscape" is one where there is no radiological contamination "flow[ing] into Cape Cod Bay and adjacent waters beyond in a severe accident."[111]

But contrary to Pilgrim Watch's suggestion, it is not the case that the NRC's environmental impacts analysis for the Pilgrim plant ignores potential releases of radionuclides or contaminated water to liquid pathways. As we earlier noted, the NRC's GEIS provides a generic, bounding severe environmental impacts analysis of severe accidents that is applicable to all plants, including the Pilgrim facility. The GEIS analysis encompasses releases to aquatic pathways in a severe core-melt accident. The analysis examines radioactive fallout onto open bodies of water, including drinking water and aquatic food pathways, and it also considers surface water contamination and potential releases to groundwater pathways.[112]

Pilgrim Watch does not identify how the Fukushima accident paints a "seriously different picture" of the environment at the Pilgrim plant, given the bounding severe accident scenarios assumed in the GEIS analysis and its consideration of liquid pathways.[113] Specifically, it is not apparent how the mitigation actions of flooding the reactor in Fukushima, the so-called "feed and bleed" scenario referenced by Pilgrim Watch and Judge Young, significantly changes for

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[110] *See id.* at 12 (quoting LBP-12-1, 75 NRC at ___ (slip op. at 14)) (emphasis in original).

[111] *See id.*

[112] *See* GEIS at 5-49 to 5-95. For the groundwater pathway, for example, the GEIS analysis assumes core meltdown and penetration of the basemat (a "worst-case accident"). *See id.* at 5-92; *see also id.* at 5-65 to 5-66 (referencing scenario of breached basemat, with molten core debris and radioactive water penetrating the strata beneath the plant, and where "soluble radionuclides" are "leached and transported with groundwater and contaminated water" to drinking water wells and surface water bodies used for fishing and shoreline activities). The GEIS concludes that the "risk from groundwater releases at ocean sites would be a small fraction of that from atmospheric releases." *See id.* at 5-95. *See also* 10 C.F.R. Part 51, Subpart A, Appendix B, Table B-1 (regarding "severe accidents").

[113] *See generally Callaway*, CLI-11-5, 74 NRC ___ (slip op.).

the Pilgrim site the GEIS's overall conclusions on either potential severe accident impacts (which includes extreme scenarios) or their overall low probability. That the Fukushima accident was a severe accident with serious consequences is self-evident. But our GEIS analysis encompasses severe accidents with serious consequences, as does the Pilgrim SAMA analysis.

We re-emphasize, though, that our review of the Fukushima accident continues, and that if "'new and significant information comes to light' that is relevant to ongoing 'application-specific NEPA documents' the NRC will evaluate the information as appropriate."[114] We note, further, that we are in the process of updating the GEIS analysis.[115] To the extent that any new information learned from the Fukushima accident presents a significant new environmental impact that should be addressed in the upcoming GEIS, or in site-specific environmental analyses, we will supplement or otherwise incorporate the information into the environmental analyses as warranted.

Judge Young, in her dissenting opinion, writes that the NRC should "refrain from terminating this proceeding," and refrain from "making an ultimate decision on the renewal application" pending more information from the Fukushima accident.[116] Judge Young reasons that although there is "insufficient information available at this time" to conclude that the ongoing Fukushima accident reviews "*would* definitely lead to significantly different analyses of environmental consequences," it is also impossible to conclude that "Fukushima-related issues" could never "lead to significantly different analyses."[117] But Judge Young's proposal is akin to our staying a decision on the license indefinitely, perhaps for years, to await a final confirmation

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[114] *See* CLI-12-10, 75 NRC at ___ (slip op. at 29).

[115] *See* "Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Main Report, Draft Report for Comment," NUREG-1437, Rev. 1 (Vol. 1 July 2009) (ML091770049).

[116] *See* LBP-12-1, 75 NRC at ___ (slip op. at 12) (Young, J., Dissenting Opinion).

[117] *See id.* at ___ (slip op. at 13) (emphasis in original).

of whether multiple Fukushima studies and reviews produce any information that may significantly alter the current applicable GEIS impacts analysis, or the Pilgrim SAMA analysis.

NEPA, however, does not "require that we wait until inchoate information matures into something that [possibly] might affect our review."[118] It requires us to conduct our review with the "best information now."[119] Based on what we know to date, the Fukushima accident does not significantly alter the overall environmental picture for severe reactor accidents at the Pilgrim site.[120] As we have stated, our review of the accident has not revealed "sufficient information . . . to make a significant difference in the *Pilgrim* environmental review."[121] Our decision today is consistent with other recent decisions we have issued addressing NEPA claims based on the accident at Fukushima.[122]

We continue to conclude that the current "operation and continued licensing" of nuclear power reactors "do not pose an imminent threat to public health and safety," or to the environment.[123] Further, we "have in place well-established regulatory processes by which to impose any new requirements or other enhancements."[124] And we are taking measures, consistent with "our overall defense-in-depth philosophy," to provide "greater assurance" that

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[118] *See* CLI-12-6, 75 NRC ___, ___ (slip op. at 32) (referencing *Marsh v. Or. Natural Res. Council*, 490 U.S. 360, 373-74 (1989)).

[119] *Id.* at ___ (slip op. at 32).

[120] *See Marsh v. Or. Natural Res. Council*, 490 U.S. at 373-74; *National Comm. for the New River, Inc. v. FERC*, 373 F.3d 1323, 1330 (D.C. Cir. 2004).

[121] *See* CLI-12-6, 75 NRC at ___ (slip op. at 32); *see also* CLI-12-10, 75 NRC at ___ (slip op. at 29).

[122] *See, e.g.*, *Luminant Generation Co., LLC* (Comanche Peak Nuclear Power Plant, Units 3 and 4), CLI-12-7, 75 NRC ___, ___ (Mar. 16, 2012) (slip op. at 10-13) (upholding Board determination that petitioners had failed to articulate factual basis for Fukushima-based NEPA dispute with specific application).

[123] *See, e.g.,* Order at 3.

[124] *See* CLI-12-6, 75 NRC at ___ (slip op. at 31).

severe accidents will not pose an undue risk to public health and safety.[125] But our ongoing efforts to evaluate and enhance our safety requirements—to bolster the layers of protection to prevent and mitigate accidents—do not imply that we now consider severe accidents significantly more likely or potentially more damaging than suggested in the GEIS, our bounding impacts analysis for license renewal.

To conclude, the issue before us is a limited one: whether Pilgrim Watch presented an admissible contention. Our rules are "designed to avoid resource-intensive hearings where petitioners have not provided sufficient support for their technical claims, and do not demonstrate a potential to meaningfully participate" in a hearing.[126] Here, the Board found that Pilgrim Watch had not met the applicable requirements under 10 C.F.R. §§ 2.309 and 2.326. Pilgrim Watch's petition reveals no error, abuse of discretion, or other reason warranting review of LBP-12-1. We therefore decline to revisit the Board's decision.[127]

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[125] *See, e.g.*, Order at 6.

[126] *See Davis-Besse*, CLI-12-8, 75 NRC at __ (slip op. at 31).

[127] Since filing its petition for review, Pilgrim Watch has submitted five supplemental filings, which it claims provides new and significant information relevant to its petition. *See Supplement to Pilgrim Watch's Petitions for Review of LBP-12-1, LBP-11-23* (Feb. 15, 2012); *Pilgrim Watch's Supplement to Pilgrim Watch's Petition for Review of LBP-12-1* (Feb. 28, 2012); *Pilgrim Watch's Supplement to Pilgrim Watch Petition for Review of LBP-12-1* (Mar. 2, 2012); *Pilgrim Watch's Supplement to Pilgrim Watch Petition for Review of LBP-12-1* (Apr. 6, 2012); *Pilgrim Watch's Supplement to Pilgrim Watch Petition for Review of LBP-12-01* (May 15, 2012). Pilgrim Watch's filings merely consist of attached news articles. Pilgrim Watch does not identify either what information in the articles is significant or why. We nonetheless reviewed the articles, but none of the material suggests error in the Board's conclusions in LBP-12-1.

III. CONCLUSION

For reasons given in LBP-12-1 and in this decision, we *deny* Pilgrim Watch's petition for review.

IT IS SO ORDERED.[128]

For the Commission

[NRC SEAL]

/RA/

Annette L. Vietti-Cook
Secretary of the Commission

Dated at Rockville, Maryland
this 7th day of June, 2012.

[128] Commissioner Apostolakis did not participate in this matter. The Chairman dissents from this order.

Chairman Gregory B. Jaczko, Dissenting

I dissent from the decision because I do not believe we should apply the standard reserved for reopening a closed hearing record to Fukushima contentions. In my view, this higher contention admissibility standard is not appropriate for contentions arising from the unprecedented and catastrophic accident at Fukushima. We are in the process of conducting a comprehensive review of those events from which we have learned, and will continue to learn, new information and insights on the safety of our nuclear fleet. Given the significance of that accident and the potential implications for the safety of our nuclear reactors, I believe we should allow members of the public to obtain hearings on new contentions on emerging information if they satisfy our ordinary contention standards.