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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
Before the Atomic Safety and Licensing Board Panel

DOCKETED  
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OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

In the Matter of )  
 )  
Entergy Nuclear Generation Company and ) Docket No. 50-293-LR  
Entergy Nuclear Operations, Inc. ) ASLBP No. 06-848-02-LR  
 )  
(Pilgrim Nuclear Power Station) )

**ENTERGY'S MOTION FOR SUMMARY DISPOSITION  
OF PILGRIM WATCH CONTENTION 3**

Pursuant to 10 C.F.R. § 2.1205 and the schedule set forth in the December 20, 2006 Order<sup>1</sup> of the Atomic Safety and Licensing Board ("Licensing Board" or "Board"), Applicants Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc. (collectively "Entergy") seek summary disposition of Pilgrim Watch Contention 3. Entergy moves for summary disposition of the contention on the grounds that no genuine issue as to any material fact exists and, thus, Entergy is entitled to a decision as a matter of law. 10 C.F.R. § 2.710(d)(2). This Motion is supported by (1) a Statement of Material Facts as to which Entergy asserts that there is no genuine dispute; (2) a declaration by Dr. Thomas Sowdon, the Manager of Emergency Preparedness with Entergy for the Pilgrim Nuclear Power Station ("PNPS");<sup>2</sup> (3) a declaration by Dr. Fred Mogolesko, the License Renewal Project Manager for PNPS;<sup>3</sup> (4) a

<sup>1</sup> Order (Establishing Schedule for Proceeding and Addressing Related Matters) (Dec. 20, 2006) ("Scheduling Order").  
<sup>2</sup> Declaration of Thomas L. Sowdon in Support of Entergy's Motion for Summary Disposition of Pilgrim Watch Contention 3 (May 15, 2007) ("Sowdon Decl.").  
<sup>3</sup> Declaration of Fred J. Mogolesko in Support of Entergy's Motion for Summary Disposition of Pilgrim Watch Contention 3 (May 16, 2007) ("Mogolesko Decl.").

TEMPLATE = SECY-041

SECY-02

declaration by Dr. Kevin O’Kula, a Senior Fellow Advisor with Washington Safety Management Solutions (“WSMS”);<sup>4</sup> and (5) a report prepared by WSMS entitled “Radiological Dispersion and Consequence Analysis Supporting Pilgrim Nuclear Power Station Severe Accident Mitigation Alternative Analysis, Revision 1 (May 2007)” (“WSMS Report”).<sup>5</sup>

## **I. PROCEDURAL BACKGROUND**

On May 25, 2006, Pilgrim Watch filed its petition to intervene<sup>6</sup> seeking the admission of five contentions. On October 16, 2006, the Licensing Board admitted two of Pilgrim Watch’s contentions, including an amended version of Pilgrim Watch Contention 3, into the PNPS license renewal proceeding.<sup>7</sup> Pilgrim Watch Contention 3, as amended by the Board, states:

Applicant’s SAMA analysis for the Pilgrim plant is deficient in that the input data concerning (1) evacuation times, (2) economic consequences, and (3) meteorological patterns are incorrect, resulting in incorrect conclusions about the costs versus benefits of possible mitigation alternatives, such that further analysis is called for.

64 NRC at 341. On December 20, 2006, the Licensing Board issued the Scheduling Order, which provides that motions for summary disposition be filed no later than June 11, 2007. Scheduling Order at 5.

## **II. STATEMENT OF THE ISSUE**

In admitting the amended Pilgrim Watch Contention 3, the Licensing Board stated that

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<sup>4</sup> Declaration of Kevin R. O’Kula (May 16, 2007) (“O’Kula Decl.”).

<sup>5</sup> Revision 1 of the WSMS Reports makes corrections and incorporates some minimal changes to Revision 0 of the Report that was provided to NRC Staff and Pilgrim Watch as part of Entergy’s Fifth Supplemental Disclosure (May 8, 2007).

<sup>6</sup> Request for Hearing and Petition to Intervene by Pilgrim Watch (May 25, 2006) (“Pilgrim Watch Pet.”).

<sup>7</sup> Memorandum and Order (Ruling on Standing and Contentions of Petitioners Massachusetts Attorney General and Pilgrim Watch), LBP-06-23, 64 NRC 257 (2006).

Pilgrim Watch has provided sufficient alleged facts . . . to demonstrate a genuine dispute with the Applicant on the material factual issues of whether in its SAMA analysis the Applicant has adequately taken into account relevant and realistic data with respect to the evacuation times in the area surrounding the Pilgrim Plant, economic consequences of a severe accident in the area, and meteorological patterns that would carry the plume in the event of such an accident; and whether as a result the Applicant has drawn 'incorrect conclusions about the costs versus benefits of possible mitigation alternatives,' such that further analysis is called for.

64 NRC at 340-41 (footnote omitted).

With respect to the meteorological data, Pilgrim Watch contends that the MACCS2 model used by PNPS has "a number of limitations" because it employs a Gaussian plume model to estimate the atmospheric dispersion of radionuclides. Pilgrim Watch. Pet. at 34-38. As for evacuation time estimates, Pilgrim Watch claims that the MACCS2 model makes improper assumptions, and that PNPS used inappropriate data and failed to consider enough evacuation scenarios when conducting its SAMA analysis. Pilgrim Watch Pet. at 39-42. Regarding the economic consequence analysis, Pilgrim Watch claims that the MACCS2 model fails to account for the loss of economic activity, such as loss of tourism. According to Pilgrim Watch, a severe accident at PNPS would severely impact tourism in at least four surrounding counties. Id. at 43-45.

As will be demonstrated, the claims raised by Pilgrim Watch Contention 3 lack merit and are refuted by the declarations provided in support of this motion. There are no material facts in dispute that warrant holding a hearing on this contention, and Entergy is entitled to a decision as a matter of law in its favor.

### III. ENTERGY IS ENTITLED TO SUMMARY DISPOSITION ON PILGRIM WATCH CONTENTION 3.

#### A. Legal Standards for Summary Disposition

Motions for summary disposition are available in 10 C.F.R. Part 2, Subpart L proceedings. They may be filed up to 45 days before the commencement of a hearing, unless the presiding officer orders otherwise. 10 C.F.R. §2.1205(a).<sup>8</sup> In ruling on motions for summary disposition, the Board is to apply the standards in subpart G of 10 C.F.R. Part 2. Id. at §2.1205(c). The standards for summary disposition under Subpart G are defined in 10 C.F.R. §2.710, which states that the “presiding officer shall render the decision sought if . . . there is no genuine issue as to any material fact and . . . the moving party is entitled to a decision as a matter of law.” Id., §2.710(d)(2).

Under the NRC Rules of Practice, a moving party is entitled to summary disposition of a contention as a matter of law if the filings in the proceeding, together with the statements of the parties and the affidavits, demonstrate that there is no genuine issue as to any material fact. The Rules “long have allowed summary disposition in cases where there is no genuine issue as to any material fact and where the moving party is entitled to a decision as a matter of law.” Carolina Power & Light Co. (Shearon Harris Nuclear Power Plant), CLI-01-11, 53 NRC 370, 384 (2001) (internal quotations omitted); Advanced Medical Sys., Inc. (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 N.R.C. 98, 102-03 (1993). Summary disposition “is a useful tool for resolving contentions in short order that . . . are shown by undisputed facts to have nothing to commend them.” Private Fuel Storage, L.L.C. (Independent Fuel Storage Installation), LBP-01-39, 54 N.R.C. 497, 509 (2001). Further, “[o]nly disputes over facts that might affect the

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<sup>8</sup> In its Scheduling Order, the Licensing Board set June 11, 2007 as the deadline for filing motions for summary disposition herein. Scheduling Order at 5.

outcome of the suit under the governing law will properly preclude the entry of summary judgment. Factual disputes that are irrelevant or unnecessary will not be counted.” Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 248 (1986).

To counter a motion for summary disposition, an opponent “may not rest upon ‘mere allegations or denials,’ but must set forth specific facts showing that there is a genuine issue.” Advanced Medical Systems, CLI-93-22, 38 NRC at 102 (footnote omitted). “Bare assertions or general denials are not sufficient. Although the opposing party does not have to show that it would prevail on the issues, it must at least demonstrate that there is a genuine factual issue to be tried.” Id. (citations omitted). “[Opponents] have to present contrary evidence that is so significantly probative that it creates a material factual issue.” Id. at n.13 (citing Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), CLI-92-8, 35 NRC 145, 154 (1992)) (emphasis added).

Affidavits play an important role in supporting or opposing a summary disposition motion. While a document may serve to establish a material fact to be considered in summary disposition, it must be submitted under an affidavit of an individual competent to testify to its contents or who is an expert in its subject matter because, ordinarily, it is hearsay. See Cleveland Electric Illuminating Co. (Perry Nuclear Power Plant, Units 1 and 2), ALAB-443, 6 NRC 741, 755 (1977). Indeed, NRC regulations require that affidavits accompanying or opposing a motion for summary disposition “must set forth the facts that would be admissible in evidence, and must demonstrate affirmatively that the affiant is competent to testify to the matters stated in the affidavit.” 10 C.F.R. § 2.710(b) (emphasis added). Further, a licensing board is under no obligation to consider documents merely quoted or cited in support of a motion without a competent affidavit. Carolina Power & Light Co. (Shearon Harris Nuclear Plant, Units 1 and 2),

LBP-84-7, 19 NRC 432, 435-36, 458-59 (1984); see First Nat'l Life Ins. Co. v. California Pac. Life Ins. Co., 876 F.2d 877, 881 (11<sup>th</sup> Cir. 1989), reh'g denied, en banc, 887 F.2d 1093 (1989) (unsworn documents not considered). Nor need it consider unauthenticated documents. Id. A board may disregard technical documents whose content is not scientifically valid, even when submitted under affidavit, similarly to the way it can exclude invalid expert testimony. See Harris, LBP-84-7, 19 NRC at 452-54, 456, 463 (disregarding documents); Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 593-95 (1993) (test for scientific validity).

As will be discussed below, Pilgrim Watch Contention 3 lacks any genuine factual dispute and, thus, has “nothing to commend” it for further litigation in this proceeding and should be dismissed.

**B. Legal Standards for Compliance with the National Environmental Policy Act**

Pilgrim Watch Contention 3 challenges the sufficiency of the environmental analysis in Entergy's Environmental Report which is a matter that must be judged under the National Environmental Policy Act (“NEPA”). There are two tenets of NEPA law that are germane.

First, NEPA does not require analysis of worst case scenarios. Robertson v. Methow Valley Citizens Counsel, 490 U.S. 332, 333 (1989). There, in rejecting a claim that NEPA required worst case analyses, the Supreme Court stated:

[Council on Environmental Quality] explained that by requiring that an EIS focus on reasonably foreseeable impacts, the new regulation “will 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. [The] regulation is entitled to substantial deference.

Id. at 356 (citations omitted).<sup>9</sup>

Therefore, a NEPA analysis should estimate realistic consequences, not the worst case scenario. This is also consistent with the Commission's guide on safety goals and risk. In its Safety Goal Policy Statement (51 Fed. Reg. 30,028 (Aug. 21, 1986)), the Commission adopted the use of mean estimates for implementing the quantitative objectives of the safety goal policy. In its policy statement on the use of probabilistic risk assessment ("PRA") in nuclear regulatory activities, the Commission affirmed that "PRA evaluations in support of regulatory decisions should be as realistic as practicable..." 60 Fed. Reg. 42,622 (Aug. 16, 1995). Thus, the cost-benefit portion of a SAMA analysis looks at the average case, not the worst case, in determining whether a SAMA would be potentially cost beneficial. Otherwise, the cost benefit analysis would be skewed.

Consequently, Pilgrim Watch cannot avoid summary disposition by alleging that a longer evacuation time is possible, or that worse meteorological conditions are possible, in the event of a severe accident. Rather, to avoid summary disposition, Pilgrim Watch must provide evidence that Entergy has not considered an average, representative scenario. The possibility of a worst case is irrelevant.

Second, it is well established that NEPA does not require federal agencies to resolve all uncertainties. Indeed, as one court has stated, "[i]f we were to impose a requirement that an impact statement can never be prepared until all relevant environmental effects were known, it is

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<sup>9</sup> "[W]orst-case" scenarios need not be considered because their consideration involves "the arduous and unproductive task of analyzing conceivable, but very speculative, catastrophes" and diverts "NRC's limited resources" from other more productive efforts. Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), CLI-02-25, 56 N.R.C. 340, 354 (2002).

doubtful that any project could ever be initiated.” Jicarilla Apache Tribe of Indians v. Morton, 471 F.2d. 1275, 1280 (9th Cir. 1973).

Thus, in Baltimore Gas & Elec. Co. v. NRDC, 462 U.S. 87, 88, 98-100, 101-02 (1983), the Supreme Court held that NRC complied with NEPA’s requirements of consideration and disclosure where it summarized major uncertainties and found the evidence tentative but favorable. In Baltimore Gas, the Supreme Court upheld the NRC’s analysis of uncertainties where the NRC had “estimate[d] its impacts conservatively, based on the best available information and analysis.” 462 U.S. at 102.<sup>10</sup>

Further, the Courts have held that NEPA does not require time consuming and expensive studies to resolve uncertainties when impacts are small. In Izaak Walton League of Am. v. Marsh, 655 F.2d 346, 377 (D.C. Cir.), cert. denied, 454 U.S. 1092 (1981), the Court held that an agency was not required to conduct a major study to better quantify biological impacts when it had concluded that the physical impacts were minor. As the Court explained:

Detailed analysis is required only where impacts are likely. . . . Where adverse impacts are not likely, expensive and time-consuming studies are unnecessary. So long as the environmental impact statement identifies areas of uncertainty, the agency has fulfilled its mission under NEPA.

Id.<sup>11</sup>

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<sup>10</sup> In holding that the NRC’s promulgation of Table S-3 did not violate NEPA, the Supreme Court noted:

[T]he Commission’s staff did not attempt to evaluate the environmental effects of all possible methods of disposing of waste. Rather, it chose to analyze intensively the most probable long-term waste disposal method – burial in a bedded-salt repository several hundred meters under ground – and then “estimate its impact conservatively, based on the best available information and analysis.”

462 U.S. at 102 (citation omitted).

<sup>11</sup> See also Carolina Env. Study Group v. U.S., 510 F.2d 796, 799 (D.C. Cir. 1975); Hydro Resources, Inc. (P.O. Box 777, Crownpoint, New Mexico 87313), LBP-04-23, 60 N.R.C. 441, 447 (2004) (The environmental

For nuclear power plant license renewal reviews, the NRC has concluded that the likelihood of radiological offsite consequences is small for all nuclear power plants. Final Rule, Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 61 Fed. Reg. 28,467, 24,481 (June 5, 1996). Thus, under Walton, NEPA does not require either the NRC or Entergy to conduct extensive new studies to eliminate all uncertainties regarding secondary impacts, such as the impact to tourism, stemming from the unlikely radiological offsite consequences.<sup>12</sup>

Consequently, Pilgrim Watch cannot avoid summary disposition by alleging that there are uncertainties regarding the impact on tourism, or that some major new psychological study needs to be performed to model risk adverse behaviors.<sup>13</sup> Where as here Entergy has used the state-of-the-art model for analyzing accident consequences, NEPA is fully satisfied.

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assessment need not include every environmental effect that could potentially result from the federal action, but rather “may be limited to effects which are shown to have some likelihood of occurring.” (footnote omitted).

<sup>12</sup> The 10<sup>th</sup> Circuit has likewise held that a federal agency need not consider the potential consequences resulting from an accident whose risk is low. In Lee v. U.S. Air Force, 354 F.3d 1229 (10<sup>th</sup> Cir. 2004), petitioners challenged the EIS prepared by the U.S. Air Force in support of its plan to permit the German Air Force to station 30 fighter aircraft at an Air Force base, in addition to 12 fighter craft already there. Lee, 354 F.3d at 1233. Specifically, petitioners challenged the U.S. Air Force’s alleged failure to discuss the environmental and economic impacts of a potential forest fire caused by an aircraft crash. Id. at 1245. As summarized by the 10<sup>th</sup> Circuit, the EIS acknowledged the risk of accident, described its methodology for calculating the risk, and described the results of these calculations. Id. Further, the EIS acknowledged that fires and environmental contamination may result from a crash, particularly in highly vegetated areas during a hot, dry summer. Id. The Court ruled, however, that because the U.S. Air Force concluded that “the risk of accident was relatively low, [the Air Force] was not required to describe the potential consequences of a resulting fire in further detail.” Id. More generally, the Court stated that the “EIS need only furnish such information as appears to be reasonably necessary under the circumstances for evaluation of the project.” Id. (citation omitted)

<sup>13</sup> In admitting Contention 3, the Licensing Board noted that given the “limited amount of detail presented in the Application regarding the actual input and assumptions” for the SAMA analysis, Pilgrim Watch could not “reasonably be expected to present specific error margins in computational results.” 64 NRC at 339. Now, however, as part of the discovery disclosure process, Pilgrim Watch has been supplied with the calculations, assumptions and inputs underlying the original analysis and the WSMS Report with its extensive discussion and sensitivity analyses, along with the input files and other backup for the sensitivity analyses. Thus, at this stage of the proceeding, Pilgrim Watch cannot rely upon vague claims of uncertainties but must come forward with concrete evidence that Entergy has not used accurate, realistic inputs for the analysis which would materially affect the analysis results by resulting in the identification of additional potentially cost effective SAMAs.

## **C. There is No Factual Dispute Requiring Litigation**

### **1. Overview of Pilgrim Watch Contention 3 and Its Lack of Validity**

PW Contention 3 as amended by the Board raises a host of issues concerning the adequacy of (1) the meteorological code and input data used in the PNPS SAMA analysis, (2) the evacuation delay and speed estimates for evacuating the 10-mile Emergency Planning Zone (“EPZ”) following a postulated accident event at PNPS, and (3) the economic costs accounted for in the analysis. As discussed in the ensuing sections, the claims raised by Pilgrim Watch Contention 3 are not only incorrect, but they are immaterial as well. PNPS has performed a series of sensitivity studies to evaluate the effects of changes in the input parameters challenged by Pilgrim Watch on the results of the SAMA analysis. For example, a sensitivity analysis has been performed which assumes that everyone within the EPZ continues with their normal activities and no mitigative steps are taken to evacuate or shelter persons within the EPZ. The sensitivity runs show that the effect of such wide ranging changes to the input parameters challenged by Pilgrim Watch is negligible and immaterial to the results of the SAMA analysis. The maximum increase in benefit in terms of reduced population dose risk and off-site economic cost risk resulting from any of the sensitivity analyses for implementing additional SAMAs would be less than 4%. However, for any additional SAMAs to become potentially cost effective, the benefits would have to increase by more than 100%, far greater than the maximum increase in benefit calculated by any of the sensitivity analyses.

Thus, as set forth more fully below, not only are Pilgrim Watch’s claims incorrect, they are also immaterial. Therefore, Entergy is entitled to summary disposition as a matter of law.

## 2. PNPS SAMA Analysis Background

Entergy used the MELCOR Accident Consequences Code System (“MACCS2”) to perform the SAMA analyses contained in the PNPS environmental report. Sowdon Decl. at ¶ 6; O’Kula Decl. at ¶ 7. The NRC sponsored the development of the MACCS2 code, and it has been used by nearly all nuclear power plants in the United States, including to support SAMA analyses for nuclear power plant operating license renewals. O’Kula Decl. at ¶ 7. The PNPS SAMA analysis using the MACCS2 code is state of the art. O’Kula Decl. at ¶ 38. The MACCS2 computer model performs SAMA analysis determination of consequences, including the population dose risk (“PDR”), which is measured in person-rem per year, and off-site economic cost risk (“OECR”), measured in dollars per year. Id. at ¶ 9. The mean values of dose and cost consequence distributions for each postulated release are calculated, and the mean population dose and offsite economic costs are multiplied by the frequency of occurrence for the postulated release to determine risk values – the PDR and OECR – for each release condition. The risk estimates for the postulated release conditions are summed to determine overall PDR and OECR estimates. Id.

The PDR and OECR estimates are factored into the cost benefit portion of the SAMA analysis to determine the expected benefit obtained if a mitigation alternative is implemented.<sup>14</sup> The greater the PDR and OECR, the greater the expected benefit obtained if a mitigation measure is implemented because greater public dose and off-site economic cost risks would be avoided.

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<sup>14</sup> The remaining costs factored into the cost benefit portion are attributable to on-site exposure costs and on-site economic costs (defined as on-site clean-up and decontamination cost, and replacement power cost). O’Kula Decl. at ¶ 43, n.5.

MACCS2 models three phases of consequence analysis: (1) an emergency phase, which encompasses the seven day period after the postulated accident; (2) an interdiction phase, which encompasses the five year period after the postulated accident; and (3) a long-term phase, which encompasses the 30 year period after the postulated accident. O’Kula Decl. at ¶ 10. Mitigation plans incorporating evacuation and sheltering are modeled only during the seven-day emergency phase period, and usually are applied only to residents within the emergency planning zone (“EPZ”). Id.

A review of the results of the original baseline PNPS SAMA analysis shows that most of the population dose – on the order of 83% – is due to the interdiction and long-term phase after the accident. O’Kula Decl. at ¶¶ 11, 24. This fact suggests that emergency actions, such as evacuation and sheltering or timing of these and other dose mitigation strategies, will have only small impacts to the overall population dose. Id. Additional review of the results of the PNPS SAMA analysis shows that the major factors controlling PDR and OECR are the size of the source term (i.e., amount of radioactivity released), the parameters controlling the interdiction and long term phases after the accident, and the large population impacted in the 20 mile to 50 mile spatial region surrounding the plant. Id. This again shows that changes in the assumptions and input parameter values for the early or emergency phase effects for the close-in population (within 20 miles of the PNPS) will have a small impact on the overall PDR and OECR. Id.

### **3. Meteorological Model and Input Data**

The host of challenges raised by Pilgrim Watch to the adequacy of the Gaussian plume model and the meteorological input data used in the PNPS SAMA analysis are flawed and lack factual basis. Furthermore, they are immaterial because no change suggested by Pilgrim Watch would result in any new SAMAs being identified as potentially cost beneficial.

The Gaussian plume model employed in the PNPS MACCS2 analysis is the standard plume model used for nuclear safety and environmental evaluations. O’Kula Decl. at ¶ 14. Literally hundreds of runs of the code must be made using different weather conditions to calculate statistically meaningful results for the different accident release conditions postulated in a SAMA analysis. Id. at ¶ 15. Computer codes that can accommodate multiple-station data to model spatial and temporal variation of wind speed and direction, as sought by the Contention, are simply impracticable to use for analyzing the large number of weather sequences needed for SAMA analyses, and are not practical given the hundreds of runs necessary to obtain statistically meaningful results. Id.

Moreover, contrary to Pilgrim Watch’s claim, MACCS2 does account for time dependent weather conditions by analyzing multiple plumes under different weather conditions. Id. at ¶ 16. For each postulated accident release condition, a statistically significant number of plume release simulations are performed by MACCS2 with weather conditions randomly chosen from the site meteorological file. Id. Data read from the file include wind speed, stability class, and precipitation rate, which is available on an hour-by-hour basis in the MACCS2 meteorological data file. Id. Thus, by simulating multiple plumes for each postulated release condition, the MACCS2 code does take into account changes in wind speed and direction as a function of time. Id.

Further, the results from the MACCS2 Gaussian plume model are comparable to, and generally more conservative than, those obtained by more sophisticated models that address variable meteorological and terrain effects. O’Kula Decl. at ¶ 17. For example, in a comparison and test study by the Idaho National Laboratory, the Gaussian plume model provided significantly more conservative results – i.e., its estimation of public dose was higher than that of

a more sophisticated model that addressed variable meteorological and terrain effects, as well as significantly higher than the actual results measured. Id. In another study, the results from the Gaussian plume model were shown to be in good agreement with the results obtained from a fully three dimensional model that accounted for terrain changes and spatial variability of weather. Id.

Finally, the MACCS2 code was conservatively applied to the Pilgrim SAMA analysis so as to produce overall conservative results. Id. at ¶ 18. For example, the PNPS SAMA analysis used a very small input (10 cm) for surface roughness length, which is a measure of the amount of mechanical mixing of the plume introduced by the roughness of the surface due to, for example, human-built structures, trees and other vegetation, and surface features. Id. A much greater surface length measure (such as 100 cm) could have easily been justified and would have resulted in greater mechanical mixing and dispersion of the plume and, thus, would have reduced doses to the public shown by the PNPS SAMA analysis. Id.

In addition, PNPS ran two sensitivity cases to evaluate the effect of terrain changes and weather variability on the results of the SAMA analysis which showed negligible effects from varying the weather or the terrain used in the base case analysis. O’Kula Decl. at ¶ 19. Sensitivity Case 2 was run to estimate the effects of changing wind direction trajectory in the MACCS2 consequence analysis by choosing different meteorological input data for release categories that last longer than an hour. Id. The results from Sensitivity Case 2 show a negligible increase in PDR and OECR of 3%. Id.<sup>15</sup> Sensitivity Case 3 approximated a terrain

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<sup>15</sup> As explained in the O’Kula declaration, the results of Sensitivity Case 2 are inherently conservative, compared to the base case, because it used conditions at the beginning of a plume release, when the release has larger dose quantity and less decay has occurred, rather than at a point an hour or more later into the release. Id.

change by releasing the plume at the ground level, rather than at 30 meters high in the base case, and the results show a 1% increase in PDR and a 4% increase in OECR. Id. at ¶ 19. The increases in PDR and OECR from Sensitivity Cases 2 and 3 are far less than that required to result in identifying any additional potentially cost-beneficial SAMAs. Id. at ¶¶ 43-47.<sup>16</sup>

Pilgrim Watch also incorrectly claims that the Gaussian plume model employed by PNPS inappropriately fails to account for the sea breeze effect and the coastal topography near PNPS. Pilgrim Watch Pet. at 35-36. In fact, the meteorological data gathered at PNPS and used in the SAMA analysis reflect the occurrence of sea breeze conditions in terms of both wind speed and direction. O’Kula Decl. at ¶ 20. Further, sea breezes are most often localized within 10 miles of the coast, and, most importantly, generally disperse the plume. Id. Therefore, sea breezes are generally highly beneficial in decreasing doses downwind from the release point. Id.<sup>17</sup> Furthermore, localized variations in sea breeze would have insignificant impact on dose to population tens of miles away and will have negligible impact in the calculation of regional population doses. Id.

Pilgrim Watch’s remaining claims regarding the adequacy of the Gaussian plume model and meteorological data used in the PNPS SAMA analysis likewise have no merit. The inability of the Gaussian plume model to estimate dispersion less than 100 meters from the source (Pilgrim Watch Pet. at 35) is irrelevant because the MACCS2 code was not used to estimate

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<sup>16</sup> Because off-site population exposure contributes about 32% of the total cost risk, and the off-site economic cost contributes about 54% of the total cost risk (O’Kula Decl. at ¶ 43), the increase in cost risk for Sensitivity Cases 2 and 3 is less than 3% compared to the 100% increase in cost risk that would be required before any additional SAMAs would potentially become cost effective (O’Kula Decl. at ¶ 44).

<sup>17</sup> As explained in the WSMS Report, any negative impact of sea breeze conditions (from a combination of sea breeze and fumigation effects) would only likely affect populations that are relatively close to the plant (within about a mile), and would occur infrequently (less than 1% of the time). WSMS Report at 20. Such conditions

dispersion within several hundred meters (in the “near field”) of the release point. O’Kula Decl. at ¶ 21. In any event, any area within such a short distance of the source is within the PNPS exclusion area, which has no permanent population who could incur radiological exposure. Id.

Contrary to Pilgrim Watch’s claim that it was inappropriate for the PNPS SAMA analysis to use meteorological data for only a year, Pilgrim Watch Pet. at 36-38, use of data for a single representative year is typical for SAMA analyses. O’Kula Decl. at ¶ 21. Furthermore, the year chosen provides the most complete set of meteorological data available for the PNPS site and is representative of meteorological conditions at the plant. Id.; Mogolesko Decl. at ¶ 10. Thus, it is not necessary, as argued by Pilgrim Watch (Pet. at 37-38),<sup>18</sup> to have multiple years of data O’Kula Decl. at ¶ 21. Nor is it necessary to have multiple sources of data as claimed by Pilgrim Watch. Id. Rather, meteorological instrumentation near or at the point of release is the most critical placement for identifying the atmospheric turbulence conditions governing initial plume travel. Id. At PNPS, such instrumentation is properly positioned to account for the turbulence structure of the atmosphere. Id.

Pilgrim Watch also erroneously argues, Pet. at 37-38, that continuous recording meteorological instruments should be installed along the coast and at additional inland sites. While such continuous recording instrumentation would relate to the ability to track a specific plume, such instrumentation would have no bearing for a SAMA analysis where the focus is determining mean consequence levels resulting from multiple plumes for different postulated

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would not extend 30 to 40 miles to the major population centers of Boston and Providence and would have no effect on the SAMA PDR and OECR results. Id.

<sup>18</sup> Pilgrim Watch’s reliance on Regulatory Guide 1.194, Pilgrim Watch. Pet. at 38, is irrelevant. Regulatory Guide 1.194 concerns data needed as input for an NRC sponsored computer code, ARCON96, which is used to model radioactivity concentration in the vicinity of reactor site building complexes. Reg. Guide. 1.194 at 1.194-1 to 1.194-2. It does not apply for modeling offsite radiological consequences.

release events to support cost-benefit decision-making on potential plant modifications. O’Kula Decl. at ¶ 21. Moreover, it would be impracticable to use multiple data sources for multiple years for analyzing the large number of weather sequences needed for SAMA analyses, particularly given the hundreds of runs necessary to obtain statistically meaningful results. Id. at ¶¶ 15, 21.

In summary, Pilgrim Watch has failed to raise any genuine dispute of material fact regarding the meteorological computer code model and input data used in the PNPS SAMA analysis. The Gaussian plume model is the standard plume model used for nuclear safety and environmental evaluations, generally provides conservative results, and was conservatively applied in the PNPS SAMA analysis. Furthermore, changes in meteorological input parameters have minimal impact on the results of the SAMA analysis, and far larger impacts would be required before any additional SAMAs would potentially become cost-effective. Hence, this basis for Pilgrim Watch Contention 3 should be dismissed.

#### **4. Evacuation Time Estimates**

The long series of claims that Pilgrim Watch raises to challenge the evacuation delay time and evacuation speed estimates used in the PNPS SAMA analysis are flawed and lack factual basis. Moreover, they are immaterial. Even accepting the claims as correct, no additional potentially cost effective SAMAs would be identified.

The MACCS2 model for the PNPS SAMA analysis uses inputs – the “evacuation delay time” and the “evacuation speed” – derived from evacuation time estimates prepared as part of

the PNPS Emergency Plan. Sowdon Decl. at ¶ 6; see also O’Kula Decl. at ¶ 22.<sup>19</sup> The evacuation delay time is the elapsed time between the notification and alert to evacuate and the beginning of the evacuation, and the evacuation speed is the speed at which the evacuation is accomplished. O’Kula Decl. at ¶ 23. The base case used a forty-minute evacuation delay time and a constant evacuation speed of 2.17 mph. Id. The original SAMA analysis contained in the Environmental Report also included two sensitivity cases which showed a maximum change in consequence estimates of less than 2%. Id. at ¶ 25. The first sensitivity case used a delay time of 2 hours instead of the base case delay time of 40 minutes and the second sensitivity case used an evacuation speed of 1.54 mph instead of 2.17 mph. Id.

To test whether Pilgrim Watch’s claims challenging the adequacy of these evacuation delay time and evacuation speed estimates used in the PNPS SAMA analysis could affect the results of the analysis, PNPS ran additional sensitivity cases to evaluate the consequences of even longer delay times and slower evacuation speeds. O’Kula Decl. at ¶ 26; WSMS Report at 24-28. These sensitivity cases considered evacuation delay times as long as six hours and evacuation speeds as slow as 0.76 mph. Id. Furthermore, another sensitivity case assumed that no mitigating action, evacuation or sheltering, was undertaken within the EPS. Id. Everyone within the EPZ carried on with their normal activities. Id. The maximum change to the PDR resulting from any of these sensitivity cases was 6%. Id. Such an increase in PDR would increase the total cost risk of the postulated release events evaluated in the SAMA analysis by only 2%, far less than the more than 100% increase that would be required before any additional

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<sup>19</sup> The SAMA analysis was performed in 2002 and uses inputs derived the evacuation time estimates performed in 1998 (“1998 Study”). Sowdon Decl. at ¶ 7. The 1998 Study is available in the NRC Public Documents Room at ML9905190222. PNPS has since had another evacuation time estimate study, which updated the information in the 1998 Study, in 2004 (“2004 Study”), which provides virtually identical estimates. Sowdon Decl. at ¶ 7.

SAMA would be identified as potentially cost-effective. Id. This result is consistent with the discussion above that most of the population dose – on the order of 83% – is due to the interdiction and long-term phase after the accident and that consequently changes in the assumptions and input parameter values for the early or emergency phase effects for the close-in population (within 20 miles of the PNPS) will have a small impact on the overall PDR and OECR. As such, Pilgrim Watch's claims challenging the adequacy of the evacuation delay and evacuation speed inputs used in the PNPS SAMA analysis are, even if true, immaterial. Therefore, summary disposition is clearly warranted.

Furthermore, Pilgrim Watch's evacuation time estimate claims are legally deficient. As acknowledged in its Petition (at 40), Pilgrim Watch is claiming that PNPS be required to evaluate worst case scenarios in its SAMA analysis in the choice of evacuation delay time and evacuation speed. However, as discussed above, NEPA does not require any analysis of worst case scenarios. Private Fuel Storage, CLI-02-25, 56 N.R.C. at 354. Nevertheless, PNPS has considered the worst case scenarios raised by Pilgrim Watch, and has demonstrated that the change in impacts from these scenarios is inconsequential.

Turning to the specific claims raised by Pilgrim Watch, contrary to Pilgrim Watch's claim the PNPS SAMA analysis does not assume that the population is out of danger upon crossing the 10-mile EPZ boundary or that radiation will not extend beyond 10 miles, Pilgrim Watch Pet. at 39, 42. The MACCS2 model assumes an evacuation zone of 10 miles because that is exactly what is provided for in the PNPS Emergency Plan, as required by the NRC's regulations at 10 C.F.R. § 50.33(g). Sowdon Decl. at ¶ 11. To assume a larger evacuation zone as argued for by Pilgrim Watch (Pilgrim Watch Pet. at 42) would be unrealistic. Further, MACCS2 assesses dose consequences beyond the 10-mile EPZ boundary, out to 50 miles, and

thus accounts for potential doses beyond 10 miles from the plant. Sowdon Decl. at ¶ 12; O’Kula Decl. at ¶ 23. Residents in the 10-mile to 50-mile region receive radiological exposure if they are within the plume passage region during the 7 day emergency phase. O’Kula Decl. at ¶ 27. Furthermore, the EPZ residents as well as persons living in the 10-mile to 50-mile region incur dose during the 30-year long-term phase following the accident as long as their area of residence remains habitable. Id. Pilgrim Watch’s claims that the PNPS SAMA analysis failed to consider doses beyond 10 miles from the plant is simply not true, and therefore is not a genuine dispute of material fact.<sup>20</sup>

Further, Pilgrim Watch erroneously argues that the SAMA analysis fails to consider those who cannot evacuate and must shelter. Pilgrim Watch Pet. at 39. However, the PNPS SAMA analyses appropriately assumed that persons who could not evacuate on their own would be provided assistance to evacuate because the PNPS emergency plans provide that state and local governments will provide assistance to evacuate those who cannot evacuate on their own. Sowdon Decl. at ¶ 13; O’Kula Decl. at ¶ 29. In addition, PNPS ran the MACCS2 Sensitivity Case 6, which turned off the evacuation model altogether. O’Kula Decl. at ¶ 29. In other words, everyone within the EPZ is assumed to carry on with their normal activities. Id. The results show an increase in PDR of about 6%. Id. As already discussed, such an increase would

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<sup>20</sup> The model does assume that, once evacuees from the EPZ have evacuated 20 miles beyond the plant and have reached designated centers, they no longer receive radiological dose during the 7 day emergency phase. O’Kula Decl. at ¶ 27. PNPS performed MACCS2 Sensitivity Case 4 to model evacuees moving to a 40-mile radius before assuming that they have reached the designated centers. O’Kula Decl. at ¶ 28. The actual centers are closer than 40 miles away from PNPS, and hence Sensitivity Case 4 is conservative in that evacuees are traveling a greater distance than would be expected in an actual evacuation. Id. The results for Case 4 show less than a 1% increase for the PDR and OECR from the base case. Thus, assuming increased travel distance for evacuees does not produce any noticeable increase to PDR and OECR. Id. Moreover, the no evacuation case discussed below, which clearly bounds the base case and Sensitivity Case 4, shows only a 6% increase in PDR which is far short of the increase in PDR that would be necessary to identify any new potentially cost effective SAMAs.

increase the total cost risk by only 2% and have no impact on the results of the PNPS SAMA analysis. Id. Thus, again there is no disputed material issue of fact.

Pilgrim Watch also erroneously claims that the SAMA analysis did not use the most recent evacuation time estimates. Pilgrim Watch Pet. at 39. The SAMA analysis relied on input from the 1998 Study, which was the most recent estimate at the time (2002) when the SAMA analysis was prepared. Sowdon Decl. at ¶ 14. In any event, even if the SAMA analysis were performed using data from the 2004 Study, the results would be the same. The 1998 Study used the same evacuation delay times as the 2004 Study. Id. at ¶ 15. In addition, the evacuation speed estimates are virtually identical – differing by only a few one hundredths of mph. Id. at ¶¶ 16-17.

Also demonstrably wrong are Pilgrim Watch's assertions that the ETEs were based only on good weather and failed to take into account commuter rush hour, summer weekend traffic, bad weather, or special events, such as July 4<sup>th</sup> celebrations. Pilgrim Watch Pet. at 40, 42-43. As clearly set forth in the 1998 Study, the ETEs were based on a wide range of scenarios. Sowdon Decl. at ¶ 18. The 1998 Study considered evacuation scenarios under varying weather conditions, such as "Good," "Rain," and "Snow," during different portions of the year, "Summer" and "Off-season," during different times of the week, "Weekend" and "Midweek" days, and during different times of the day, "Midday" and "Evening," including periods of "Heavy Traffic." Id. (emphasis added). The 1998 Study also considered weather conditions in conjunction with other pertinent factors, such as "[s]udden rain. . . with tourist and beach population at capacity concurrent with accident at Pilgrim Station." Id. (emphasis added). There simply is no basis for Pilgrim Watch's assertions that the ETEs looked only at good weather.

Pilgrim Watch erroneously asserts that the PNPS SAMA analysis used faulty evacuation time estimate assumptions for voluntary evacuations and shadow evacuation. Pilgrim Watch Pet. at 40.<sup>21</sup> To the contrary, the SAMA analysis was based on an assumed directed evacuation of the entire 10 mile EPZ in accordance with the Emergency Plans providing for such evacuation in appropriate circumstances, and not voluntary evacuations as implied by Pilgrim Watch. Sowdon Decl. at ¶ 20; O’Kula Decl. at ¶ 30. Further, as described in Chapter 8 of the 1998 Study, the PNPS SAMA analysis (by relying on input from the PNPS Emergency Plan) takes into account shadow evacuation. Sowdon Decl. at ¶ 21. The PNPS Emergency Plan has measures in place to keep traffic from entering the EPZ, which will abate any shadow evacuation by preventing the populace from towns not in the EPZ from feeding onto Route 3 and hindering the evacuation of the EPZ. Id.

Pilgrim Watch is also mistaken in claiming that the evacuation delay time estimates of 40 minutes used for the base SAMA analysis and 2 hours used in a sensitivity case<sup>22</sup> are inappropriate because it could take much longer (up to 5 or 6 hours) to notify the population of an accident. Pilgrim Watch Pet. at 41. The bottom line is that these claims are immaterial. PNPS has since performed MACCS2 Sensitivity Case 7a, which assumed a 6-hour evacuation delay time from the EPZ (the delay time asserted by Pilgrim Watch if an accident were to occur during the middle of the night). Sowdon Decl. at ¶ 25; O’Kula Decl. at ¶ 31. The results from Case 7a show only a 5% increase in public dose risk. Sowdon Decl. at ¶ 25; O’Kula Decl. at ¶

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<sup>21</sup> Specifically, Pilgrim Watch claims that voluntary evacuation from within the EPZ was estimated to be 50% within a 2-5 mile ring around the reactor, excluding the “key-hole;” and 25% in the annular ring between the 5-mile boundary of the circle and the 10-mile EPZ boundary. Id.

<sup>22</sup> Sensitivity Case 1.a assumed a two-hour evacuation delay time, three times longer than the 40 minutes assumed in the base case, to evaluate the sensitivity of the consequence results to uncertainties in the delay time. Sowdon Decl. at ¶ 25; O’Kula Decl. at ¶ 25. Comparison of the results from the sensitivity case and base case showed that there was a less than a 2% deviation in PDR and OECR. Sowdon Decl. at ¶ 25; O’Kula Decl. at ¶ 25.

31. Case 7a is further bounded by Case 6, which turned off the evacuation model altogether, and resulted in a 6% increase in PDR. O’Kula Decl. at ¶ 31. Such negligible increases in OECR and PDR are not sufficient to identify any new SAMAs as being potentially cost beneficial. Sowdon Decl. at ¶ 25; O’Kula Decl. at ¶ 31. Hence, even if Pilgrim Watch’s claims regarding the evacuation delay time used in the SAMA analysis are accepted as true, they are immaterial.<sup>23</sup>

Pilgrim Watch further asserts that the original PNPS SAMA analysis and sensitivity case<sup>24</sup> used inappropriate evacuation speed estimates because the traffic estimates ignored both summer week-end traffic and special events and shadow evacuation. Pilgrim Watch Pet. at 42-43. Any question on the perceived non-conservatisms regarding the evacuation speed for persons evacuating EPZ is laid to rest by the bounding analysis performed in MACCS2 Sensitivity Case 6, which turned off the evacuation model altogether. O’Kula Decl. at ¶ 32. In any event, as previously discussed, the ETes from the 1998 Study expressly account for a wide range of traffic conditions, and the PNPS Emergency Plan does consider and take mitigating

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<sup>23</sup> Moreover, there is no factual basis for Pilgrim Watch’s challenges to the evacuation delay times used in the analysis. Pilgrim watch claims that (1) individual delay times may vary depending upon the individual’s location, such as at home or sailing, or what the individual was doing, such as attempting to return from outside the EPZ to inside the EPZ to evacuate with that individual’s household; and (2) the warning sirens cannot be heard in certain circumstances and that it might be 5-6 hours before word of a nighttime accident spread. Pilgrim Watch Pet. at 41. Neither claim has merit. With respect to the first claim, the PNPS ETes considered evacuation delay time estimates for persons off the beach, on the beach, or on boats. Sowdon Decl. at ¶ 23. Further, the 1998 Study explicitly considers variances in elapsed times: “The amount of elapsed time will vary from one individual to the next depending where that person is, what that person is doing and related factors.” *Id.* (quoting 1998 Study). With respect to the second claim, as recently as April 2005, the NRC has determined that the PNPS siren system meets the design criteria for the emergency alerting system and would alert the public of an emergency within 15 minutes. *Id.* ¶ 24 (citing the NRC’s April 1, 2005 response to the 10 C.F.R. 2.206 petition filed by Ms. Mary Elizabeth Lampert regarding the PNPS siren system). Consequently, Pilgrim Watch’s concerns about the evacuation delay time estimates are unfounded.

<sup>24</sup> Sensitivity Case 1.b maintained the base case 40-minute evacuation delay time, but assumed a lower evacuation speed of 1.54 mph to evaluate consequence sensitivities due to uncertainties in the evacuation speed, e.g. road conditions and traffic congestion. O’Kula Decl. at ¶ 25. The result was less than 2% deviation between the base case and the sensitivity case. Sowdon Decl. at ¶ 27.

steps to ensure shadow evacuation does not impede evacuation of the EPZ. Sowdon Decl. at ¶¶ 18, 21, and 26.

Again, the bottom line is that this claim is immaterial. PNPS has since performed MACCS2 Sensitivity Case 7b, which assumed an evacuation speed of only 0.76 mph. Sowdon Decl. at ¶ 27; O’Kula Decl. at ¶ 32. This evacuation speed is one-third of the evacuation speed of the base case and less than one-half of the slowest of any of the evacuation speeds in either of the 1998 Study or the 2004 Study. O’Kula Decl. at ¶ 32; Sowdon Decl. at ¶ 17. This extremely slow evacuation speed showed only an increase of 3% in PDR. Sowdon Decl. at ¶ 27; O’Kula Decl. at ¶ 32. Again, such negligible increases in consequences do not result in the identification of any additional potentially cost beneficial SAMAs. Sowdon Decl. at ¶ 27; O’Kula Decl. at ¶¶ 43-47. Indeed, because the PDR accounts for only 32% of the total cost risk, a 3% increase in PDR would only increase the cost risk 1%, which is two orders of magnitude less than the 100% increase in cost risk that would be required before any additional SAMAs would be identified as potentially cost effective. O’Kula Decl. at ¶¶ 43-44.<sup>25</sup>

In sum, Pilgrim Watch has failed to raise a genuine dispute of material fact regarding the evacuation delay time and evacuation speed estimates used in the PNPS SAMA analysis. Hence, this basis for Pilgrim Watch Contention 3 should be dismissed.

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<sup>25</sup> Pilgrim Watch is also mistaken in faulting the assumption that snow removal will add only an hour and a half to the evacuation time for winter snow conditions. Pilgrim Watch Pet. at 42. PNPS obtained this estimate as a result of a phone survey it conducted, which reported 85% of driveways being passable within about 1.5 hours, and 100% being cleared within 3.5 hours. Sowdon Decl. at ¶ 29. The snow removal time estimate distributions are accounted for in the ETes. *Id.* Furthermore, even assuming all driveways could not be cleared within 3.5 hours and evacuation would take longer than estimated, this case would still be bounded by the sensitivity analyses described in the WSMS Report, which alternatively assumed no evacuation, an evacuation delay time of 6 hours, and an evacuation speed of less than one half of that estimated in the 1998 Study for winter snow conditions. Sowdon Decl. at ¶ 29; O’Kula Decl. at ¶ 31. Furthermore, as discussed above, the increases resulting from these sensitivity evaluations are far below those that would be necessary to identify any potentially new cost beneficial SAMAs. O’Kula Decl. at ¶¶ 43-47.

## 5. Economic Cost Modeling Issues

### a. Pilgrim Watch's Claims regarding the PNPS SAMA Economic Consequence Model Lack any Factual Basis

Pilgrim Watch's claim that the Pilgrim MACCS2 economic consequence model is inadequate because it only includes the economic costs of "mitigative actions" such as evacuation and decontamination (Pilgrim Watch Pet. at 43-44) is demonstrably incorrect based upon the provisions of the MACCS2 code and applicable industry guidelines. MACCS2 accounts for a wide range of economic costs in accordance with industry guidance on SAMA cost-benefit analysis. O'Kula Decl. at ¶ 34. MACCS2 accounts for region-specific and county-specific costs, and includes:

- cost of evacuation;
- cost for temporary relocation (food, lodging, and lost income);
- cost of decontaminating land and buildings;
- loss of building/land use and any corresponding lost return on investment and depreciation associated with decontamination and interdiction;
- cost of repairing temporarily interdicted property;
- value of crops destroyed or not grown because they were contaminated by direct deposition or would be contaminated by root uptake; and
- value of farmland and of individual, public, and non-farm commercial property that is condemned.

Id. Therefore, MACCS2 accounts for a wide range of economic losses, such as loss of income, loss of value of crops not grown, and loss of use and return on property, including commercial and business property. Id. at ¶ 35.

Further, in terms of loss of use and return on property, MACCS2 considers as part of the interdiction costs of (1) a depreciation rate on property improvements to account for loss of value of buildings and other structures, and (2) an expected rate of return from land, building, and equipment. O'Kula Decl. at ¶ 35. The PNPS SAMA analysis based the non-farm property value

input on non-farm fixed reproducible tangible wealth – a measure of the non-farm land and durable goods, i.e., items that people own, including business and commercial buildings, related equipment and inventory, residential houses, cars, washing machines, etc. Id. at ¶ 36. The values for non-farm property used in the SAMA analysis were based on equalized valuations of all property so as to equate to the actual fair market value of all property within the region. Id. Thus, the PNPS SAMA analysis accounts for a return of 12% on the actual fair market value of all business property and therefore accounts for loss of economic activity during the interdiction phase. Id. at ¶ 37. Additionally, the SAMA analysis accounts for the full value of any non-farm property that would be condemned. Id.

Pilgrim Watch's claims to the contrary are simply wrong. Nonetheless, PNPS has performed an additional SAMA analysis sensitivity case to assess Pilgrim Watch's claims regarding business and tourism loss risks. O'Kula Decl. at ¶ 39. Sensitivity Case 8 modified the input parameters for the value of non-farm property to include data that specifically account for county and metropolitan area gross domestic product so as to directly account for any loss of tourism, business activity, wages, etc. Id. Under this revised approach, the county-specific gross county product ("GCP") for each county was added to the non-farm property value used in the original analysis for the county. Id. at ¶ 40. Then, the new, higher value for non-farm property for each county was used in Sensitivity Case 8. Id. The results, therefore, account for the non-farm wealth (tangible wealth owned) in the individual counties as well as their direct economic output, thus directly accounting for the total value of goods and services produced in an area. Id.

Sensitivity Case 8.b substituted the new value for non-farm property for the various counties and held the other parameters constant and resulted in no change to the PDR and an

increase of the OECR of 2%. O’Kula Decl. at ¶ 41.<sup>26</sup> Thus, augmenting the non-farm wealth economic indices with county and region-specific business and tourism data has negligible impact on the results of the SAMA analysis. Id. The 2% increase in the OECR would not result in identifying any additional potentially cost effective SAMAs. Id. at ¶ 42.

Indeed, because OECR only accounts for approximately 50% of the total risk, the 2% increase in the OECR for Sensitivity case 8.b would increase the total cost risk by only about 1% compared to the 100% increase in cost risk required for any additional SAMAs to become potentially cost effective. Id. at ¶¶ 43-44. Accordingly, the OECR would need to increase by roughly two orders of magnitude more than the 2% increase calculated for Sensitivity case 8.b, or by 200%, before any additional SAMAs would become potentially cost effective. Id. at ¶ 42. This large margin provides high confidence in the validity of the PNPS SAMA analysis results. Id.

In short, Pilgrim Watch has failed to raise a genuine dispute of material fact regarding the economic cost modeling data used in the PNPS SAMA analysis. Hence, this basis for Pilgrim Watch Contention 3 should be dismissed.

b. As a Matter of Law, PNPS Does Not Need to Perform any Further Detailed Economic Cost SAMA Estimates

As set forth above, the economic cost model for MACCS2 accounts for loss of business activity by providing for a return based on the full assessed value of business property,

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<sup>26</sup> It is worth noting that the original SAMA analysis utilized a highly conservative value for the average regional value of non-farm property, which is used in making determinations in the analysis as to whether property is interdicted or condemned. O’Kula Decl. at ¶ 41, n.4. Retaining the same highly conservative value for non-farm property used in the original analysis while using the new, augmented county values for non-farm property (Sensitivity case 8.b) results in the 2% increase in the OECR discussed above. If the average regional value of non-farm property were recalculated based on the new, augmented county values for non-farm property in accordance with the applicable SAMA guidance (Sensitivity case 8.a), the OECR would decrease by 13%. Id.

equipment and inventory. Additionally, a sensitivity analysis has been run which directly accounts for business activity and tourism by including the Gross County Product in the non-farm value of property used in MACCS2. As such, the MACCS2 economic cost evaluation accounts for the loss of tourism and other loss of business activity due to interdiction of business property while business property is being decontaminated as well as the value of business property that is condemned as a result of radioactive contamination.<sup>27</sup>

Pilgrim Watch, however, makes additional claims that go beyond the economic cost due to radioactive contamination occurring from a severe accident. It claims that:

Even if cleanup and decontamination of these sites were possible it is unlikely that this tourism would ever recover fully after a severe accident. Yet there is no economic analysis in the [ER's] SAMAs which accounts for the destruction of this region's economy as a major tourist, and historical and recreational area.

Pilgrim Watch Pet. at 44-45 (emphasis added). In other words, Pilgrim Watch contends (without any support) that no matter the level of cleanup and decontamination achieved after a postulated accident, tourists would fear the risk of contamination, where none exists, and fail to return to the tourist destinations, resulting in further economic harm. However, fear of the risk of non-existent contamination is not cognizable under NEPA and, thus, need not be considered in the instant license renewal proceeding. In Metropolitan Edison Co. v. People Against Nuclear Energy, 460 U.S. 766, 775-76 (1983), the Supreme Court held that NEPA does not require the NRC to evaluate the alleged psychological health damage stemming from the risk of a nuclear accident because the "risk of an accident is not an effect on the physical environment." Hence, NRC did not need to consider any alleged psychological damage stemming from that risk. Id.

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<sup>27</sup> As set forth in the WSMS Report, interdiction costs constitute the largest economic cost incurred as a result of a severe accident, decontamination and clean-up ranks second in cost, and condemnation is third in terms of

Here, any economic consequences of fear of risk of non-existent contamination, either cleaned up or never present in the first place, is likewise not an effect on the physical environment. Consequently, Entergy (and the NRC) need not consider any economic damages resulting from that risk.

Moreover, under the case law discussed above, the NRC is not required to perform “expensive and time consuming studies” on secondary impacts, such as the impact to tourism, stemming from the unlikely radiological offsite consequences. Walton, 655 F.2d at 377. The PNPS license renewal Environmental Report sufficiently describes the risk of accident with radiological offsite consequences, describes the methodology for calculating that risk, and describes the results of those calculations. Indeed, as discussed throughout this Motion, PNPS has performed detailed SAMA analyses that calculate expected population dose risk and offsite economic cost risk. In short, PNPS has acknowledged that environmental and economic consequences would result from the postulated scenarios. Nevertheless, because the likelihood of such an accident with offsite radiological consequences is low, 61 Fed. Reg. at 24,481, Entergy “need only furnish such information as appears to be reasonably necessary under the circumstances for evaluation of the project.” Lee, 354 F.3d at 1245. Entergy has exceeded its burden and is not required to provide further, detailed analyses on the specific impact to area tourism as a result of offsite radiological consequences. Walton, 655 F.2d at 377; Lee, 354 F.3d at 1245. Finally, as also discussed above, it is well established that NEPA does not require federal agencies to resolve all uncertainties in evaluating potential environmental impacts, otherwise an impact statement can never be prepared until all relevant environmental effects were known and it is doubtful that “any project could ever be initiated.” Morton, 471 F.2d. at 1280; see also

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economic cost impact. WSMS Report at 34.

Baltimore Gas & Electric, 462 U.S. at 98-100. The PNPS SAMA analysis used the MACCS2 code, which is state of the art and is used throughout the industry for SAMA analyses. O’Kula Decl. at ¶ 38. It is based on industry guidance, which the NRC Staff has endorsed and no other code exists that performs similar analyses for severe accidents at nuclear power plants. Id. There is no better methodology to evaluate potential economic loss of a severe accident. Thus, any arguments for further, never ending analysis that may be made by Pilgrim Watch must be rejected. The state of the art analysis has been provided, and indeed even more than that by virtue of the Sensitivity Case 8.

Finally, the futility of further detailed analysis is highlighted by virtue of the large margin between the avoided economic costs as calculated using the state of the art code and the cost implementing additional SAMAs discussed next.

**6. No new cost beneficial SAMAs have been identified**

The results of the new sensitivity analyses do not make any of the SAMAs being considered cost beneficial. O’Kula Decl. at ¶ 43. The maximum increase to the PDR for any of the new sensitivity studies was 6%, and the maximum increase to the OECR was 4%. Id. Using these maximum increases for the PDR and the OECR values would increase the total avoided cost for each of the 59 SAMAs by about 4%, because off-site population exposure contributes about 32% of the total, and the off-site economic cost contributes about 54% of the total. Id. The baseline benefit, or the total cost avoided, for the SAMA that is closest to becoming potentially cost effective would have to increase by more than 100% for it to be potentially cost

beneficial.<sup>28</sup> Id. at ¶ 44. This is a factor of 25 times greater than combining the maximum increases for PDR and OECR observed for any of the new sensitivity analyses evaluated. Id. at ¶¶ 44-45.<sup>29</sup>

As no new potentially cost beneficial SAMA has been identified as a result of considering the challenges raised by Pilgrim Watch, Pilgrim Watch's challenges raise no material dispute of fact. Therefore, Entergy is entitled to summary disposition as a matter of law on Pilgrim Watch Contention 3.

#### IV. CONCLUSION

For the reasons set forth above, the Board should grant Entergy's Motion for Summary Disposition of Pilgrim Watch Contention 3.

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<sup>28</sup> SAMA #8 is the closest to becoming potentially cost effective – its baseline benefit of \$2,405,508 is less than half of the estimated cost of implementing the SAMA, which is more than \$5,000,000. Thus, its baseline benefit would have to increase by more than 100% before becoming potentially cost beneficial. Id.

<sup>29</sup> The large margins and conservatisms present in the SAMA analysis are further demonstrated by looking at the bounding analyses performed as part of the original PNPS SAMA analysis. O'Kula Decl. at ¶ 46; WSMS Report at 40. The first was a baseline case with uncertainty and the second was sensitivity case assuming a lower discount rate of 3% versus the 7% originally assumed. Id. Even for these bounding analyses, the margins between the benefits and the cost implementing the SAMA that is next to being potentially cost effective are approximately an order of magnitude larger than the increases in risk calculated by any of the sensitivity analyses described above. Id.

**V. CERTIFICATION**

In accordance with 10 C.F.R. §2.323(b) and the Scheduling Order, counsel for Entergy conferred with counsel for the parties in a sincere effort to resolve the matters at issue in the instant Motion prior to the filing of the Motion, but was unsuccessful in doing so.

Respectfully Submitted,

A handwritten signature in cursive script, appearing to read "Paul Gaukler", is written over a horizontal line.

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Dated: May 17, 2007

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
Entergy Nuclear Generation Company and	)	Docket No. 50-293-LR
Entergy Nuclear Operations, Inc.	)	ASLBP No. 06-848-02-LR
	)	
(Pilgrim Nuclear Power Station)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of (1) "Entergy's Motion for Summary Disposition of Pilgrim Watch Contention 3"; (2) "Statement of Material Facts"; (3) "Declaration of Fred Mogolesko in Support of Entergy's Motion for Summary Disposition of Pilgrim Watch Contention 3," with an Exhibit; (4) "Declaration of Thomas L. Sowdon in Support of Entergy's Motion for Summary Disposition of Pilgrim Watch Contention 3," with Exhibits; and (5) "Declaration of Dr. Kevin R. O'Kula," with Exhibits, were served on the persons listed below by deposit in the U.S. Mail, first class, postage prepaid, and where indicated by an asterisk by electronic mail, this 17<sup>th</sup> day of May, 2007.

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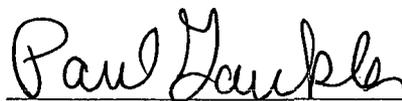
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