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**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

**OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF**

Before the Commission

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 BRIEF IN RESPONSE TO CLI-09-11

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Pursuant to the Commission's June 4, 2009 Memorandum and Order ("CLI-09-11"), Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc. (collectively "Entergy") submit this brief on the issues identified by the Commission. CLI-09-11, slip op. at

7. The Commission seeks additional briefing on two questions:

(1) In granting summary disposition, was it appropriate for the Board majority to exclude challenges to the use of particular methodologies, such as the use of the straight-line Gaussian plume model to predict the atmospheric dispersion of radionuclides, or the use of the MACCS2 code for determining economic costs?

(2) Did Pilgrim Watch present a supported, genuine dispute that could materially affect the ultimate conclusions of the SAMA cost-benefit analysis?

Id.¹ As demonstrated below, the Board majority correctly granted summary disposition of Contention 3 because Pilgrim Watch ("PW") did not present any information disputing Entergy's analyses demonstrating that no additional SAMAs would become cost effective even when taking into consideration PW's claims. Further, the majority correctly excluded challenges to the MACCS2 Code because PW limited Contention 3 to the appropriateness of the "input data."

Reflecting the scope pled by PW, Contention 3, as admitted by the Board, was limited to whether certain input data for the SAMA analyses were inadequate. The admitted Contention did not question Entergy's use of the MACCS2 Code, but merely argued that Entergy had failed

to compensate for alleged limitations in the code in its choice of the input data used. Entergy's summary disposition motion provided the further analysis called for by the Contention in the form of sensitivity studies which addressed the precise, alleged limitations in the code identified by PW and demonstrated that PW's concerns would not make additional SAMAs cost beneficial.

In its response, PW attempted to change its Contention so as to challenge any use of the MACCS2 Code and never came forward with facts to dispute the results of Entergy's sensitivity analyses. Indeed, PW claimed for the first time in response to Entergy's summary disposition motion that, no matter the inputs used, the MACCS2 model would never produce correct results – that Entergy's sensitivity studies were a “waste of everybody's time.”²

Correctly applying the scope of Contention 3 as pled and admitted, the majority properly excluded challenges to the use of the MACCS2 Code, including its embedded Gaussian Plume model and economic model. The majority then correctly granted Entergy's Motion for Summary Disposition because PW did not show that changes to the input data could make additional SAMAs become cost beneficial and thus failed to present any supported, genuine dispute that could materially affect the ultimate conclusions of the SAMA cost-benefit analysis.

STATEMENT OF THE CASE

This proceeding involves the application by Entergy to renew the operating license for Pilgrim for an additional twenty-year period.³ PW filed an intervention petition seeking the admission of five contentions, including Contention 3 on severe accident mitigation alternatives (“SAMA”).⁴ PW Contention 3 as initially pled stated:

¹ Citations and footnotes omitted in all references unless otherwise indicated.

² Pilgrim Watch's Answer Opposing Entergy's Motion for Summary Disposition of Pilgrim Watch Contention 3 (June 29, 2007) (“PW SD Motion Answer”) at 54.

³ 71 Fed. Reg. 15,222 (Mar. 27, 2006). The current operating license for Pilgrim expires on June 8, 2012. *Id.*

⁴ Request for Hearing and Petition to Intervene By Pilgrim Watch (May 25, 2006) (“Pet.”).

The Environmental Report inadequately accounts for off-site health exposure and economic costs in its SAMA analysis of severe accidents. By using probabilistic modeling and incorrectly inputting certain parameters into the modeling software, Entergy has downplayed the consequences of a severe accident at Pilgrim and this has caused it to draw incorrect conclusions about the costs versus benefits of possible mitigation alternatives.

Pet. at 26. Thus, as pled, Contention 3 sought to raise two issues: (1) that probabilistic modeling should not be used (i.e., it was inappropriate to multiply consequences by probabilities, see Pet. at 29-31); and (2) “Entergy may also have minimized consequences by using incorrect input parameters for the computer consequences model.” Id. at 31 (emphasis added).

Explaining the bases of its Contention, PW suggested that Entergy had not used the most recent version of the MACCS2 model⁵ and asserted the need to be aware of limitations in that model. Pet. at 31-34. PW acknowledged, however, that the “MACCS2 is currently the state-of-the-art consequence code,” id. at 31, and that software issues can be avoided by understanding MACCS2 limitations and capabilities (id. at 32). But PW claimed that it could not fully evaluate the correctness of Entergy’s SAMA conclusions because the “complete inputs to the MACCS2 for the license renewal of Pilgrim are not publicly available” and further claimed that “Entergy used incorrect input data to analyze severe accident consequences.” Id. at 34 (emphasis added).

With respect to “meteorological data,” PW stated that because the MACCS2 model incorporates a Gaussian Plume model, the Code becomes less reliable when predicting dispersion patterns over long distances and time periods. Id. at 35. In addition, PW asserted that the Gaussian Plume model does not take into account terrain effects and cannot be used for estimating dispersion less than 100 meters from the source. Id. at 35. PW further alleged that

⁵ While this allegation was not within the scope of Contention 3 as admitted, Entergy re-ran its SAMA analysis using the most recent version of the MACCS2 Code (version 1.13.1, which dispositioned known errors and addressed a number of user interface issues), and utilized the updated analysis in supporting its later motion for summary disposition of Contention 3. Entergy Motion for Summary Disposition of Pilgrim Watch Contention 3 (May 17, 2007), Exhibit 2 to Declaration of Kevin O’Kula at 4.

the meteorological data acquisition sites available limit the ability to model the sea breeze in the vicinity of Pilgrim (id. at 36), advocated measurements from multiple sites in the field (id.), and questioned Entergy's use of only one year of data (id. at 38).

With respect to "economic data," PW alleged that the MAACS2 model considered only costs of mitigative actions and failed to consider "loss of economic activity in Plymouth County" and "economic infrastructure and tourism." Pet. at 43-45. PW also challenged "emergency response data," in particular the evacuation times used in the SAMA analysis. Id. at 39-43.

Entergy opposed admission of PW's claim that accident consequences should not be weighted by probability as a challenge to Commission regulations and precedent. Entergy Answer at 25-29.⁶ Entergy also opposed admission of PW's input data claims because PW failed to address the conservative bounding assumptions and sensitivity analyses described in the Application, and PW had provided no information demonstrating that any alleged deficiency was sufficiently significant to alter the SAMA analysis. Id. at 31-33. In addition, Entergy argued that PW failed to provide any basis for contending that Entergy misunderstood or misapplied MACCS2. Id. at 36-37.

The NRC Staff similarly opposed admission of Contention 3 on multiple grounds.⁷ The NRC Staff argued that PW offered only "mere speculation" and had "not taken issue with any of these specific inputs." NRC Staff Answer at 29-30. Likewise, the Staff noted that PW had failed to establish that any of its alleged deficiencies would have any effect on the SAMA analyses. Id. at 31-33.

⁶ Entergy's Answer to the Request for Hearing and Petition to Intervene by Pilgrim Watch and Notice of Adoption of Contention (June 26, 2006) ("Entergy Answer").

⁷ NRC Staff's Response to Request for Hearing and Petition to Intervene Filed by Pilgrim Watch (June 19, 2006) ("NRC Staff Answer") at 23-33.

On Reply,⁸ PW distanced itself from any challenge to use of the MACCS2 Code, stating:

Entergy appears to have misconstrued the substance of Petitioners' contention completely. In this contention, Petitioners assert that by inputting incorrect and incomplete data into the accident modeling software, the Applicant has underestimated the true consequences of a severe accident at Pilgrim, and this may have caused it to dismiss mitigation alternatives that are cost beneficial. In other words, the analysis was not performed correctly.

PW Reply at 12 (emphasis added). Similarly, PW stated that Contention 3 "focuses mainly on the input parameters used in the accident modeling software," PW Reply at 14, and that

[t]he bulk of our Contention highlights input data that were incorrect, incomplete, or inadequate. Whether any of these defects would have a "material impact on the rest of the analysis" . . . is both beyond the scope of what Petitioners must show at the admissibility stage, and beyond the abilities of Petitioners, who neither have access to the input parameters used by Entergy, nor the software code.

Id. at 16 (emphasis added).⁹ At oral argument, PW reiterated that "[t]he bulk of our contention highlights input data that were incorrect, incomplete or inadequate." Tr. at 371 (Bartlett).

In a unanimous decision, the Board admitted a narrowed version of Contention 3:

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 patters are incorrect, resulting in incorrect conclusions about the costs versus benefits of possible mitigation alternatives, such that further analysis is called for.

LBP-06-23, 64 N.R.C. 257, 341 (2006) (emphasis added). The Board held that PW had "raised questions about certain specific input data to the analysis that are material in three areas. . ." and that PW "has supported its call for further analysis by raising relevant and significant questions about the input data." Id. at 338 (emphasis added). Because of the limited detail in the

⁸ Pilgrim Watch Reply to Entergy Answer to Request for Hearing and Petition to Intervene by Pilgrim Watch (July 3, 2006) ("PW Reply").

⁹ Petitioners explained that their "discussion of the limitations of the MACCS2 software was included because it appears that nuclear plant licensees have allowed their limitations to take on a life of their own . . ." Id. at 20. PW stated, "[e]ven though the software cannot include the impact of terrain effects, long range dispersion, or economic costs . . .," these costs "should be compensated for" by "supplementing the analysis data." Id. at 20-21.

Application regarding the input data, the Board held that PW was not required, at this time, to show that its concerns would materially affect Entergy's SAMA analysis, but only that there was a possibility that they could. Id. at 339. Furthermore, the Board made it clear that Contention 3 was not being admitted as a challenge to probabilistic techniques or models:

[T]o the extent that any part of the contention or basis may be construed as challenging on a generic basis the use of probabilistic techniques that evaluate risk, we find any such portions to be inadmissible. The use of probabilistic risk assessments and modeling is obviously accepted and standard practice in SAMA analysis. In any event, as PW points out in its Reply to Entergy, the focus of the contention, and the part we admit, is on what input data should be utilized in the SAMA analysis with regard to evacuation time, economic realities, and meteorological patterns

Id. at 340 (emphasis added).

On May 17, 2007, Entergy moved for summary disposition,¹⁰ supported by declarations of qualified experts¹¹ and a series of sensitivity studies evaluating the effects of changes in the input parameters challenged by PW.¹² As explained in the Motion, because the baseline benefit of the SAMA closest to becoming cost effective is less than half of the estimated implementation cost, its baseline benefit would have to increase by more than 100% to become potentially cost beneficial. SD Motion at 30-31 & n.28. Thus, no genuine dispute would exist if Entergy could demonstrate that, even when considering the incorrect input alleged by PW, the change in baseline benefit would not exceed 100%.

¹⁰ Entergy Motion for Summary Disposition of Pilgrim Watch Contention 3 (May 17, 2007) ("SD Motion").

¹¹ Entergy's Motion was supported by declarations of Dr. Kevin O'Kula, who addressed the conservatism of the input data used in Entergy's MACCS2 modeling and presented the results of sensitivity analyses; Dr. Thomas L. Sowdon, who supported the emergency response assumptions used in the analyses; and Dr. Frederick J. Mogolesko, CCM, who supported the representativeness of the meteorological data used in the analyses.

¹² MACCS2 models offsite 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. SD Motion at 11. 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. Id. The risk estimates for the postulated release conditions are summed to determine overall PDR and OECR estimates. Id.

To put PW's concerns with the limitations of the MACCS2 Code's Gaussian Plume model in perspective, Entergy's expert, Dr. O'Kula,¹³ presented the results of studies¹⁴ showing that the MACCS2 Gaussian Plume model provides results that are in good agreement with, and generally more conservative than, more sophisticated models that address variable meteorological and terrain effects. O'Kula Decl. ¶ 16.¹⁵ Dr. O'Kula also explained that the Gaussian Plume model hard-wired in MACCS2 is the standard atmospheric plume model used for nuclear safety and environmental evaluations for numerous regulatory applications, and is the underlying radiological dispersion and consequence model underpinning NRC Regulatory Guide 1.194. Id. ¶ 14. He further explained that the MACCS2 Code performs a statistically significant number of plume release simulations with weather conditions randomly chosen from hour-by-hour data on wind speed, stability class, and precipitation rate. Id. ¶ 16.¹⁶ In addition, he explained that the input parameter for surface roughness length (a measure of the amount of mixing of the plume introduced by ground surface features) used in the Pilgrim analysis had been particularly conservative (by about a factor of 10). Id. ¶ 18.

To put PW's concerns with the sea breeze in perspective, Dr. O'Kula explained that the meteorological data gathered at the site and used in Entergy's analysis would reflect the

¹³ Dr. O'Kula has 18-years of extensive experience in using the MACCS and MACCS2 codes, having taught MACCS2 training courses for DOE and having been the lead author of a DOE guidance document on MACCS2, and being a member of the MACCS2 Review Panel providing recommendations on applying MACCS2 to both the Sandia National Laboratory and the NRC's State of the Art Reactor Consequence Analysis Program. O'Kula Decl. ¶ 3. He holds a BS in Applied and Engineering Physics from Cornell, and MS and PhD degrees in Nuclear Engineering from the University of Wisconsin.

¹⁴ Radiological Dispersion and Consequence Analysis Supporting Pilgrim Nuclear Power Station [SAMA] Analysis, Washington Safety Management Solutions LLC, Report No. WSMS-TR-07-0005 Rev. 1 (May 2007) ("WSMS Report") at 13-19, Exh. 2 to O'Kula Declaration.

¹⁵ With respect to PW's claim that the MACCS2 model cannot be used to estimate atmospheric dispersion less than 100 meters from the source, Dr. O'Kula explained that the Pilgrim analysis followed NRC guidance for on-site exposure and economic costs, which were accounted for separately, and so did not use the MACCS2 Code to estimate dispersion within several hundred meters (in the "near field") of the release point. O'Kula Decl. ¶ 21.

¹⁶ Dr. O'Kula explained that in a SAMA analysis, each postulated release is simulated in well over a hundred simulations to achieve meaningful statistical results under different weather conditions. Id. ¶ 15.

occurrence of sea breeze conditions in terms of both wind speed and direction. Id. ¶ 20.

Elaborating in the WSMS Report, Dr. O’Kula explained that using MACCS2 in a probabilistic sampling mode and applying site-specific meteorology ensures that representative weather sequences are accounted for and weighted by their likelihood, including sea breeze effects.

WSMS Report at 20. He also explained that the sea breeze phenomenon is most often localized within 10 miles of the coast and is generally beneficial in dispersing a plume and decreasing dose. O’Kula Decl. ¶ 20. Because sea breeze conditions are “only likely to affect populations that are relatively close to the plant” and “the off-site consequences modeled for MAACS2 . . . are affected most by the population dose especially within the 20-mile to 50-mile region,” sea breeze effects “will have little bearing on the SAMA PDR and OECR results.” WSMS Report at 20. Moreover, because of the dispersive turbulence, even in weather conditions where sea breeze effects might persist 30 to 40 miles from the plant, the populations in these areas would experience substantially less exposure than without the sea breeze effects. Id. at 19.

Although concluding that the Gaussian Plume model in the MACCS2 Code is generally conservative and is applied in a manner to provide statistically meaningful results, and that the Pilgrim analysis had used conservative inputs, Dr. O’Kula nevertheless presented the results of sensitivity analyses showing the minimal effect of varying the weather and terrain from that used in the Pilgrim analysis base case. Sensitivity Case 2 estimated 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. The results indicated a negligible 3% increase in PDR and OECR. Case 3 was run to show the effects of a terrain change which was approximated by releasing the plume at ground level. These results showed a 1% increase in PDR and a 4% increase in OECR. In comparison, the 100% increase in the baseline benefit

required to make any additional SAMA cost beneficial was a factor of 25 greater than the increases seen from any of the sensitivity analyses. O’Kula Decl. ¶¶ 20, 43-45.

To address whether PW’s evacuation-related claims could affect the results of the analysis, Entergy ran additional sensitivity cases to evaluate the consequences of longer delay times and slower evacuation speeds. SD Motion at 18. One of these cases (Sensitivity Case 6) assumed that no evacuation or sheltering was undertaken within the EPZ. Id. The maximum change to the PDR resulting from any of these sensitivity cases was 6%. Id. Such a PDR increase would increase total cost risk by only 2%, far less than the more than 100% increase required to identify any additional potentially cost-effective SAMAs.

Regarding PW’s claims on economic impacts, Entergy demonstrated that 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. SD Motion at 25. In addition, Entergy demonstrated 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. ¶ 41 n.4. Further, Entergy performed Sensitivity Cases 8 and 8b, which specifically accounted for county and metropolitan area gross domestic product and subsumed any loss of tourism, business activity, or wages. SD Motion at 27. The result was no change in PDR and an OECR increase of 2%, which would not result in identifying any additional potentially cost effective SAMAs. Id. at 27.

The NRC Staff supported Entergy’s Motion because Entergy had demonstrated that no genuine dispute on any material issue remained. NRC Staff Answer to SD Motion at 6.¹⁷ The

¹⁷ NRC Staff Response to Entergy’s Motion for Summary Disposition of Pilgrim Watch Contention 3 (June 29, 2007) (“NRC Staff SD Motion Response”);

Staff noted that “the information Pilgrim Watch sought to have considered in Entergy’s SAMA analysis has now been considered [and] Entergy has demonstrated that the additional factors considered do not change the conclusions of the SAMA analysis.” *Id.* The Staff’s Answer was supported by affidavits of experts, including Dr. Nathan Bixler, a Principal Member of the Technical Staff in Sandia National Laboratory’s Analysis and Modeling Department. Dr. Bixler, confirmed that “the calculated plumes with the MACCS2 code are generally more focused and more concentrated than would be the case if the calculations had been performed with more sophisticated models,” resulting in larger economic consequences, and that in his opinion, multi-weather station analysis would not change the conclusions of the SAMA analysis. Jones & Bixler Affidavit ¶ 8.¹⁸

PW opposed summary disposition. Rather than challenging any particular “input data,” PW challenged the use of the MACCS2 model, asserting that “the straight line Gaussian plume model does not apply to Pilgrim’s coastal location so that no matter how many different inputs are entered into the model, it will not give correct results.” *See, e.g.*, PW SD Motion Answer at 5; *see also id.* at 55 (“no matter how many different simulations, ‘jiggering’ of inputs into the model, are performed the output will not reflect what actually will happen at this site. The added simulations were a waste of everybody’s time”). PW also challenged the sensitivity analyses on grounds that “probabilistic modeling can underestimate the true consequences of a severe accident.” *See, e.g.*, PW SD Motion Answer at 7-8.

PW included with its opposition the Declaration of Bruce A. Egan, an environmental consultant,¹⁹ who discussed generally the availability of other models developed for air quality

¹⁸ Affidavit of Joseph A. Jones and Dr. Nathan Bixler Concerning Entergy’s Motion for Summary Disposition of Pilgrim Watch Contention 3 (Jun. 256, 2007) (“Jones & Bixler Affidavit”).

¹⁹ Declaration of Bruce A. Egan, Sc.D., CCM, in Support of Pilgrim Watch’s Response Opposing Entergy’s Motion for Summary Disposition of Pilgrim Watch Contention 3 (June 20, 2007) (“Egan Decl.”).

determinations. Egan Decl. ¶ 7. Without challenging Dr. O’Kula’s and Dr. Bixler’s statements that the Gaussian Plume model is conservative, Egan responded:

The fact that a model may seem to be conservative in particular applications or in limited data comparisons does not mean that the model is better or should be recommended for an application. Models can be conservative but have incorrect simulations from underlying physics. Similarly, sensitivity studies do not add useful information if the primary model is flawed.

Egan Decl. ¶ 13. Egan further asserted that realistic, as opposed to conservative, assessments were needed for emergency planning and developing and implementing evacuation plans:

Dispersion models used for developing evacuation plans or in implementing evacuation plans need to provide realistic projections of expected ambient air concentrations and dosages that the public might be subjected to. While for many regulatory applications of models, especially to support licensing applications, modelers may rely on being conservative in the sense of over predicting expected concentrations, models used for emergency planning or evacuation purposes must be based on good science and provide realistic assessments of where and for how long exposures to the public might take place.

Id. at 14.²⁰ Egan provided no tie, however, to SAMA analyses.

Similarly, PW asserted that the sensitivity analyses on economic costs “were flawed in the same way as the applicants [sic] original SAMA, by placing the inputs in the same flawed models.” PW SD Motion Answer at 45. PW provided a “blog” from David Chanin, one of the developers of the MACCS2 Code, suggesting that the MACCS2 cost model is flawed.²¹

A majority of the Board granted summary disposition of Contention 3. Quoting Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 248 (1986), the Board majority held that “the substantive law will identify which facts are material” and that “[o]nly disputes over facts that might affect the outcome of the suit under the governing law will properly preclude the entry of

²⁰ PW also included with its answer opposing summary disposition a one-paragraph Declaration (with various attachments) of Richard Rothstein, who asserted that “[u]se of . . . improved modeling techniques will allow for more accurate and reliable predictions of potential consequences in a severe accident and to determine the best protective actions for emergency response.” Declaration of Richard Rothstein in Support of Pilgrim Watch’s Response Opposing Entergy’s Motion for Summary Disposition of Pilgrim Watch Contention 3 (June 19, 2007).

summary judgment.” LBP-07-13, 66 N.R.C. 131, 140 (2007) (emphasis added). For Contention 3, the Board majority held that the “determination rests on whether or not there are facts at issue which can affect whether or not a particular SAMA is cost-effective,” which required a “thorough examination of the potential materiality of the support offered by the Parties for their positions.” Id. at 140-41.

The Board majority held that many of PW’s arguments raised in response to the SD Motion were outside the scope of Contention 3, including PW’s claims that probabilistic modeling was insufficient and its generalized attacks on the adequacy of the computer code used to perform the SAMA analyses. Id. at 143-44. The majority explained that as admitted, Contention 3 consisted of “three explicit challenges to ‘input’ to the MACCS2 code,” evacuation times, economic consequences, and meteorological patterns. Id. at 143.

The Board majority then addressed the three specific input data issues identified in the admitted Contention. With respect to evacuation times, the Board found that Pilgrim Watch failed to substantively challenge Sensitivity Case 6, which along with other Entergy analyses, “convincingly demonstrate[d] that the evacuation time assumptions (i.e., the input regarding evacuation time) cannot make any difference in determining whether a SAMA analysis would be cost-effective.” Id. at 144-45. For economic input, the Board majority ruled that “[PW] offers no counterpoints to the results of Entergy’s newly supplied analyses examining larger impact from loss of regional economic activity, including effects on business and tourism, which clearly indicate that the size of the changes in economic impact cannot approach the increment required to make any not-implemented SAMA cost-effective.” Id. at 146.

²¹ Declaration of David I. Chanin in Support of Pilgrim Watch’s Response Opposing Entergy’s Motion for Summary Disposition of Pilgrim Watch Contention 3 (June 5, 2007).

With respect to Chanin's Declaration and supporting materials on economic consequence modeling, the Board majority found them to be a "generalized attack on the MACCS2 computer code, which was rejected *ab initio*." Id. at 148-49. The majority found that "none of the statements attributed to or made by Mr. Chanin indicate any specific error or flaw in MACCS2 or any input or assumptions made by the Applicant in its use in this proceeding, and therefore offer no information regarding the three specific input errors alleged." Id. at 149. Moreover, with respect to the sensitivity analyses performed by Entergy, the majority found

not a single statement by Mr. Chanin addressing any specific result obtained by the Applicant or addressing the Applicant's input or computations in this instance or any other instance in any manner, or indicating, even broadly, that the results obtained by the Applicant are not conservative.

Id. Thus, Chanin "fail[ed] to provide any indication that there is a material fact at issue." Id.

For meteorological data, the Board found that PW's challenges – that it did not matter how many sensitivity cases Entergy performed because it was using the wrong model – amounted to "an attack on probabilistic modeling, as these arguments are supported by affidavits arguing, in effect . . . that deterministic modeling must be used to accurately capture the time-dependent effects of variations in meteorology." Id. at 146. The Board held that these attacks were "previously rejected" when admitting the contention, and otherwise "offer no express challenge to the 'input' to the MACCS2 code relating to meteorology." Id.

The Board majority found that Mr. Egan's Declaration amounted to an impermissible "general attack on the stochastic/statistical (probabilistic) approach taken by users of the MACCS2 code." Id. at 150. In addition, the majority noted that both the NRC Staff and Entergy agree that the Gaussian Plume model results are in good agreement with and generally more conservative than the results obtained by more sophisticated models, (id. at 151, citing Jones & Bixler Affidavit ¶ 8; O'Kula Decl. ¶ 17), and the MACCS2 Code was conservatively applied to

the Pilgrim SAMA analysis to cause it to model overall conservative results (id., citing O’Kula Decl. ¶ 18). The majority observed that Egan “offer[ed] no challenge to Entergy’s assertion that the computations prepared by the Applicant are conservative . . . and he certainly presents no specific information which indicates otherwise.” Id. Thus, the majority concluded that Entergy had provided “uncontroverted testimony indicating that its analyses maximize the effects of radiation carried by the meteorological pattern in each of the hundreds of particular scenarios computed” and that “Applicant’s analyses encompass any particular scenario which might incorporate the time-dependent effects of the ‘sea breeze.’” Id. (emphasis added). The majority further noted that Mr. Egan “simply notes that models can be conservative and still have incorrect simulations of the underlying physics . . . [and] that only deterministic modeling would capture the details (physics),” but did not “challenge the statements by Entergy that the results of its SAMA analyses are conservative.” Id. at 151 n.21.

In short, the majority found that PW had offered no evidence to contradict Entergy’s conclusion that no not-implemented SAMA would become potentially cost-effective. Id. at 146.

ARGUMENT

I. THE BOARD MAJORITY CORRECTLY EXCLUDED CHALLENGES TO THE MACCS2 CODE

The Board majority appropriately excluded challenges to the use of the MACCS2 Code, including its embedded Straight-line Gaussian Plume model and economic model, because these issues were not within the scope of Contention 3 as pled by PW or as admitted by the full Board.

Contention 3 as initially pled challenged neither the use of the Gaussian Plume model nor the use of MACCS2 for determining economic costs. Rather, Contention 3 as pled sought to raise two issues: (1) “using probabilistic modeling” in SAMA analyses, and (2) “incorrectly inputting certain parameters into the modeling software.” Pet. at 26. Contention 3 as pled did

not challenge the modeling software itself. Indeed, PW acknowledged that MACCS2 was the “state-of-the-art” code. Instead, PW claimed that Entergy used incorrect input data to analyze severe accident consequences, and argued that it could not “fully evaluate” whether Entergy’s SAMA analysis was correct because it did not have the complete inputs for that analysis. Pet. at 34. Similarly, in replying to arguments on the admissibility of its proposed Contention, PW explicitly advised both the Board and parties that “[i]n this contention, Petitioners assert that by inputting incorrect and incomplete data into the accident modeling software, [Entergy] has underestimated the true consequences of a severe accident. . . .” PW Reply at 12. PW repeatedly made it abundantly clear that its contention focused on the input data used in the SAMA analysis. PW Reply at 14, 16; Tr. at 371 (Bartlett).

Further, although PW claimed that there were limitations in the software, PW asserted that Entergy could compensate for those limitations through the inputs. PW Reply at 20-21; Tr. at 431 (Bartlett). Nowhere did PW suggest or provide any basis for a claim that the MACCS2 Code, and its embedded Gaussian Plume and economic models, could not be used at all.

In light of PW’s repeated statements that the focus of Contention 3 was on the “input data,” the Board unanimously and reasonably admitted Contention 3 limited to challenging “what input data should be utilized in the SAMA analysis.” LBP-06-23, 64 N.R.C. at 340 (emphasis added). The plain language of the admitted contention is limited solely to “input data” and does not challenge use of the MACCS2 Code, or the Gaussian Plume and economic model embedded in the Code. Indeed, the Board pointed specifically to statements in PW’s Reply that the “focus of the contention and that part [admitted by the Board]” is on the input data. *Id.*

In subsequently opposing Entergy’s SD Motion, PW ignored the scope of the admitted Contention and resorted to challenging the model, rather than challenging any particular input

data. PW argued that the sensitivity studies were a “waste of everybody’s time” because “no matter how many different inputs are entered into the model, it will not give correct results concerning offsite consequences from a severe accident.” See, e.g., PW SD Motion Answer at 5, 54 (emphasis added). This new allegation raised for the first time in PW’s opposition to summary disposition was flatly inconsistent with statements made in its Petition and its Reply that the focus of its contention was on the “input data” used in the SAMA analysis. See, e.g., Pet. at 31; PW Reply at 20-21. It was not until PW responded to the SD Motion, in the face of overwhelming evidence that none of its concerns with regard to input data would result in any additional SAMAs becoming cost effective, that PW sought to raise the new claim, beyond the scope of the admitted contention, that the MACCS2 Code could not be used at all.

The Board majority properly rejected PW’s attempt to raise new issues not within the scope of the admitted Contention. As the Board majority correctly explained, Contention 3 “as admitted and expressly limited at the time of its admission by this Board” was limited to “three explicit challenges to the ‘input’ to the MACCS2 Code.” LBP-07-13, 66 N.R.C. at 143. As the Board held, all other matters raised in the original contention, including any generalized attack on the code used by Entergy to perform the SAMA computations, were considered by the Board at the contention admissibility stage and rejected. Id., citing LBP-06-23, 64 N.R.C. at 338-41.²²

The majority’s ruling is consistent with Commission rules and long-standing precedents prohibiting amendment of contentions, including attempts to provide new bases for an admitted

²² As the Board ruled in admitting the limited version of Contention 3,

[T]o the extent that any part of the contention or basis may be construed as challenging on a generic basis the use of probabilistic techniques that evaluate risk, we find any such portion(s) to be inadmissible. The use of probabilistic risk assessment and modeling is obviously accepted and standard practice in SAMA analyses.

LBP-06-23, 64 N.R.C. at 340. PW’s appeal has not challenged this ruling which limited the scope of its Contention. Further, the Commission defers to a Board’s rulings on admissibility in the absence of clear error or abuse of discretion. Crow Butte Resources, Inc. (License Renewal for the In Situ Leach Facility, Crawford, Nebraska), CLI-09-09, 69 N.R.C. ___, slip op. at 4 (May 18, 2009)

contention, without compliance with 10 C.F.R. §§ 2.309(c), (f)(2). See, e.g., Nuclear Management Company, LLC (Palisades Nuclear Plant) CLI-06-17, 63 N.R.C. 727, 732 (2006) (“[n]ew bases for a contention cannot be introduced . . . any other time after the date the original contentions are due, unless the petitioner meets the late-filing criteria set forth in 10 C.F.R. § 2.309(c), (f)(2)”) Here, PW made no attempt to follow the prescribed procedures for amending its Contention, but impermissibly attempted to recast its Contention without permission in order to avoid summary disposition.

Judge Young’s Dissent does not demonstrate any error in the majority’s ruling and ignores the specific wording of the admitted contention, which is limited to “input data.” Indeed, the Dissent concedes that the plume model is not “‘input’ *per se* in the technical sense.” LBP-07-13, 66 N.R.C. at 161. The Dissent nevertheless claims that a challenge to the plume model was within the scope of Contention 3 because the plume model is “implicitly part of what is ‘put in’ to the MACCS2 Code to produce results about meteorological patterns.” *Id.* This claim cannot stand because the admitted Contention challenged “input data” – not models embedded and hard-wired into MACCS2 Code. The Dissent’s strained reading simply cannot be reconciled with the wording of the Contention that all three judges admitted, or with PW’s own statements explaining the focus of its Contention.²³

²³ In CLI-09-11, in identifying the issues to be briefed, the Commission notes that the licensing board in the Indian Point license renewal proceeding admitted a contention challenging a particular use of the straight-line Gaussian air dispersion model in the applicant’s SAMA analysis. CLI-09-11, slip op. at 7. Entergy respectfully submits that the scope of a markedly different contention admitted in another proceeding is neither relevant to, nor determinative of, the scope of Contention 3 as admitted in the Pilgrim proceeding. In Indian Point, the contention as pled explicitly challenged the air dispersion model. The contention alleged that the “air dispersion model will not accurately predict the geographic dispersion of radionuclides released in a severe accident and Entergy’s SAMA will not present an accurate estimate of the costs of human exposure.” Entergy Nuclear Operations, Inc. (Indian Point Generating Station, Units 2 and 3), LBP-08-13, 68 N.R.C. 43, 110 (2008). In contrast, Contention 3 as pled in the Pilgrim proceeding claimed that Entergy “incorrectly input[] certain parameters into the modeling software.” Pet. at 26.

II. PILGRIM WATCH PRESENTED NO GENUINE MATERIAL DISPUTE

The Board majority correctly granted Entergy's SD Motion because PW's response, including the attached declarations and other materials, failed to show the existence of any genuine issue of material fact. PW provided no evidence showing any lack of conservatism in Entergy's analyses, no evidence disputing the results of the sensitivity analyses (other than the new claim that any analysis based on the MACCS2 Code was a waste of time), and no evidence showing that any concern might result in an additional SAMA becoming cost-beneficial.

The Board majority's ruling was consistent with the standards for summary disposition, defined in 10 C.F.R. § 2.710 (which apply to Subpart L proceedings, 10 C.F.R. § 2.1205(c)), 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." 10 C.F.R. § 2.710(d)(2). "Only disputes over facts that might affect the 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, 477 U.S. at 248.

When a motion for summary disposition is made and supported, an opponent "may not rest upon 'mere allegations or denials,'" but must by affidavit or as otherwise provided in the NRC rules set forth specific facts showing that there is a genuine issue. 10 C.F.R. § 2.710(b); Advanced Medical Systems (One Factory Row, Geneva, Ohio 44041) CLI-93-22, 38 N.R.C. 98,102 (1993). "[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 N.R.C. 145, 154 (1992)) (emphasis added).

Applying these standards (see LBP-07-13, 66 N.R.C. at 139-40), the majority stated that "the inquiry becomes whether or not there is at issue any fact which can materially influence the determination the NRC . . . must make, i.e., in the case of Contention 3 challenging SAMA

analyses, the determination rests on whether or not there are facts at issue which can affect whether or not a particular SAMA is cost-effective.” LBP-07-13, 66 N.R.C. at 140. This inquiry is consistent with the Commission’s admonition that “it would be unreasonable to trigger full adjudicatory proceedings . . . under circumstances in which the Petitioners have done nothing to indicate the approximate relative cost and benefit of the SAMA.” Duke Energy Corp. (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-17, 56 N.R.C. 1, 12 (2002).²⁴

The Board majority found that PW’s opposition to the SD Motion “is unsupported by any information which indicates that the factual matters they point to are in any manner whatsoever material to the Agency’s determinations in this proceeding – which is, in this instance, whether or not any individual SAMA is cost-effective.” LBP-07-13, 66 N.R.C. at 147, 157. The Board majority found that Energy had presented a series of bounding analyses demonstrating that the maximum change from the use of different input data is on the order of 2%, far short of the 100% change required for a SAMA to become potentially cost effective. Id. at 147. The Board majority found that “Pilgrim Watch offers no evidence which contradicts this conclusion.” Id.

This conclusion by the Board majority was based on a careful examination of each of the declarations and other documents that PW provided with its opposition to the SD Motion. See id. at 147-54. With respect to Mr. Chanin’s Affidavit, on which PW relied to support its economic modeling arguments, the Board found:

[N]one of the statements attributed to or made by Mr. Chanin indicate any specific error or flaw in MACCS2 or any input or assumptions made by the Applicant in its use in this proceeding and therefore offer no information regarding the three specific input errors alleged. Finally, we note that Applicant’s

²⁴ While the Board did not hold PW to this standard when it admitted Contention 3 because of the alleged unavailability of the input data (see LPB-06-23, 64 N.R.C. at 329, 335, 338-39), Entergy had provided all input data including the data used in the sensitivity analyses to PW during the mandatory disclosures prior to moving for summary disposition.

motion is based in large part upon additional analyses performed by the Applicant in response to Pilgrim Watch's admitted Contention 3, which Applicant posits address the asserted shortcomings by performing conservative computations which envelope the alleged shortcomings, and there is not a single statement by Mr. Chanin addressing any specific result obtained by the Applicant or addressing the Applicant's input or computations in this instance or any other instance in any manner, or indicating, even broadly, that the results obtained by the Applicant are not conservative. This affidavit, therefore, fails to provide any indication that there is a material fact at issue.

Id. at 149 (emphasis added).

With respect to Mr. Egan's Declaration, on which PW relied to support its meteorological modeling arguments, the Board majority observed:

[B]oth NRC Staff and Entergy agree that the Gaussian plume model results are in good agreement with and generally more conservative than the results obtained by more sophisticated models, *see, e.g.*, Jones-Bixler Affidavit ¶ 8; O'Kula Decl. ¶ 17, and the MACCS2 code was conservatively applied to the Pilgrim SAMA analysis to cause it to produce overall conservative results. *See* O'Kula Decl. ¶ 18. Mr. Egan offers no challenge to Entergy's assertion that the computations prepared by the Applicant are conservative (i.e. they predict worse consequences, and, therefore, higher costs of any particular event), and he certainly presents no specific information which indicates otherwise. Thus, we have before us uncontroverted testimony indicating that the Applicant's analyses maximize the effects of the radiation carried by the meteorological pattern in each of the hundreds of particular scenarios computed. . . . Thus failing to provide any technical support for the proposition that the input at issue are in error or that the results of the cost-benefit analysis prepared by the Applicant are in error, Mr. Egan's affidavit fails to provide any relevant support for the opposition to the subject motion.

Id. at 151-52 (emphasis added). With respect to the material from Mr. Rothstein, the Board majority found that none of his general concerns with meteorological and evacuation monitoring "address[] any specific portion of the Applicant's SAMA modeling or any potential flaws or errors in the SAMA analysis." Id. at 149.²⁵

²⁵ The Board majority also dutifully reviewed the other hodgepodge of documents that PW appended to its opposition and likewise found that none of these challenged Entergy's analyses or demonstrated that any additional SAMA might be cost beneficial. See id. at 147-48, 152-54.

The Board majority's conclusions are clearly supported by the record. As averred by the Staff's experts, the MACCS2 is conservative because "the calculated plumes with the MACCS2 code are generally more focused and more concentrated than would be the case if the calculations had been performed with more sophisticated models" and "economic consequences are generally smaller when plumes are broader and more dilute." Jones & Bixler Affidavit ¶ 8. Similarly, as Dr. O'Kula demonstrated, studies have shown that the MACCS2 Gaussian Plume model provides results that are in good agreement and generally more conservative than more sophisticated models addressing variable meteorological and terrain effects. O'Kula Decl. ¶ 17.

In contrast, rather than challenging the conservatism of Entergy's analyses, Mr. Egan's declaration merely stated, "The fact that a model may seem to be conservative in particular applications or in limited data comparisons does not mean that the model is better or should be recommended for an application." Egan Decl. ¶ 13. Indeed, Mr. Egan's statement that "[d]ispersion models used for developing evacuation plans or in implementing evacuation plans need to provide realistic projections of expected ambient air concentrations and dosages that the public might be subjected to," *id.* ¶ 14 (emphasis added), suggests that his focus was on whether a Gaussian Plume model is appropriate for emergency planning decisions – a topic not even within the scope of a license renewal proceeding.²⁶ Mr. Egan's statement that, "for many [other] regulatory applications of models, especially to support licensing applications, modelers may rely on being conservative in the sense of over predicting expected concentrations" (*id.* ¶ 14) is tantamount to an admission that conservative bounding analysis is appropriately used in

²⁶ Indeed, one can infer from these and other PW statements that its real agenda in this proceeding was to challenge emergency planning – in particular, the installation of continuous recording meteorological instruments along the coast and at additional inland sites. *See* Pet. at 37-38. As Dr. O'Kula responded, while continuous recording instruments would relate to the ability to track a specific plume, such instrumentation would have no bearing for SAMA analyses where the focus is determining mean consequence levels to support cost-benefit decision-making on potential plant modifications. O'Kula Decl. ¶ 21.

licensing applications. None of Mr. Egan's statements challenge the Entergy or NRC Staff expert opinions that the Gaussian plume model provides conservative results.

Similarly, while advocating additional inland data measurement to "allow the implications of the sea breeze to be even better understood," Mr. Egan provided no information that would indicate that such additional data might affect the outcome of Entergy's SAMA analysis. Rather, Mr. Egan faulted Entergy's "appreciation of the importance of sea breeze flows on coastal community population exposures and on the need to obtain and properly use sufficient meteorological data in emergency response planning." Egan Decl. ¶ 13 (emphasis added). Egan did not dispute Dr. O'Kula's statement that the sea breeze phenomenon is most often localized within 10 miles of the coast (O'Kula Decl. ¶ 20) and that because "the off-site consequences modeled for MAACS2 . . . are affected most by the population dose especially within the 20-mile to 50-mile region," sea breeze effects to the close-in population "will have little bearing on the SAMA PDR and OECR results." WSMS Report at 20. While he asserted that at a coastal site, the sea breeze would draw contaminants across the land and inland (Egan Decl. ¶13), he provided no information that its influence would extend to the 20-mile to 50-mile region significant to the PDR and OECR results. Nor did Egan dispute Dr. O'Kula's statement that, even in weather conditions where sea breeze effects might persist 30 to 40 miles from the plant, the populations in these areas would experience substantially less exposure than without the sea breeze effects because of the sea breeze's dispersive turbulence. WSMS Report at 19. Mr. Egan put forward no evidence to indicate that any particular SAMA would become potentially cost beneficial, or otherwise "indicate[d] the approximate relative cost and benefit of the SAMA," McGuire, CLI-02-17, 56 N.R.C. at 12, by further consideration of sea breeze.

Thus, neither Mr. Egan nor any of PW's other declarants in fact disputed the conservatism of Gaussian Plume model, or that Entergy's statistically significant analyses considered all weather conditions at Pilgrim (i.e., "subsume[d] all reasonably possible meteorologic patterns," 66 N.R.C. at 151), but merely asserted that other more sophisticated models might provide more realistic assessments that would be better for emergency planning (Egan Decl. ¶¶ 14-15; Rothstein Decl.). As such, PW's attempt to challenge the Gaussian plume model would have been insufficient to defeat Entergy's summary disposition motion, even if the Board majority had permitted PW to expand its Contention to include a challenge to the model. Similarly, the absence of any challenge by PW's declarants to the conservatism of the Gaussian Plume model renders meaningless PW's repeated claims that Entergy's sensitivity analyses were irrelevant because Entergy had used the wrong model. See, e.g., PW SD Motion Answer at 15-16. Obviously, if Entergy's analyses are conservative, then its conclusion that no additional SAMA will be cost-beneficial are unaffected by claims that other models may provide "more realistic" dispersion estimates.

In short, Petitioners presented no genuine dispute on any issue that could materially affect the outcome of any SAMA analysis, including the examples raised in CLI-09-11 (slip op. at 7). Although Mr. Egan claimed that a variable trajectory plume model would be more realistic and useful in emergency planning, nowhere did he proffer evidence that such a model would change any SAMA analysis, or dispute that the Gaussian Plume model was conservative, or that Entergy performed a statistically significant analyses that subsumed all reasonably possible meteorological patterns. Likewise, though Mr. Chanin's blog questioned the MACCS2 Code economic modeling, nowhere did Mr. Chanin proffer evidence disputing the results, or their

conservatism, of the sensitivity analyses that addressed the deficiencies alleged by PW concerning economic input data.

The Dissent incorrectly suggests that the Board majority's examination of the materiality of the Parties' affidavits constitutes a weighing of evidence not appropriate for summary disposition. LBP-07-13, 66 N.R.C. at 156. Nowhere in its opinion does the Board majority reject any of Pilgrim Watch's declarants as unqualified, or accept Entergy's or the NRC Staff's statements as more credible. Rather, the majority merely scrutinized the statements of PW's declarants to determine whether they indeed indicated the existence of a genuine dispute on a material issue, and found none. The NRC standards in 10 C.F.R. § 2.710 require this scrutiny.

The Dissent also incorrectly suggests that it is enough that PW disputes Entergy's conclusions, "through, inter alia, Dr. Egan's statement . . . about sensitivity studies not adding 'useful information' given the flawed dispersion model that is used." LBP-07-13, 66 N.R.C. at 160. Under the NRC rules and precedents, it is not enough to merely dispute the evidence provided in support of a motion for summary disposition. Rather, the opposing party must show that there is a genuine issue on a material fact. 10 C.F.R. § 2.710(d)(2). Because Mr. Egan does not dispute the conservatism of Entergy's model and analyses, but rather suggests that "more realistic" assessments could be provided by more sophisticated models, his statements do not in fact impugn Entergy's conclusions. If Entergy's modeling is conservative (which Mr. Egan does not dispute) and if the sensitivity analyses show (as they did) that altering the input parameters to account for uncertainties would not come close to affecting the results, then PW's call for "more realistic modeling" simply raises no material issue.

Indeed, the Dissent in effect acknowledges that PW has not demonstrated the existence of a genuine dispute on a material issue, stating:

It is not clear that the information provided by Intervenors . . . would sufficiently overcome Entergy's analyses, including its sensitivity analysis and resulting conclusions to the effect that, even considering the issues involved in Contention 3 from various conservative perspectives, the challenges Intervenors pose are not significant enough to affect the ultimate cost-benefit analysis that is at the core of a SAMA analysis.

LBP-07-13, 66 N.R.C. at 160. The simple fact is that, despite having access to all data that Entergy used in its analyses, PW never made any attempt to quantify its concerns or to show that any of them could cause a 100% increase in baseline benefit needed to make any additional SAMA cost beneficial.

In sum, PW never presented any genuine material dispute that could have affected the ultimate conclusions of Entergy's SAMA analysis.

CONCLUSION

For the reasons set forth above, the Commission should affirm the summary disposition of PW Contention 3.

Respectfully Submitted,



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Dated: June 25, 2009

June 25, 2009

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

Before the Commission

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 "Entergy's Brief in Response to CLI-09-11" 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 25th day of June 2009.

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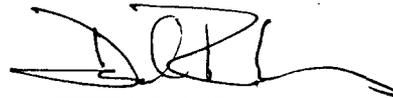
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