

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Ann Marshall Young, Chair
Dr. Paul B. Abramson
Dr. Richard F. Cole

In the Matter of:

ENTERGY NUCLEAR GENERATION
COMPANY AND ENTERGY NUCLEAR
OPERATIONS, INC.
(Pilgrim Nuclear Power Station)

Docket No. 50-293-LR

ASLBP No. 06-848-02-LR

October 26, 2010

ORDER

(Questions from Board Majority Regarding the Mechanics of Computing “Mean Consequences”
in SAMA Analyses)

On September 23, 2010, the Board directed parties to brief the issue of whether Pilgrim Watch timely raised concerns regarding the NRC’s practice of using mean consequence values in SAMA analyses, resulting in an averaging of potential consequences.¹ Specifically, the Board instructed parties to address whether in proffering original Contention 3, Pilgrim Watch, either explicitly or implicitly, raised concerns regarding the use of mean consequence values in SAMA analyses, and if not, whether Pilgrim Watch’s concerns are timely raised.² This briefing was in support of the Board’s response to the mandate of the Commission in CLI-10-22 at footnote 34 that:

We additionally noted in CLI-10-11 that it is NRC practice for SAMA analysis to utilize mean consequence values, which results in an averaging of potential consequences. *See id.* at 38-39. Because Pilgrim Watch apparently questions this practice, *see, e.g.*, Tr. at 637, **it would be appropriate for the Board on remand to consider whether the**

¹ See Licensing Board Order (Confirming Matters Addressed at September 15, 2010, Telephone Conference) (Sept. 23, 2010) at 2 (unpublished).

² Id.

NRC's practice is reasonable for a SAMA analysis, and whether Pilgrim Watch's concerns are timely raised.³

The Board is not, at this time, addressing the merits of the foregoing mandate—rather we seek further technical information to address the threshold question of whether the matter was timely raised and/or presents either an admissible contention on its own, or falls within the scope of Contention 3 as currently admitted.⁴

The Applicant, the NRC Staff, and Pilgrim Watch filed simultaneous briefs and responses on October 1, and October 8.

In briefing the issue, Pilgrim Watch contends that original Contention 3 challenged the NRC's use of mean consequences in "important parameters input into the modeling software, and an examination of this 'NRC practice' could significantly change the cost-benefit conclusions and affect what safety enhancements are cost-effective to implement."⁵ In arguing that position, Pilgrim Watch seems to take the view that the use or computation of "mean consequences" occurs as an input or other parameter within one of the three modules (ATMOS, EARLY or CHRONC) as it computes the various phenomenological models, such as those for meteorology or radioactivity transport and deposition, or those for the location of the population

³ Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc. (Pilgrim Nuclear Power Station), CLI-10-22, 72 NRC __, __ (slip op. at 8 n.34) (Aug. 27, 2010) (emphasis added).

⁴ We do not interpret the Commission's mandate to be instructing the Board to consider the reasonableness under NEPA of utilizing mean consequences in SAMA evaluations if the matter was not timely raised by Pilgrim Watch. Such a result would, in our view, be equivalent to calling for a mandatory hearing or the issuance of an advisory opinion on the topic. We decline to take such action absent a clear mandate from the Commission to do so.

⁵ See Pilgrim Watch Reply to Entergy's and NRC Staff's Briefs Regarding Timeliness of Pilgrim Watch's Raising Averaging Practice Concerns (Oct. 8, 2010) at 3.

at the time of deposition (which depends, in part, upon the evacuation assumptions/input).⁶ In contrast, the NRC Staff argues that mean consequence values are: “(1) an output of the MACCS2 code, not an input into the code, (2) a mathematical technique used to provide a representative value for a set of outputs, (3) a characteristic necessitated by the rigorous statistical modeling used in the SAMA analysis, i.e. the technique is the same regardless of the plant being analyzed.”⁷ Similarly, the Applicant argues that “mean consequence values” refers to “[m]ean consequence population dose and off-site economic costs [which] are outputs of the MACCS2 code analysis, and not ‘input data’ or ‘input parameters’ as repeatedly suggested by Pilgrim Watch.”⁸

This apparent disagreement among the Parties as to the definition of “mean consequence values” in the issue remanded to the Board is exacerbated by the absence of any statement of alleged facts or expert opinion that would normally accompany an Intervenor’s proffered contention. Indeed, to date, there has been no factual basis, expert testimony, or affidavit supporting the varying positions. In the majority’s view, the “mean consequence values” issue now integrally involves a purely technical matter as to which the record is devoid of expert information. Because the Board must make its decisions based on the record of the proceeding, the majority of the Board believes that, in order to rule upon the question of whether or not the referenced matter was timely raised and/or presents either an admissible contention

⁶ See, e.g., Pilgrim Watch’s Brief: Petitioner Timely Raised Issue of NRC’s Practice to Use Mean Consequence Values in SAMA Analyses at 3-5 (Oct. 1, 2010) (suggesting that input parameters and input data encompasses average practice concerns).

⁷ NRC Staff’s Reply to Pilgrim Watch’s Brief (Oct. 8, 2010) at 9.

⁸ Entergy’s Reply Brief on the Untimeliness of Pilgrim Watch Concerns Regarding the Use of Mean Values at 4 (Oct. 8, 2010) (emphasis in original).

on its own or falls within the scope of currently admitted Contention 3, it is necessary to have the Parties' experts submit affidavits explaining⁹, in detail sufficient for understanding of the computer code's process order and mechanics, the following:

Explain at what point in the process of SAMA computations performed using the MACCS2 code the "mean consequences" referred to by the Commission in footnote 34 of CLI-10-22 are done. We are interested in the "flow of the computations," and when in that flow the "mean consequences"¹⁰ are computed, and whether that particular part of the computation is a pure mechanical application of a standard mathematical formula for determining the "mean" of a set of numbers. To be clear, we note that we do not seek information regarding details of unrelated models or input, nor do we seek the experts' views of the Parties' respective pleadings on this matter to date. Further, no Party should address, or have its expert address the merits of the substantive matter set forth by the Commission (whether the NRC's practice is reasonable for a SAMA analysis). In answering this question, each Party's expert or experts should:

- a. Explain (briefly and succinctly) what is computed within each of the three modules;¹¹

⁹ That this is necessary is made clearer by our colleague's Separate Statement, attached hereto, in which it seems to us that there are technical matters upon which our colleague has already reached conclusions without the benefit of this necessary information.

¹⁰ For example, we are interested in whether the consequences are first computed for a variety of scenarios and the mean computed from the various consequences arrived at from those scenario computations, and if not, what is the order of determination of the mean of the consequences.

¹¹ For example, a suitable response would contain detail and information such as the following hypothetical response: "The ATMOS module uses models for the wind direction and velocity, humidity, precipitation, source term of radiation release from the reactor containment, and location of population during the postulated event (which depends upon the initial population distribution and the evacuation model) to compute the radiation dose to the population and to the property in the affected area over the time of the event. The user must select input values (continued. . .)

- b. Explain briefly the process of dealing with the fact that many independent variables (such as source term, meteorological conditions, evacuation) cannot be definitively predicted to be occurring at any given time and must be addressed probabilistically, and how that leads to the computation of many different potential “consequences”;
- c. Describe generally the process for determining the consequences of each particular scenario (i.e., describe generally the selection process used for the values to be used for independent variables, and generally how those determine input or select model usage within a particular code module);
- d. Describe how the results of the separate computations of consequences are used to develop a representative “consequence” which is to be used for comparison to the cost of mitigation mechanisms, where in the foregoing process the computation of “mean consequences” is done or accomplished, and its relationship to the representative consequence used for the foregoing purpose.

In answering the foregoing questions, bear in mind that the Board is attempting to determine if a challenge to use of the “mean consequences” was timely raised and/or presents an admissible contention or part of Contention 3 as admitted—evidence on the merits of the issue of the suitability of that methodology is not sought at this time and should not be included in the answers to the foregoing inquiry.

(. . .continued)

for [list generally what is selected which drives the computation]. The computed doses are passed to the EARLY and CHRONC modules for computation of the “consequences” of those doses to the population and to property. [Add similar explanations regarding EARLY and CHRONC.] Such computations are repeated many [list a typical number of times] times, with each result using different values for the various models and input, and producing a particular resultant consequence to the population and to property.”

The expert affidavits shall be delivered to the Board not later than noon on Friday, November 12, 2010, and shall not exceed ten double-spaced pages. The Parties shall advise us and the other Parties no later than three business days after the issuance of this Order if they are not able to submit the affidavits by November 12, and shall state why they cannot do so, and provide a date by which they can submit the affidavits.

Response to Judge Young's Separate Statement

Before addressing the substance of Judge Young's separate statement, we are compelled to note the unusual nature of her decision to disagree with our election to seek expert affidavits. Our colleague begins her statement by asserting that she "do[es] not take lightly" her course of action, and we agree, she should not.¹² To our knowledge, this is first time that any licensing board member has objected to the efforts of any other member to obtain clarification on matters before the board, whether done in writing by a request for further written filings or in some oral context.¹³ Moreover, a closer examination of our colleague's statement reveals that not only does she object procedurally to the Board's request for further information from the parties so that we are capable of deciding the threshold issue of whether Pilgrim Watch's challenge to the NRC practice of using mean consequence values in SAMA analyses was timely raised, our colleague also seems to set forth her substantive decision on the timeliness

¹² Separate Statement of Administrative Judge Ann Marshal Young at 1 (hereinafter Separate Statement).

¹³ This certainly seems to be the first instance of such an objection since the Commission revised its regulations to vest the primary responsibility of questioning witnesses upon licensing board members, instead of party counsel. See e.g., 10 C.F.R. § 2.1207(b)(6).

issue itself.¹⁴ We believe that the issues she raises in this latter context, which relate only to the merits of the timeliness issue, reveal information regarding our colleague's perspective which is inappropriate for publication at this stage of the proceeding.

In our view, there are two ways that we can proceed to reach a decision on the timeliness of the mean consequence values issue, both of which require us to obtain further information to adequately address the dispute raised in the parties' briefs regarding the definition of "mean consequence values" as remanded by the Commission. Either we obtain the information in writing now and resolve the issue based on the pleadings, or we hold some sort of oral argument on this narrow issue. Our colleague suggests an alternative course of action, asserting that it would be more efficient to simply conduct a full merits hearing on whether the NRC's use of mean consequence values in SAMA analysis is reasonable, without first deciding whether the issue was timely raised. She states that, "it would, in my view, make more sense to allow the parties, on at least a provisional basis, to present evidence on all matters relating to averaging and mean consequence values (including their responses to the Board majority's questions) as part of their prefiled written testimony."¹⁵ However, without a compelling efficiency argument, which she has not provided, we cannot support her approach because it is inconsistent with the Commission's regulations requiring that issues be timely raised in order to

¹⁴ Separate Statement at 1. Furthermore, she seems to have decided this issue when she states, "I find the [majority's] approach to be . . . in any event unnecessary, given that the matter was, quite arguably, presented on a timely basis." Id.

¹⁵ Separate Statement at 1.

be entertained by the Board¹⁶ and disregards the Commission's mandate that we decide "whether Pilgrim Watch's concerns are timely raised."¹⁷

Nonetheless, had she limited her objections to the matter of efficiency, we would not find any impropriety in the Separate Statement. But the Separate Statement raises matters well beyond simply disagreeing with the majority as to whether the Board should proceed as we have elected in asking the parties our technical questions. Instead, she raises other matters which lay out (no matter how our colleague attempts to qualify the Statement's content) her view of particular aspects of the merits of any eventual decision on this threshold timeliness issue.¹⁸

While the focus of the Separate Statement appears at first blush to rest upon the premise that it would be more efficient from a litigation perspective to go directly to a merits hearing on the underlying mean consequence value issue on a provisional basis, reserving the timeliness determination until after we have received all prefiled testimony, careful review of the Statement makes clear that it raises matters which go straight to the merits of the timeliness issue. We believe that the Statement reveals our colleagues view's on the merits of the timeliness issue before deliberations on that decision are complete, and are manifestly inappropriate at this juncture. Three such matters that draw our attention are:

1. The Separate Statement makes, and addresses rather fully, the assumption that the Commission intended that we consider both the use of the mean of the consequences determined by the hundreds of separate computations of various scenarios, and the use

¹⁶ See 10 C.F.R. § 2.309(c), 2.309(f)(2).

¹⁷ See Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc. (Pilgrim Nuclear Power Station), CLI-10-22, 72 NRC at ___ (slip op. at 8 n.34).

¹⁸ Furthermore, in setting out her views opposing our approach to proceeding as we have elected, she, once again, has impropriously provided a "roadmap" for litigation opposing our approach.

of averaging a variety of computed values of variables used in the actual process of computing the consequences of any particular scenario; and

2. The Separate Statement addresses fully the question of whether, when Pilgrim Watch disputed certain material facts asserted by Entergy to be not at issue in its motion for summary disposition of original Contention 3, which resulted in our (majority) ruling and the present remand, it timely raised the issue of the reasonableness of the NRC use of a mean of the consequences of the various scenarios by stating, among other things, that, regarding Entergy's Statement 2, instead of using the mean of total costs avoided, Entergy "should make a comparison to the *sum* of the total costs avoided, not the mean";¹⁹
3. The Separate Statement explains rather fully our colleague's perspective on the technical dispute of whether the meaning of the term "parameter" in the context of SAMA analyses includes the computation of "averaging" and/or of a mean of the consequences.

The Question of Efficiency of Our Approach

Our colleague's claim that it would be more efficient to proceed to a full merits hearing on the mean consequence value issue without first determining whether the issue was timely raised is flawed. We believe the inquiry of whether or not the use of a mean of the consequences in making its cost-benefit analysis is appropriate under NEPA to be entirely different from the question of whether or not Pilgrim Watch timely raised a concern regarding the NRC's practice of using, when performing its cost-benefit analysis of mitigative mechanisms,

¹⁹ Separate Statement at 4 (quoting Pilgrim Watch's Answer Opposing Entergy's Motion for Summary Disposition of Pilgrim Watch Contention 3 at 6).

the mean of the consequences computed from the hundreds of different scenarios analyzed in a SAMA analysis.²⁰ We believe our colleague grossly underestimates, and thereby minimizes the potential litigation necessary to properly address the underlying question of reasonableness of the technique under NEPA.

In our view, which is informed by both a technical and legal understanding of the matters at hand, full briefing of that underlying issue requires a far reaching inquiry, encompassing, among other things, what is acceptable practice under NEPA in this context, what sort of conservatisms are required or acceptable, the implications of whether the event being considered is remote and speculative, the particular methods used by the NRC to determine which “representative” consequence should be used for its cost-benefit analysis regarding mitigative activities and devices, and the interplay between the NRC’s NEPA obligations and the NRC’s other mechanisms for dealing with severe accidents.²¹ Plainly, such an inquiry requires an in-depth legal analysis of what is reasonable under NEPA in evaluating alternatives and application of those principles to this particular context. It also requires an in-depth technical analysis of the specific methodologies used by the NRC in making its determination of what “consequences” of severe accidents should be used in making cost-benefit comparisons to mitigative mechanisms. Such an inquiry seems to us to be a far cry from the ten-page affidavit we direct the parties to submit in answering our questions, which, we believe, will provide us

²⁰ Moreover, because of the parties’ briefing on the timeliness issue, the matter now involves the corollary inquiry - what precisely did Pilgrim Watch raise when it asserted for the first time, at the summary disposition stage, that the NRC should use the “sum” of the total costs avoided, not the mean, which is wholly unrelated to the NEPA reasonableness inquiry.

²¹ Our colleague grossly oversimplifies what is involved here when she disagrees with our approach because “in considering any NEPA requirements a ‘practical rule of reason’ governs.” Separate Statement at 2 n.3.

with the information necessary to make the “threshold” timeliness determination and resolve the associated dispute between the parties concerning the definition of “mean consequence values” in the Commission’s remand.

We believe that our colleague’s approach would lead, inexorably, to the preparation of exhaustive legal briefs and extensive expert affidavits on topics which we may never need to address, if we were to determine, after receiving the full merits briefing she proposes as an efficiency, that the issue was not timely raised. Further, our inquiry is but a small portion of the technical inquiry which would be required if the Board asked for full merits briefing on the mean consequence issue. Thus, it is far more efficient to first obtain answers to our questions. We believe that the information provided by the expert affidavits will enable the entire Board to make an informed decision on this narrow threshold timeliness issue. In this regard, we have invited our colleague to pose questions of her own, but she has declined to do so, believing, as she has so clearly pointed out, that this is an inefficient approach.

Three Other Matters

Turning now, with serious reservations, and avoiding prejudging the threshold timeliness decision until the requested technical information has been received and digested, we address briefly, the three other principle matters our colleague has raised.

Our colleague states:

I do note the lack of clarity that leads the Board majority to pose their questions. For example, the terms “averaging” and “mean consequence values” as used by the Commission are concepts – or a collective concept – that may well have more than one possible interpretation and usage and/or be used at more than one stage of the SAMA analysis and modeling in the MACCS2 code.²²

²² Separate Statement at 3.

But, as discuss above, the Parties have argued this matter, and we have asked for expert testimony which we believe necessary to comprehend the computational process and how it might involve those concepts. The Board will address those arguments as illuminated by the expert testimony in its decision on the merits of the threshold timeliness issue. But we are concerned that our colleague seems to have determined, without benefit of that expert advice, that these concepts are indeed separate and somehow intertwined in the present inquiry, for example when she discusses what she found by scanning the MACCS2 Users' Guide and characterizes Entergy's statements to support the view.²³

The second merits concept raised by our colleague is that we should pay heed to Pilgrim Watch's statement in opposing summary disposition that Entergy "should make a comparison to the *sum* of the total costs avoided, not the mean."²⁴ But again, this is a matter of what specifically was raised by Pilgrim Watch, and therefore goes directly and singularly to the merits of the threshold timeliness decision.

Finally, our colleague sets forth her opinion that the definition of the term "parameter" can be read to encompass some form of averaging which the Commission intended be examined by the Board. Here it seems plain that our colleague has formed her personal views on this matter before we have had the opportunity to receive and review the requested expert testimony which we have requested. The Separate Statement asserts:

I do not find Entergy's and Staff's arguments regarding the meaning of "parameter" and the distinctions between inputs and outputs altogether persuasive. Although it is clear that Pilgrim Watch's arguments in this regard are not as precise as they might be, I do

²³ Separate Statement at 3.

²⁴ Separate Statement at 4. We note, however, that our colleague acknowledges by quoting Entergy, that the consequences are computed as the sum of the two principle forms of consequence, that to person and that to property. Id.

take into account its *pro se* status at this point. And it would seem, from a “plain language” perspective, that, in order to obtain outputs consisting of “mean consequence values,” there would need to be some defining aspects of the modeling that lead to the production of such outputs, and that the use of the term “parameter” by an unrepresented party to describe such defining aspects is not an unreasonable use of the term under the circumstances. Nor would such usage – again, from a “plain language” perspective – appear to be altogether inconsistent with the concept expressed in one of the definitions of the term found in Webster’s Third New International Dictionary (1976), namely, “an independent variable through functions of which other functions may be expressed.”²⁵

But we are not so persuaded as our colleague that Pilgrim Watch’s *pro se* status and the “plain language” interpretation of the term “parameter” vitiates the Board’s need to obtain expert affidavits on this issue. No member of this Board is able to simply address this technical matter based only on the parties’ legal pleadings, of which Pilgrim Watch’s should somehow be afforded greater leeway because of its *pro se* status. This issue of the meaning of “parameter” involves a very specific contextual and technical definition, and because the record is devoid of expert testimony on this issue, we have asked the parties to provide expert testimony on the topic. We fail to comprehend why or how our colleague feels able to reach, or apparently reached, a conclusion on this meaning of the term parameter when: (1) the Board cannot base

²⁵ Separate Statement at 4-5 at n.14 (internal citations omitted).

such a decision on the present record of this proceeding; (2) it is plain that each Party has an expert capable of providing a definitive explanation; and (3) the questions posed are designed to help us to determine the definition of “parameter” in this context.

FOR THE ATOMIC SAFETY
AND LICENSING BOARD²⁶

/RA/

Dr. Paul B. Abramson
ADMINISTRATIVE JUDGE

/RA/

Dr. Richard F. Cole
ADMINISTRATIVE JUDGE

Rockville, Maryland
October 26, 2010²⁷

²⁶ Judge Young does not subscribe to the above Board questions and has issued a Separate Statement (attached hereto) regarding this Inquiry.

²⁷ Copies of this Order were provided to all parties and/or representatives for parties by e-mail transmission on this date.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing ORDER (QUESTIONS FROM BOARD MAJORITY REGARDING THE MECHANICS OF COMPUTING "MEAN CONSEQUENCES" IN SAMA ANALYSES) AND SEPARATE STATEMENT OF ADMINISTRATIVE JUDGE ANN MARSHALL YOUNG have been served upon the following persons by U.S. mail, first class, or through NRC internal mail.

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Docket No. 50-293-LR
ORDER (QUESTIONS FROM BOARD MAJORITY REGARDING THE MECHANICS OF
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STATEMENT OF ADMINISTRATIVE JUDGE ANN MARSHALL YOUNG

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Office of the Secretary of the Commission

Dated at Rockville, Maryland
this 26th day of October 2010