UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
ENTERGY NUCLEAR OPERATIONS, INC.	)	Docket Nos. 50-247-LR/ 50-286-LR
	)	
(Indian Point Nuclear Generating Units 2 and 3)	)	

NRC STAFF'S REPLY TO STATE OF NEW YORK'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW FOR CONTENTION NYS-12/12A/12B/12C ("NYS-12C")

Brian G. Harris
Counsel for NRC Staff

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I. INTRODUCTION[1]

5.79 In accordance with the Atomic Safety and Licensing Board's ("Board") scheduling orders,[2] proposed findings of fact and conclusions of law concerning Contention NYS-12C (SAMA Analysis Decontamination and Cleanup Costs) ("NYS-12C") were timely filed by Entergy Nuclear Operations, Inc. ("Entergy" or "Applicant"), the State of New York ("New York"), and the Staff of the NRC ("Staff"). Pursuant to the Board's orders, the Staff herewith files its reply to New York's proposed findings of fact and conclusions of law concerning NYS-12C.

II. Applicable Legal Standards

A. New York's Waived Any Challenge to the Staff's Witnesses and Entergy's Witnesses Expertise

5.80 New York argues for the first time in its proposed findings of fact and conclusions of law that the experts presented by the Staff and Entergy in opposition to NYS-12C are not qualified to testify on issues related to the MACCS2 code used in Entergy's SAMA analysis.

[1] The paragraph numbering system in these reply findings generally follows the numbering utilized in the "NRC Staff's Reply To New York's Proposed Findings Of Fact And Conclusions Of Law On Part 5: Contention NYS-12C (SAMA Analysis Decontamination and Cleanup Costs)," dated March 22, 2013.

[2] *See* (1) Scheduling Order (July 1, 2010), at 19; and (2) Order (Scheduling Post-Hearing Matters and Ruling on Motions to File Additional Exhibits) (Jan. 15, 2013) at 1.

State of New York's Proposed Findings of Fact and Conclusions of Law for Contention NYS-12/12A/12B/12C ("New York's Proposed Findings on NYS-12C") at 34-38.

5.81 New York waived any challenge to the expertise of the Staff's witnesses or Entergy's witnesses by waiting until after the hearing before attempting to raise the issue with the Board. *Macsenti v. Becker*, 237 F.3d 1223, 1231 (10th Cir. 2001); *Marbled Murrelet v. Babbit*, 83 F.3d 1060, 1066 (9th Cir. 1996); *see also Maritime Overseas Corp. v. Ellis*, 971 S.W.2d 402, 410 (Tex. 1998); *Garcia v. Health and Human Services*, No. 05-0720V, 2010 WL 2507793 (Fed.Cl. May 19, 201). In order "to prevent trial or appeal by ambush, … the complaining party must object to the reliability of scientific evidence before trial or when the evidence is offered." *Maritime Overseas Corp. v. Ellis*, 971 S.W.2d 402, 410 (Tex. 1998). Courts have consistently held that objections to expert reliability are waived when no objections were made at trial but held until "after the close of all evidence." *Macsenti v. Becker*, 237 F.3d 1223, 1231 (10th Cir. 2001).

5.82 The Atomic Safety and Licensing Appeal Board, similar to both federal and state courts throughout the country, has summarily rejected challenges to expert witness qualifications after the close of the hearing. "If a meritorious challenge to the qualifications of a witness is permitted to be withheld until after the taking of evidence is concluded, then one of two undesirable results would follow: either (1) the party sponsoring the witness would be deprived of its opportunity to present a different expert; or (2) the hearing or trial would have to be reopened to afford the sponsoring party that opportunity. Neither result would be tolerable. In the absence of a justification for the delay in bringing the challenge, [the] challenge must be rejected as untimely." *Vermont Yankee Nuclear Power Corp.*, (Vermont Yankee Nuclear Power Station), ALAB-179, 7 AEC 159, 179 (1974); *see also Houston Lighting & Power Comp.* (Allens Creek Nuclear Generating Station, Unit No. 1), ALAB-629, 13 NRC 75, 81 n. 8 (1981) (summarily rejecting a challenge to a witnesses qualifications after the close of the hearing).

5.83 Here, New York waited to raise any objection to the Staff's witnesses' and Entergy's witnesses. When motions *in limine* were due to be filed, New York waited in silence. During the Board's questioning of the witnesses New York could have objected to the testimony and the witnesses' qualifications, it again remained silent. During the unusual opportunity to conduct cross-examination, New York could have chosen to examine the witnesses' qualifications further, and objected to their expertise. Again, New York remained silent, but here on cross-examination unlike its passive silence during its previous opportunities to object the witnesses' qualifications, New York actively avoided the witnesses qualifications choosing instead to elicit testimony from Entergy's and Staff's witnesses on precisely the issues that it now complains was outside their expertise. Even when New York concluded its cross-examination, it did not object to any of the witnesses' qualifications. It is precisely these types of inequitable trial tactics that caused the courts and Atomic Safety and Licensing Appeal Board to craft the concept of waiver when a party remains silent as to any objections to witness qualification.

5.84 New York proffered no excuse for its delay in raising this issue. In light the ample opportunities that New York had to raise the issue of witness qualification, it is difficult to understand its objection at this late juncture. New York's actions deprived the Board and the parties from having any opportunity to examine these claims or cure any unarticulated concerns New York's counsel may have had with respect to each witness' expertise. Raising these objections now only causes in intolerable results identified by the Atomic Safety and Licensing Appeal Board of having to conduct additional hearings on this issue and take additional testimony to detriment of the limited resources of the Board and other parties to the proceeding.

5.85 Under these long-standing principles of evidence and waiver, New York's failure to challenge the expertise of the witnesses when their testimony was proffered by filing motions *in limine*, failure to raise timely objections to the witnesses' testimony during the hearing, and the lack of any questions regarding witnesses qualifications during its cross-examination waived

any challenge New York may have had. *Macsenti v. Becker*, 237 F.3d 1223, 1231 (10th Cir. 2001); *Marbled Murrelet v. Babbit*, 83 F.3d 1060, 1066 (9th Cir. 1996).

5.86 New York's argument, in addition to taking issue with Mr. Jones qualifications, one of the Staff's witnesses, makes a number of *ad hominem* attacks. New York argues that the record does not show "Mr. Jones has experience running the MACCS2 code, developing MACCS2 inputs, or reviewing SAMA analyses." NYS Proposed Findings on NYS-12C at 37. New York never raised the issue with parties or the Board until after the hearing. New York did not explore Mr. Jones qualifications with respect to these issues during its unusual opportunity for cross-examination. New York did not object to Mr. Jones testimony during the hearing on precisely these issues. Had New York raised these issues in a timely manner through appropriately filed motions *in limine*, objections during the hearing, or motion after exploring the issue on cross-examination, the issue could have been easily cured as Mr. Jones has substantial experience running the MACCS2 code, developing inputs, and reviewing analyses. Like New York's other challenges to the Staff's witnesses, New York waived this argument by waiting to raise it until after the close of the hearing.

5.87 New York attacks Mr. Jones because he deferred to Dr. Bixler when responding to particular questions. New York suggests that this somehow demonstrates a lack of knowledge and expertise with the MACCS2 code. NYS Proposed Findings on NYS-12C at 37. New York emphasizes that Mr. Jones is not qualified because Dr. Bixler, in New York's words had to "correct inaccurate or incomplete testimony." NYS Proposed Findings on NYS-12C at 37. Utilizing New York's own argument that a witness is not qualified to testify regarding the MACCS2 code, if he/she provides incorrect testimony, Dr. Lemay would not be qualified to testify as an expert on the MACCS2 code because he incorrectly believed that the code did not conserve mass and based his calculations on this fundamental mistake. (Transcript at 2251-52, 2131-35, 2143-45, 2148-49, 2176-77.) A mistake, Mr. Jones and Dr. Bixler had to correct. (Transcript at 2116, 2143.) Unlike Dr. Lemay's clear error, New York acknowledges that Mr.

Jones testimony may have only been incomplete. Mr. Jones testimony on that is clear. He stated at the beginning of his answer about decontamination factors that the issue needed additional discussion later. Mr. Jones said, "There's one other point of clarification with regard to how the decontamination factor is calculated from MACCS, and this will be important as the discussion goes on." (Transcript at 1990.) As the discussion progressed, Dr. Bixler added additional information distinguishing Mr. Jones' discussion of the groundshine calculations with protection factors used elsewhere in the MACCS2 code. (Transcript at 1993.) Dr. Bixler's answer in no way indicates that there was anything incorrect with Mr. Jones answer. (*See id.*)

B. New York's Request the That the Board Consolidate NYS-12C and NYS-16B Deprives the Parties of a Fair and Equitable Hearing

5.88 In its proposed findings, New York has attempted to interject new bases into scope of contention NYS-12C and Contention NYS-16B (SAMA Analysis Population Estimate) ("NYS-16B"), by asking the Board to consolidate these contentions into a single issue. New York's Proposed Findings on NYS-12C at 107-108. New York should have and could have raised this issue during one of its many amendments to NYS-12C and NYS-16B.[3] Consolidating the contentions at this late date deprives the Board from having the opportunity to have these issues fairly presented during the hearing by the parties. Consolidation at this late date would deprive Entergy and the Staff of an equitable hearing because the Board would decide the contentions on issues that were not briefed by the parties as related issues. New York's delay deprived Entergy and the Staff of any reasonable notice of their claims.

[3] New York amended NYS-12C four separate times and amended NYS-16B three separate times. *See* New York State Notice of Intention to Participate and Petition to Intervene, at 163 (Nov. 30, 2007); "State of New York Contentions Concerning NRC Staff's Draft Supplemental Environmental Impact Statement" at 9 (Feb. 27, 2009); State of New York Contentions Concerning NRC Staff's Draft Supplemental Environmental Impact Statement (Feb. 27, 2009), available at ADAMS Accession No. ML090690303. *See also* State of New York's New and Amended Contentions Concerning the December 2009 Reanalysis of Severe Accident Mitigation Alternatives (Mar. 11, 2010), available at ADAMS Accession No. ML100780366; State of New York New Contention 12-C Concerning NRC Staff's December 2010 Final Environmental Impact Statement and the Underestimation of Decontamination and Clean Up Costs Associated with a Severe Reactor Accident in the New York Metropolitan Area at 3-15 (Feb. 3, 2011), available at ADAMS Accession No. ML110680212.

5.89 New York's belated attempt to consolidate NYS-12CB with NYS-16B through its filing of proposed findings comes too late, and fails to follow Commission requirements for the supplementation or amendment of contentions. Accordingly, New York's attempt to inject these issues into the proceeding by way of its proposed findings must be rejected as impermissible. As the Commission recently stated:

> We have long required contention claims to be set forth "with particularity," stressing that it "should not be necessary to speculate about what a pleading is supposed to mean." Our proceedings would prove unmanageable--and unfair to the other parties--if an intervenor could freely change an admitted contention "at will as litigation progresses," "stretching the scope of admitted contentions beyond their reasonably inferred bounds." "Petitioners must raise and reasonably specify at the outset their objections to a license application."
>
> Our rules allow for amendment of contentions and the submission of new contentions when good cause is shown. But [the Intervenor] here does not suggest that new information was introduced that it could not have known about earlier, and it never has sought to amend its contention. It instead insists that Contention 3 as proffered was intended, all along, to include this challenge . . . . We are not persuaded . . . .

Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc. (Pilgrim Nuclear Power Station), CLI-12-01, 75 NRC 39, 55-56 (2012) (footnotes omitted). *Accord, Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), CLI-10-05, 71 NRC 90, 100-05 (2010); *Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-28, 56 NRC 373, 380-81, 386 (2002). Indeed, this Board has previously acknowledged that intervenors must amend their contentions to raise new issues that are beyond the scope of a contention as admitted, citing the Commission's admonition "against allowing 'distinctly new complaints to be added at will as litigation progresses, [and thereby] stretching the scope of admitted contentions beyond their reasonably inferred bounds."[4] Thus,

[4] "Order (Granting in Part and Denying in Part Applicant's Motions in Limine)" (Mar. 6, 2012), slip op. at 3-4, *citing, inter alia, Entergy Nuclear Generation Co. and Entergy Nuclear Operations, Inc*. (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC 287, 309 (2010) (emphasis added by the Board). In its Order, the Board found that certain issues raised in the intervenors' testimony were within the scope of

adding NYS-16B bases to NYS-12C at this late date raises issue outside the admitted scope of this proceeding.

5.90 New York asserts that these issues should be decided together because the Staff chose to provide consolidated testimony on NYS-12C and NYS-16B. The Staff consolidated the testimony because each contention attempted to raise a challenge to the SAMA analysis. As such, the Staff felt that instead of repeating a substantial portion of the testimony laying out fundamental information about SAMA analyses, the MACCS2 code, the different levels of PRA analysis, the types of inputs needed, the sensitivity analysis, and the uncertainty analysis it would be more efficient for the Board to read the background of SAMA analyses once. For example, New York has repeatedly asserted that it is not challenging the MACCS2 code. In order to understand how the inputs into the MACCS2 code that New York is challenging, it was important to describe the modules of the MACCS2 code, how they interact, and the function of each module.

5.91 The Staff never treated or discussed NYS-12C and NYS-16B as consolidated contentions and clearly indicated the testimony that was specific to each contention. (*See* NRC Staff Testimony Of Nathan E. Bixler, S. Tina Ghosh, Joseph A. Jones, And Donald G. Harrison Concerning NYS' Contentions NYS 12/16 ("NRC Staff's Testimony on NYS-12C") at 32 and 94.) Entergy never treated or discussed NYS-12C and NYS-16B as consolidated contentions. Only in the proposed findings, did New York treat the two contentions as needing to be consolidated. New York's Proposed Findings on NYS-12C at 107-108.

5.92 New York's late arguments for consolidating NYS-12C and NYS-16B appears to recognize that in light of the Commission precedent, it has not met its burden of going forward. The Commission stated:

> Ultimately, we hold adjudicatory proceedings on issues that are material to licensing decisions. With respect to a SAMA analysis in

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the contentions as admitted, while one issue (leaks from sources other than the spent fuel pools) was not. *See, e.g., id.*, slip op. at 28-31.

> particular, unless a contention, submitted with adequate factual, documentary, or expert support, raises a potentially significant deficiency in the SAMA analysis—that is, a deficiency that could credibly render the SAMA analysis altogether unreasonable under NEPA standards—a SAMA-related dispute will not be material to the licensing decision, and is not appropriate for litigation in an NRC proceeding.[5]

5.93 The Commission warned that "in a highly predictive analysis such as a SAMA analysis, there are bound to be significant uncertainties, and therefore an uncertainty analysis is performed."[6] The Commission, anticipating the wide ranging disputes over individual aspects of the SAMA analysis, has said:

> It always will be possible to conceive of yet another input or methodology that could have been used in the SAMA computer modeling, and many different inputs and approaches may all be reasonable choices. … The SAMA analysis is not a safety review performed under the Atomic Energy Act. The mitigation measures examined are supplemental to those we already require under our safety regulations for reasonable assurance of safe operation.[7]

5.94 In other words, it is simply not enough to take issue with a particular aspect of the SAMA analysis, an intervenor challenging the SAMA analysis must show that it was unreasonable on the whole.[8] The Commission recently "stressed that the 'proper question is not whether there are plausible alternative choices for use in the analysis, but whether the analysis that was done is reasonable under NEPA.'"[9] A petitioner may not simply assert a deficiency. Rather to challenge an applicant's SAMA analysis "a petitioner must point with support to an asserted deficiency that renders the SAMA analysis unreasonable under NEPA."[10]

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[5] *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-12-01, 75 NRC 39, 57 (2012) (emphasis added).

[6] *Id.* at 58.

[7] *Id.* at 57.

[8] *Id.* at 57-58.

[9] *FirstEnergy Nuclear Operating Co.* (Davis-Besse Nuclear Power Station, Unit1), CLI-12-08, 75 NRC 393, 418 (2012) (reversing the admission of contention challenging the costs to clean-up a severe accident) (internal citations omitted).

[10] *Id.*

Specifically, "[a] contention proposing alternative inputs or methodologies must present some factual or expert basis for why the proposed changes in the analysis are warranted…."[11] Even more, intervenors must show "why the inputs or methodology used is unreasonable, and the proposed changes or methodology would be more appropriate."[12]

5.95 In NYS-12C, New York's testimony and evidence challenge the "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" ("GEIS")[13] conclusions that the probablility weighted consequences of severe accidents are small for all plants. 10 C.F.R. Part 51, Table B-1. Dr. Lemay's testimony and report purport to not be a SAMA analysis. Dr. Lemay's testimony and report conclude not that the SAMA analysis is incorrect, but that the costs of a severe accident have been underestimated. (Pre-Filed Written Testimony Of Dr. François J. Lemay Regarding Consolidated NYS-12-C (NYS-12/12-A/12-B/12-C) ("New York's Pre-filed Testimony on NYS-12C"), Ex. NYS000241, at 8.; Pre-Filed Written Rebuttal Testimony Of Dr. François J. Lemay Regarding Consolidated Contention NYS-12C (NYS-12/12A/12B/12C)("New York's Rebuttal Testimony on NYS-12C"), Ex. NYS000420, at 3; Review Of Indian Point Severe Accident Off Site Consequence Analysis, ISR Report 13014-01-01 ("ISR Report"), Ex. NYS000242, at 32.) The only testimony New York elicited on the impact of increasing the costs of severe accidents was that it would depend on the mitigation selected and the accident scenario, among other things, but no conclusion could be drawn from an increased cost of accident that was equally applicable to both the unmitigated accident and the mitigated accident. (Transcript at 2332-2333; 2525-2528.) Concluding that the cost-beneficial analysis would change or that some mitigation measures might become more cost-beneficial based only on the assertion that the costs of a severe accident was underestimated is mere

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[11] *Id.*

[12] *Id.*

[13] NUREG-1437 (May 1996), Exhibit ("Ex.") NYS000131A-I.

speculation. (*Id.*) Thus, New York's arguments and evidence failed to establish a prima facia case that the SAMA analysis was unreasonable.

C. New York's Argument that the Hearing and The Board's Decision Do Not Supplement the Staff's FSEIS is Contrary to Long Standing Precedent

5.96 New York contends that a deficient FSEIS cannot be cured by submissions during the adjudicatory hearing and that the appropriate remedy for a deficient Environmental Impact Statement is for the Board to remand the matter to the NRC Staff to re-analyze site-specific environmental impacts and prepare a supplemental EIS.[14] Entergy on the other hands asserts that after the Board considers the entire record of this proceeding, the FSEIS will be "deemed supplemented" by the Board's decisions on NEPA contentions and by any subsequent Commission decision.[15] For the reasons stated below, we find that the FSEIS will be "deemed supplemented" by this adjudicatory decision and by any subsequent Commission decision in this proceeding.

5.97 New York contends that the Commission's deliberate elimination of an earlier regulation, 10 C.F.R. § 51.52(b)(3),[16] permitting licensing boards to "modify the content" of an EIS precludes *"post hoc* supplementation by the Board . . . to cure deficiencies in the challenged FSEIS."[17] However, as Entergy notes, the Commission and licensing boards have routinely followed the process of supplementing EIS conclusions in reactor licensing and other

[14] New York Proposed Findings on NYS-12C at 129-140.

[15] Entergy Proposed Findings on NYS-12C at 40-46.

[16] "An initial decision . . . may include findings and conclusions which affirm or modify the content of the final environmental impact statement prepared by the staff. To the extent that findings and conclusions different from those in the final environmental statement prepared by the staff are reached, the statement will be deemed modified to that extent and the initial decision will be distributed as provided in § 51.26(c)."

[17] New York Proposed Findings on NYS-12C at 130.

proceedings through adjudicatory decisions to remedy an otherwise deficient EIS, not only in recent decisions, but also in cases dating back decades.[18]

5.98 Moreover, the Appeal Board in *Limerick* explicitly addressed this issue and found that 10 C.F.R. § 51.102 essentially replaced the provision in section 51.52 such that amendment of an environmental statement by the adjudicatory hearing record and subsequent licensing board decision is entirely proper under NRC regulations and court precedent.[19] Further, the Appeal Board noted,

> We need not decide which regulation controls, for section 51.102 serves the same purpose as its differently worded predecessor, section 51.52(b)(3). LEA's argument is therefore without merit. Section 51.102(a) states that '[a] Commission decision on any action for which a final environmental impact statement has been prepared shall be accompanied by or include a concise public record of decision.' Generally, that record is to be prepared by the staff. 10 C.F.R. § 51.102(b). When an adjudicatory hearing is held on the action, however, the initial decision of the [Licensing Board] . . . will constitute the record of decision. An initial or final decision constituting the record of decision will be distributed as provided in § 51.93. 10 C.F.R. § 51.102(c). Section 51.103 describes the contents of the 'record of decision,' noting that it may incorporate by reference any material in the final environmental statement. On its face, 10 C.F.R. § 51.102 thus merges the FES with any relevant licensing board decision to form the complete

[18] Entergy Proposed Findings on NYS-12C at 41-43, citing *Entergy Nuclear Generation Co*. (Pilgrim Nuclear Power Station), CLI-12-01, 75 NRC 39, 61 (2012) (citing *La. Energy Servs., L.P.* (Nat'l Enrichment Facility), CLI-05-28, 62 NRC 721, 731 (2005)); *Pac. Gas & Elec. Co.* (Diablo Canyon Power Plant Indep. Spent Fuel Storage Installation), CLI-08-26, 68 NRC 509, 526 (2008); *Dominion Nuclear N. Anna, LLC* (Early Site Permit for North Anna ESP Site), CLI-07-27, 66 NRC 215, 230 (2007) ("But *our own* examination of the entire administrative record leads us to conclude that the Staff's underlying review was sufficiently detailed to qualify as "reasonable" and a "hard look" under NEPA — even if the Staff's description of that review in the FEIS was not. Our explanation below provides an additional detailed discussion as part of the record on the alternative site review. We direct the Staff to include a similar level of detail in future FEIS analyses of alternative sites.") (emphasis in original); *Hydro Res., Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-04, 53 NRC 31, 53 (2001) ("[T]he Presiding Officer's incorporation into LBP-99-30 of a staff affidavit on costs and benefits also does not require FEIS supplementation . . . in an adjudicatory hearing, to the extent that any environmental findings by the Presiding Officer (or the Commission) differ from those in the FEIS, the FEIS is deemed modified by the decision."); *Phila. Elec. Co.* (Limerick Generating Station, Units 1 & 2), ALAB–819, 22 NRC 681, 705-07 (1985), *aff'd in part and review otherwise declined*, CLI–86–5, 23 NRC 125 (1986), *remanded in part on other grounds sub nom. Limerick Ecology Action, Inc. v. NRC*, 869 F.2d 719 (3d Cir. 1989); *Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347 (1975); *S. Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-09-7, 69 NRC 613, 733 (2009).

[19] *Limerick*, ALAB-819, 22 NRC at 705-07.

> environmental record of decision—just as former section 51.52(b)(3) did. But even under the stricter construction of section 51.102 urged by LEA, nothing in it precludes modification of an FES by licensing board decision.[20]

5.99 New York contends, however, that to the extent the *Limerick* decision suggests that a licensing board may supplement an EIS, it is inconsistent with 10 C.F.R. § 51.102(c) in that § 52.102 does not contain any provision for the incorporation of testimony or exhibits in an adjudicatory hearing.[21] We disagree. As the Commission has explicitly stated, "[t]he adjudicatory record and Board decision (and . . . any Commission appellate decisions) become, in effect, part of the FEIS."[22] Moreover, we agree with Entergy that 10 C.F.R. § 51.102 governs the resolution of environmental issues following an adjudicatory hearing and requires the Board to consider the adjudicatory record as a whole when evaluating the environmental impacts of the proposed action, to supplement the FSEIS as necessary, and to modify the NEPA analysis and conclusions, if necessary.[23]

5.100 New York also contends that supplementation of the FSEIS through an adjudicatory hearing "is inconsistent with federal regulations that emphasize the importance of the EIS itself, as well as the public's right to review and participate in the process.[24] New York further asserts that materials prepared after the FSEIS such as studies and memoranda are not a substitute for supplementation and recirculation for public comment.[25] However, as Entergy notes, the Commission has uniformly rejected this argument and has found that, "the hearing process itself allows for additional and more rigorous public scrutiny of the [environmental

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[20] *Id.* at 706.

[21] New York Proposed Findings on NYS-12C at 137-138.

[22] *Hydro Res.*, CLI-01-04, 53 NRC at 53 (citing *La. Energy Servs.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 89 (1998)).

[23] Entergy Proposed Findings on NYS-12C at 46.

[24] New York Proposed Findings on NYS-12C at 129-30.

[25] New York Proposed Findings on NYS-12C at 133.

statement] than does the usual circulation for comment."[26] Moreover, as Entergy notes, the cases New York relies on regarding subsequent studies and memoranda have been previously considered and distinguished by Atomic Safety and Licensing Appeal Boards.[27]

5.101 Additionally, New York asserts that the NRC Staff is bound by 10 C.F.R. § 51.92 which requires that the Staff prepare a supplemental EIS when there are substantial changes to the proposed action or new and significant information.[28] We find New York's argument unconvincing given that the Commission has repeatedly authorized the supplementation of the FSEIS through the adjudicatory record despite the existence of § 51.92.[29] Moreover, we agree with Entergy's assertion that New York's argument would essentially give no effect to section 51.102(c) governing the resolution of environmental issues following an adjudicatory hearing.[30]

5.102 Finally, New York asserts that federal courts have consistently recognized that under NEPA, the remedy to cure a deficient EIS is to remand the proceeding to the administrative agency to re-initiate the EIS process.[31] However, as New York itself acknowledges, few federal agencies have internal administrative procedures like the NRC's for adjudicating or appealing NEPA issues.[32] Nevertheless, multiple federal courts of appeals have

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[26] Entergy Proposed Findings on NYS-12C at 43-44, citing *Hydro Res.*, CLI-01-04, 53 NRC at 53 (quoting *Limerick*, ALAB-819, 22 NRC at 707).

[27] *See* Entergy Proposed Findings on NYS-12C at 44-46.

[28] New York Proposed Findings on NYS-12C at 130.

[29] Supra n.18. *See also* Entergy Proposed Findings on NYS-12C at 43.

[30] Entergy Proposed Findings on NYS-12C at 44.

[31] New York Proposed Findings on NYS-12C at 130.

[32] New York Proposed Findings on NYS-12C at 134-35. New York refers to the Interior Board of Land Appeals (within the Department of Interior) as an example of an administrative board requiring a formal supplement to an EIS. *Id.* In contrast, Entergy notes that agencies such as the Federal Energy Regulatory Commission ("FERC") have allowed supplementation through public hearings. Entergy Proposed Findings on NYS-12C at 42-43, citing *Pacific Alaska LNG Co.*, 9 FERC ¶ 61,334, 61,709 ("the CEQ General Counsel suggests that the matter should also be considered in the FEIS because the Commission proceeding does not provide the broad public review and comment required by NEPA. We disagree. Our final decision will address this issue in detail, based on the record in the proceeding. All interested parties have had an opportunity to contribute to that record, and our decision will therefore be based on full information. This procedure fully comports with the letter and spirit of NEPA.") (citing

consistently upheld the NRC's practice of supplementing environmental impact statements through the adjudicatory process.[33] Accordingly, for the reasons described above, we find that the FSEIS will be "deemed supplemented" by the Board's decision in this proceeding and by any subsequent Commission decision.

III. Findings of Fact

A. New York's Proposed Findings Do Not Raise Credible Evidence in Support of a Challenge to the SAMA Analysis Conclusions

1. New York's Testimony Failed to Address the Ultimate Issue Before the Board

5.103 New York's proposed findings incorrectly frame the issue before the Board. New York's proposed findings intimate that the Board is reviewing a site specific severe accident analysis along with a SAMA analysis. New York's Proposed Findings on NYS-12C at 23. New York describes the purpose Indian Point's SAMA analysis as "the vehicle by which the Staff considers … the environmental impacts of a severe accident and alternative mitigation measures. NYS Findings of Fact on NYS-12C at 23. New York is incorrect. The NRC's GEIS for license renewal generically evaluates severe accident impacts and provides the technical basis for the NRC's conclusion in 10 C.F.R. Part 51 that "the probability-weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to groundwater, and societal and economic impacts from severe accidents are small for all plants."

Aberdeen & Rockfish R.R. v. SCRAP, 422 U.S. 289, 320-21 (1975); *Citizens For Safe Power, Inc. v. NRC*, 582 F.2d 87 (1st Cir. 1978)).

[33] Entergy Proposed Findings on NYS-12C at 42-43, citing *Citizens for Safe Power, Inc. v. NRC*, 524 F.2d 1291, 1294 n. 5 (D.C. Cir. 1975) (holding that the "deemed modified" principled did not depart "from either the letter or the spirit" of NEPA); *Ecology Action v. AEC*, 492 F.2d 998, 1001–02 (2nd Cir. 1974) (omissions from an FEIS can be cured by subsequent consideration of the issue in an agency hearing); *New England Coalition on Nuclear Pollution v. NRC*, 582 F.2d 87, 94 (1st Cir. 1978) (having "no trouble finding" that the NRC's supplementation process satisfies NEPA). *See also Pub. Serv. Co. of N.H.* (Seabrook Station, Units 1 & 2), CLI-78-1, 7 NRC 1 (1978). Although the Appeal Board in *Limerick* noted that federal courts of appeals approved the procedure set forth in former section 51.52(b)(3), providing for the amendment of an environmental statement through the adjudicatory process, the Appeal Board clarified that "[t]here is no reason to believe that the courts would not be just as approving of the same procedure today, either as embodied in section 51.102 or, indeed, in the absence of any regulation, as a matter of board practice." *Limerick*, ALAB-819, 22 NRC at 705-07.

(GEIS, Exhibit ("Ex."). NYS000131A, at xliv; GEIS, Ex. NYS000131C, at 5-115 – 5-116; 10 C.F.R. Part 51, Table B-1.) The GEIS thus addresses the impacts of severe accidents generically in bounding fashion.[34] New York's argument is a direct challenge to the Commission's regulations in 10 C.F.R. Part 51, Table B-1, and is therefore not within the scope of this licensing proceeding. 10 C.F.R. § 2.309(f)(1)(iii).

5.104 The Commission has limited contentions raising environmental issues in license renewal proceedings to those issues that are affected by license renewal and have not been addressed by rulemaking or on a generic basis. *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, units 3 and 4), CLI-01-17, 54 NRC 3, 11, 16 (2001). While "severe accident mitigation alternatives" is a Category 2 issue,[35] the impact finding of "small" for societal, environmental, and economic impacts from severe accidents is a generic determination for all plants. *See* Table B-1. This generic finding, codified in NRC's regulations, is not subject to challenge absent a waiver. *See* 10 C.F.R. § 2.335(a). New York has not petitioned the Commission for a waiver.

5.105 The narrow issue before the Board is the reasonableness of the cost-benefit analsyis. The Commission stated:

> Ultimately, we hold adjudicatory proceedings on issues that are material to licensing decisions. With respect to a SAMA analysis in particular, unless a contention, submitted with adequate factual, documentary, or expert support, raises a potentially significant deficiency in the SAMA analysis—that is, a deficiency that could credibly render the SAMA analysis <u>altogether unreasonable</u> under NEPA standards—a SAMA-related dispute will not be material to

[34] *Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc.,* (Pilgrim Nuclear Power Station), CLI-12-15, 75 NRC 704, 709 (2012) ("SAMA analysis must also be understood against the backdrop of our Generic Environmental Impact Statement (GEIS), which contains a bounding, generic severe accident impacts analysis, applicable to all plants.").

[35] *See* Table B-1 (citing 10 C.F.R. § 51.53(c)(3)(ii)(L)) and noting that alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives). *See also Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc.,* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC 287, 316 (2010).

> the licensing decision, and is not appropriate for litigation in an NRC proceeding.[36]

5.106 The Commission warned that "in a highly predictive analysis such as a SAMA analysis, there are bound to be significant uncertainties, and therefore an uncertainty analysis is performed."[37] The Commission, anticipating the wide ranging disputes over individual aspects of the SAMA analysis, has said:

> It always will be possible to conceive of yet another input or methodology that could have been used in the SAMA computer modeling, and many different inputs and approaches may all be reasonable choices. … The SAMA analysis is not a safety review performed under the Atomic Energy Act. The mitigation measures examined are supplemental to those we already require under our safety regulations for reasonable assurance of safe operation.[38]

5.107 In other words, it is simply not enough to take issue with a particular aspect of the SAMA analysis, an intervenor challenging the SAMA analysis must show that it was unreasonable on the whole.[39] The Commission recently "stressed that the 'proper question is not whether there are plausible alternative choices for use in the analysis, but whether the analysis that was done is reasonable under NEPA.'"[40] A petitioner may not simply assert a deficiency. Rather to challenge an applicant's SAMA analysis "a petitioner must point with support to an asserted deficiency that renders the SAMA analysis unreasonable under NEPA."[41] Specifically, "[a] contention proposing alternative inputs or methodologies must present some

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[36] *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-12-01, 75 NRC 39, 57 (2012) (emphasis added).

[37] *Id.* at 58.

[38] *Id.* at 57.

[39] *Id.* at 57-58.

[40] *FirstEnergy Nuclear Operating Co.* (Davis-Besse Nuclear Power Station, Unit1), CLI-12-08, 75 NRC 393, 418(2012) (reversing the admission of contention challenging the costs to clean-up a severe accident) (internal citations omitted).

[41] *Id.*

factual or expert basis for why the proposed changes in the analysis are warranted…."[42] Even more, intervenors must show "why the inputs or methodology used is unreasonable, and the proposed changes or methodology would be more appropriate."[43] Thus, the narrow issue before the Board of whether the cost-benefit analysis is flawed was not addressed by New York or its witnesses. New York's proposed findings, evidence, and testimony are singularly silent on this issue. Dr. Lemay did not testify as to what impact if any his changes would have the cost-benefit analysis. New York proposed findings rest on attorney argument that if the overall economic costs for a severe accident increase then those mitigation measures that are cost-beneficial become more cost-beneficial and those mitigation measures that are not cost-beneficial might become cost-beneficial. New York's Proposed Findings on NYS-12C at 41-42.

5.108 New York incorrectly claims that Dr. Ghosh testified that as the costs of a severe accident increases the cost-beneficial candidates become more cost-beneficial. During questioning, Dr. Ghosh testified that if the benefit of a SAMA was increased and the cost was held constant, then a mitigation measure would become more cost-beneficial. Dr. Ghosh, however, never opined on the impact of an increase in costs of severe accident that would be applicable to both the unmitigated accident and the mitigated accident. As shown in the line of questioning below, New York's questioning did not address the impact from increasing the costs of a severe accident.

> MS. LIBERATORE: When we are looking at SAMAs that have already been -- SAMA candidates that have already been determined to be cost beneficial, if the costs associated with a severe accident, the onsite and offsite costs increase, wouldn't the delta between the costs and benefits of those SAMAs actually decrease, such that those costs -- already cost beneficial SAMAs become more cost beneficial?
>
> DR. GHOSH: Okay. I think I understood your question. I believe your question is the implementation cost is staying the same. If

[42] *Id.*

[43] *Id.*

> the benefit term, which is the averted cost element, were to increase, would the net benefit increase for a given SAMA? I believe that is your question.
>
> MS. LIBERATORE: Yes.
>
> DR. GHOSH: Yes. That is correct. …

(Transcript at 2333.) Ms. Liberatore's question, as Dr. Ghosh clarified, is circular. (*Id.)* New York essentially asked if it would be correct to conclude that when the net benefit increases and everything else is held constant, you increase benefits. (*Id.*) New York did not ask what would happen to the cost-benefit analysis if the costs of a severe accident increase. As discussed above, Ms. Liberatore returned to this topic during her cross-examination for NYS-16B and the witnesses confirmed that no conclusions can be drawn from an increase in the costs for a severe accident. *(Id.* at 2525-28.)

5.109 The limited testimony that New York elicited from the witnesses contradicts New York's incorrect assumption.

> MS. LIBERATORE: I'd like to pose a hypothetical. For the purposes of this hypothetical, please assume that population dose risk remains the same and off-site economic cost risk increases by a factor of three to seven. In this hypothetical, would IP2 SAMA 025 become cost-effective?
>
> MS. POTTS: Lori Potts for the applicant again. In that hypothetical, I do not know the answer to that question. I would like to state that increasing the OECR by three percent does not equate to increasing the benefit of any particular SAMA by three percent.
>
> MS. LIBERATORE: I believe you may have misunderstood my question. In my hypothetical, I would like you to assume that population dose risk remains the same, and OECR increases by a factor of three to seven, not three to seven percent.
>
> MS. POTTS: I'm sorry. As I stated, increasing the OECR by a factor of three does not equate to increasing the benefit of any particular SAMA by a factor of three.
>
> MS. LIBERATORE: What would increasing the OECR by a factor of three translate to as far as the benefit of a given SAMA?
>
> MS. POTTS: It is SAMA-specific.

MS. LIBERATORE: Let's focus on IP2 SAMA 025, since it appears that you've done some analysis on that. What would an increase in OECR by a factor of three translate into for IP2 SAMA 025?

MS. POTTS: I don't know at this point, without looking into it.

MS. LIBERATORE: Does anyone else on the panel? Can anyone else on the panel respond?

MR. TEAGARDEN: Well, let me augment Ms. Potts' answer. The factor of three increase that's being hypothetically postulated could be coming from various means. And you don't know how those various means are being incorporated into any specific SAMA candidate evaluation, whether this is being the result of a frequency change, a consequence change. And each SAMA candidate has its own unique footprint of how it impacts the risk. So it's something that would need to be evaluated.

JUDGE McDADE: Mr. Teagarden, are you saying that you wouldn't be able to estimate it without actually running the calculation for that particular SAMA, which is not something you could do here in your head?

MR. TEAGARDEN: Yes, your Honor. It could be dependant -- it's dependant upon how the risk is being increased, and how that relates to the mitigation that that SAMA candidate is providing.

DR. GHOSH: Could I add something? This is Tina Ghosh of the staff. That particular SAMA candidate mitigates steam generator rupture problems that might occur during a severe accident.

And there are actually potentially cost-beneficial SAMAs that are already in the FSEIS listed to mitigate exactly those types of accidents, and SAMA 025 would be a more costly way to mitigate those same types of accidents for which these other SAMA candidates are already identified. Just for some perspective.

MS. LIBERATORE: Going back to my hypothetical, please assume that the increase in OECR by a factor of three to seven is caused by an increase in population. Can you now answer my question as to what effect this OECR increase would have on the cost-beneficial-ness of IP2 SAMA 025?

MS. POTTS: If the increase in OECR was due to an increase in population, the population dose risk would also increase. I can't do the other part of your hypothetical, where you said it would not change.

(Transcript at 2525-28.) Particularly telling, New York's witness offered no opinion as this issue when asked by Ms. Liberatore. Ms. Liberatore did not even pose this question her witness, Dr. Lemay, for this particular contention.

5.110 It seems quite clear from the testimony that there is no basis to conclude anything regarding the cost-beneficial analysis merely because the costs of a severe accident might increase. (Transcript at 2333, 2525-28.)

5.111 Although New York protests that it is not obligated to perform a SAMA analysis, this is no longer the contention admissibility stage. New York is obligated to present a prima facia case. New York and its witness stopped short of challenging the SAMA analysis' conclusions. As such, this leaves no evidence to support a finding that the SAMA analysis was unreasonable.

2. New York's Analysis Is So Flawed as to Be Entirely Unreliable

5.112 New York's witness admitted to the Board that he made a fundamental error in his analysis. (Transcript at 2176-77.) During Board questioning, Dr. Lemay acknowledged that his analysis was based on an incorrect assumption that the MACCS2 code did not conserve mass. (Transcript at 2176-77; *compare id.* at 2131-33.) Dr. Lemay presumed that the source term utilized for each SAMA analysis did not deplete through deposition. (Transcript at 2131-32.) In effect this would result in the same deposition at the reactor site's boundary as at the boundary of the modeled area, 50 miles from the reactor site. (*See* Transcript at 2131-33.) The testimony at the hearing demonstrated that this type of assumption is incorrect. First, the plume is depleted as it travels over the modeled area resulting in lower contamination levels further from the site. (Ex. NRC000060 at 3, 6, 9, 12, 15, 18, 21, 24; Transcript at 2143-47.) In addition to this error in his analysis, Dr. Lemay compounded his mistake regarding the conservation of mass by assuming that the contamination that the MACCS2 code treats as being deposited on a flat plane for the purpose of decontamination would be duplicated for each interior and exterior surface of a contaminated building. (Transcript at 2147-49, 2377-79.) For the most basic

building, this results in increasing the contamination by a factor of 11 instead of reducing it by a factor of 11. (*Id.*) As the buildings become larger, Dr. Lemay's error increases substantially. (*See id.*) New York's proposed findings ignore Dr. Lemay's admitted error. Accounting for just the most basic building of four walls (interior and exterior), a floor, a ceiling, and roof reduces Dr. Lemay's projected decontamination costs below Entergy's input values. (*See id.*; NRC Staff's Proposed Findings on NYS-12C at 36-40.)

5.113 This fundamental error regarding the conservation of mass was not Dr. Lemay's only error that New York has not accounted for in its proposed findings. The Staff identified an error where Dr. Lemay introduced faults into the logic of the MACCS2 codes decontamination process. (*See* Transcript at 2199-2202, 2273-74; Entergy's Testimony, Ex. ENT000450, at 15, 73-75, 77-80.) For example, the MACCS2 code programming prior to Dr. Lemay's alterations makes decontamination decisions based on the initial level of contamination and assumes that the decontamination occurs fairly rapidly at least as compared to the times suggested by Dr. Lemay. (Transcript at 2199-2202; *see id.* at 1982-83, 2272-74.) Under Dr. Lemay's suggested inputs for TIMDEC, the assumption built into the MACCS2 code that no decay occurs during the decontamination process is incorrect and results in decontamination decisions that may unreasonably exceed the actual decontamination required under Dr. Lemay's model. (Transcript at 2199-2202; *see id.* at 1982-83, 2272-74.) Moreover, the MACCS2 code expends the entire decontamination costs in the first year and does not account for the net present value of the decontamination costs if they are expended over multiple years. (Transcript at 2209, 2273.) Dr. Lemay's process results in a significant inflation of the decontamination costs. (Transcript at 2252, 2273, 2383-84, 2200-02.) Dr. Lemay's alteration to the MACCS2 code to extend to the decontamination times also defeats the decontamination scheme because it forces property to be condemned rather than decontaminated due the depreciation rates in the code. (Transcript at 2115..)

5.114 Dr. Lemay's alterations to the MACCS2 code were not verified for functionality in the new extended input ranges. *See* Decl. of Dr. François J. Lemay, at 5 (Feb. 17, 2012) (ML12048B413) (stating that that unaltered code produced identical result to the altered code.). In order to perform the verifications Dr. Lemay conducted, he chose to only test his changes to the MACCS2 code with inputs that conformed to the unaltered code ranges. *See id.* Further, Dr. Lemay performed no analysis to show that his changes to the MACCS2 code produce accurate and reliable results capable of supporting a reasonable analysis under NEPA. In light of Dr. Lemay's other errors with respect to the operation of the MACCS2 code, it would be unreasonable to rely on his testimony that his changes were either simple or of no consequence to the code's ability to produce reliable results in the extended range. (*See* Transcript at 2199-2202, 2273-74; Entergy's Testimony, Ex. ENT000450, at 15, 73-75, 77-80.)

B. Dr. Tawil's Email Is Unreliable and Should be Given No Weight

5.115 Dr. Tawil's email is speculative and unsupported by any knowledgeable witness' testimony or any expert opinion. New York, for reasons unknown, decided to not offer Dr. Tawil as a witness in its pre-filed testimony and decided not to offer him at the hearing.[44] Dr. Tawil's email, similar to New York's argument regarding certain of Entergy's employees not being present at the hearing, speculates based on information that Dr. Tawil has no knowledge of, has no particular expertise in, and is not subject to examination by the Board or the parties. *See* Ex. NYS000426 at 1. Unlike Dr. Tawil's email, Entergy presented witnesses familiar with the topics on which they testified.[45] New York, on the other hand, presented no witness familiar with the

[44] New York insinuates in its proposed findings that Entergy acted improperly because it did not present every employee that had signed-off on the SAMA analysis. (New York's Proposed Findings on NYS-12C at 56.) Contrary to New York's insinuation regarding Entergy, who did provide qualified witnesses with actual knowledge of the SAMA analysis, New York did not offer any witness with knowledge of the events surround Dr. Tawil's email or analysis.

[45] Similar to its other complaints regarding witnesses not being presented at the hearing, New York presents statements from Mr. David Chanin in its proposed findings. New York's Proposed Findings on NYS-12C at 54-55. Mr. Chanin was one of New York's witnesses throughout most of this proceeding, However, New York choose to not present Mr. Chanin at the hearing for examination. Accordingly, his statements should be given no weight.

subject of Dr. Tawil's email. New York chose to not allow its witness to be examined and thus the testimony and evidence related to his email should be given no weight.

C. Dr. Tawil's Analysis is Not a SAMA

5.116 New York's proposed findings assert that Dr. Tawil's draft analysis is an example of a site-specific SAMA analysis that developed site-specific decontamination costs for the Indian Point site. New York's Proposed Findings on NYS-12C at 72-76. New York essentially argues that the Board should give this draft analysis more weight because the Staff did not disclose this document in its hearing files. *Id.* at 14. Beginning with that second issue first, New York, by its own filings, discovered this document only after contacting its author. New York's Pre-filed Rebuttal Testimony at 26-27. It is unclear where New York obtained its copy of Dr. tawil's draft report. At no point has New York provided any evidence or testimony in support of its now baseless allegations regarding the Staff's disclosures. Similar to its arguments regarding a 30-year old reference, New York seems to want the Staff to search for and to produce documents that are not in its possession but may somehow be relevant to New York's theory. The requirements regarding discovery are clear; the Staff does not have to produce documents that it does not have custody or control over. Clearly, Dr. Tawil's draft paper was not subject to disclosure.

5.117 New York's proposed findings substitute attorney argument for evidence regarding Dr. Tawil's unpublished draft analysis. New York's own witness does not refer to Dr. Tawil's analysis as SAMA analysis. (Transcript at 2256-58; *see also id.* at 2252-55.) Dr. Lemay's pre-filed rebuttal testimony seems to only cite Dr. Tawil's analysis to support his analysis utilizing the CONDO code. NYS' Pre-filed Rebuttal Testimony on NYS-12C at 27-28. Upon Board questioning, the Staff's witnesses and Entergy's witnesses explained that Dr. Tawil's draft analysis was not a site-specific SAMA analysis because it did not properly account for variability of the weather or the likelihood of all the accident scenarios. (Transcript at 2252-55; 2258-59.) The Staff's experts explain that Dr. Tawil's analysis assumes one of the worst

accident source terms and forces the weather to blow the radioactive plume directly to New York City. (Transcript at 2252-55.) *See also* New York's Proposed Findings on NYS-12C at 72-76. New York argues that Dr. Tawil's analysis used SST-5 (siting source term event), which they explain constitutes " '[l]imited core damage' and '[c]ontainment functions as designed with minimal leakage." New York's Proposed Findings on NYS-12C at 74, 74n.43. They base this assertion upon Dr. Tawil's unsupported and unexamined email. *Id.* Dr. Tawil's draft report contradict's Dr. Tawil's email New York's assertion. The draft report states that it used three SSTs. (Ex. NYS000424H at 5.3.) Each of the source terms utilized in Dr. Tawil's analysis involve severe core damage and significant breaches to containment or bypass of containment scenarios.[46] (*Id.*) Section 5.2.1 of Dr. Tawil's draft report, reproduced below discusses how the source terms were generated.

46

5.2.1 Step 1: Running CRAC2

The 13 scenarios are defined with respect to one of three accident severity levels and one of six meteorological conditions. The accident severity levels are defined by the Siting Source Terms (SST) SST1, SST2, and SST3 described in Table 5.1.

The six meteorological conditions are defined by the Pasquill A through F weather stabilities; these are used with respective wind speeds of 3, 3.5, 4, 4, 3 and 1.5 m/sec. In each scenario, a constant wind speed and direction are assumed for the duration of the release.

Thirteen CRAC2 runs--one for each scenario--provided two sets of files, one used by the program DOSES, and the other used by the program GRID. The data include 1) a set of dose conversion factors, 2) isotope decay rates, and 3) ground concentrations and dispersion factors (σ_y's) for the following downwind distances: 0.402, 0.805, 1.609, 2.414, 3.219, 4.023, 4.828, 5.633,

Table 5.1. Siting Source Term (SST) Descriptions

Group	Description
SST1	Severe core damage. Essentially involves loss of all installed safety features. Severe direct breach of containment.
SST2	Severe core damage. Containment fails to isolate. Systems to mitigate fission product release (e.g., sprays, suppression pool, fan coolers) operate to reduce release.
SST3	Severe core damage. Containment fails by basemat melt-through. All other release mitigation systems function as designed.

Source: USNRC 1981

5.118 These unreasonable assumptions render any meaningful comparison to the SAMA analysis actually conducted for Indian Point baseless and of little, if any, probative merit. Thus, Dr. Tawil's analysis should be given no weight.

D. Long Term Research Proposals

5.119 New York asserts that the Staff concealed Mr. Lee's email regarding his proposal to conduct new research on the inputs that have been used in SAMA analysis. New York's

Proposed Findings of Fact for NYS-12C at 69-71. New York claims that Mr. Lee's email contradicts the Staff's position regarding the "pedigree" of the inputs into the SAMA analysis. *Id*.

5.120 New York representation of Mr. Lee's email is contrary to the testimony and the Staff's previous corrections regarding New York's error.[47] As the Staff explained and Dr. Ghosh testified, Mr. Lee submitted a proposal to conduct additional long-term research regarding certain SAMA inputs used in SAMA analyses. (Transcript at 2328-32.) The Staff evaluated Mr. Lee's proposal and determined that it did not raise any issues that represent a technical gap in the Staff's current understanding. (Transcript at 2328.) The Staff identified in its opposition to New York's request to submit a new exhibit that Mr. Lee's proposal was evaluated as one of the lowest priorities of all the proposals that year. NRC Staff's Answer To State of New York Motion For Leave To File An Additional Exhibit And Additional Cross-Examination Questions Concerning Consolidated Contention NYS-12C at 1, 5-6 n.16 (Sep. 28, 2012); Affidavit Of S. Tina Ghosh Concerning State Of New York Motion For Leave To File An Additional Exhibit And Additional Cross-Examination Questions Concerning Consolidated Contention NYS-12C, at 3-4 (Sep. 28, 2012). (Transcript at 2328.) Although New York made requests for additional documents from Entergy near the close of the hearing, New York notably remained silent with respect to wanting to examine the Long-Term Research Proposal's evaluation. (*See* Transcript at 2384.) During cross-examination, New York remained silent as wanting or needing to examine the Long-Term Research Proposal's evaluation. Once again, New York waits until after the close of the hearing to raise an issue that could and should have been raised earlier, if at all. These actions leave the Board in a difficult conundrum that granting any relief to New York based on arguments not raised prior to the hearings conclusion would work a substantial

[47] As the Staff had previously explained, New York's representation of the contents of each separate email and the person who received each email is incorrect. NRC Staff's Answer To State Of New York Motion For Leave To File An Additional Exhibit And Additional Cross-Examination Questions Concerning Consolidated Contention NYS-12C at 1, 5-6 n.16 (Sep. 28, 2012); Affidavit Of S. Tina Ghosh Concerning State Of New York Motion For Leave To File An Additional Exhibit And Additional Cross-Examination Questions Concerning Consolidated Contention NYS-12C, at 3-4 (Sep. 28, 2012).

injustice on the other parties. Thus, this late argument like the others should be given no weight.

E. New York's Other Errors Regarding the Costs Accounting in the MACCS2 Code

1. The MACCS2 Code Appropriately Accounts for Costs Resulting Contaminated Drink Water Sources

5.121 New York's proposed findings assert that the MACCS2 code does not account for the costs associated with cleaning bodies of contaminated drinking water. New York's Proposed Findings on NYS-12C at 50. This assertion is incorrect. Dr. Bixler explained that although the MACCS2 code does not incur costs as a clean-up expense, it does account for the costs of the contaminated water. (Transcript at 2277-79, 2379-80.) The MACCS2 code forces the contaminated water to be consumed and accounts for the costs of the contaminated water through the dose imposed on the population. (*Id.*) Although New York may now disagree with the method that MACCS2 code uses to account for these costs, this is precisely how the code was intended to work. New York has repeatedly assured this Board that it is not challenging the MACCS2 code. New York's Proposed Findings on NYS-12C at 42. Dr. Lemay endorsed the code to the Board and also testified that he was not challenging the MACCS2 code. (New York's Rebuttal Testimony on NYS-12C at 6.) Thus, New York should not be allowed to raise distinctly new claims that challenge the code's internal programming and function.

2. MACCS2 Code Accounts for Building Density Implicitly by Accounting for the Population Density

5.122 New York asserts that the MACCS2 analysis does not account for building density at all unlike the CONDO model it chose to develop decontamination costs from. New York's Proposed Findings at 46-47. Careful examination of this assertion shows its fundamental flaw. New York's dispute appears to be with the method that MACCS2 uses to account for building density rather than whether it accounts for building density. The MACCS2 code accounts for building density based on the population density, which inherently and implicitly accounts for the increased building density resulting from additional people living on the same

land area. (Transcript at 2040) Since, New York is not challenging the MACCS2 code, it should be able to raise this new issue as how MACCS2 accounts for building density internally at this late date. Therefore, New York's challenge to MACCS2 codes method for account for building density should be given no weight.

3. The Staff Correctly Identified the Excess Margin in the SAMA Analysis Resulting From Its Uncertainty Analysis

5.123 New York asserts that the Staff made an "incorrect [and] conclusory claim" regarding the existing margin in the SAMA analysis. New York's Proposed Findings on NYS-12C at 78. New York then argues that Dr. Lemay essentially addressed this issue when he addressed the benchmarking for Level 1, Level 2, and Level 3 PRA analysis. *Id.* However, Dr. Lemay never disputes that there is excess margin in the uncertainty analysis, he merely attributes to the Level 1 and Level 2 PRA analysis. (Transcript at 2324; *compare with id.* at 2220, 2230-33.) Dr. Ghosh explained why the excess margin exists in the SAMA analysis in both her pre-filed testimony and in response to Board questioning. (Transcript at 2230-33.) Dr. Lemay provided only conclusory claims regarding the magnitude of the uncertainty analysis. (Transcript at 2324.) These are issues that Dr. Lemay does not appear to have done any analysis. Thus, New York's assertions amount to mere speculation regarding the Staff's uncertainty analysis.

4. The Wind Direction at the Indian Point Site Blows Predominately in a North South Direction Depending Seasonality

5.124 New York also provides an incomplete representation of Dr. O'Kula's testimony regarding the wind direction. New York asserts that Dr. O'kula agreed that predominate wind direction was North to South. Dr. O'Kula, however, identified the predominate wind direction as being affected seasonally and blows in either a predominately North to South direction or a South to North direction.

> DR. O'KULA: Your Honor, Kevin O'Kula for the applicant. There is some seasonal variation.

> JUDGE WARDWELL: But keep it simple.
>
> DR. O'KULA: On average, the wind would be blowing north to south. But it can be balanced seasonally. (Off record comment.)
>
> JUDGE WARDWELL: You support Dr. Lemay's statement? Is that a yes.
>
> DR. O'KULA: It is bar-bell shape, and there is some, also some preference based on seasonality, of going in the opposite direction.

(Transcript at 2294.)

5. New York's Complaints Regarding a 30-year Old Missing Reference For a Seminal Study Are Immaterial

5.125 New York also argues that the Staff should not be able to rely on NUREG-1150 and the pedigree of the SAMA inputs because one document referenced in the Staff's previous analysis that received substantial peer review is no longer available at the NRC or Sandia National Laboratories ("Sandia"). New York's Proposed Findings on NYS-12C at 60. New York's argument seems to imply that the Staff was somehow obligated to keep a thirty-year old plus document simply because New York might wish challenge it in the future. It is not even clear that the document, "An Assessment of Decontamination Costs and Effectiveness for Accident Radiological Releases,"[48] was ever in the possession or control of the NRC. New York's argument goes so far as to challenge the actual analysis and information from NUREG-1150 simply because the Staff no longer has the document. New York's complaints regarding the Staff's and Sandia's lack of possession of a particular reference is immaterial to New York's obligations to present a case. New York proved adept at locating other references that were not in the NRC's possession. Therefore, this argument should be disregarded.

[48] Ostmeyer, R.M., and G.E. Runkle, An Assessment of Decontamination Costs and Effectiveness for Accident Radiological Releases, Albuquerque, N.M.: Sandia National Laboratories, to be published.

IV. CONCLUSIONS OF LAW

5.126 The Licensing Board has considered all of the evidence presented by the parties on NYS-12C. Based upon a review of the entire record in this proceeding and the proposed findings of fact and conclusions of law submitted by the parties, and based upon the findings of fact set forth above, which are supported by reliable, probative and substantial evidence in the record, the Board has decided all matters in controversy concerning this contention and reaches the following conclusions.

5.127 We find that the Staff's FSEIS complies with the requirements of NEPA and 10 C.F.R. Part 51 regarding the discussion of SAMAs in license renewal proceedings. The FSEIS provides a reasonable estimate of the cost and benefits of the proposed mitigation measures. We find that Entergy's selection of values for TIMDEC and CDNFRM are reasonable and appropriate for Indian Point, its site-specific features, and produce conservative results with respect the issues and evidence presented by New York's expert.

5.128 We find that NRC is not required to make modifications, as suggested by New York, to the MACCS2 code in order to conduct a SAMA analysis under NEPA. It is clear that the modifications made to the MACCS2 code by New York produced unreliable and unreasonable results because it introduced challenges to the delicate logic previously established in the code for making decontamination, habitability, and interdiction decisions, and accounting for the costs of various decontamination efforts. We also find that the decontamination costs presented by New York are unreasonable because the estimates introduce errors with respect to the conservation of mass principles that are fundamental to producing accurate contamination levels. Thus, New York's assertions would not have any material impact on the conclusions made by the Indian Point SAMA analysis.

5.129 Finally, we find that the Staff responded adequately to each of New York's timely filed comments on the DSEIS.

/Signed (electronically) by/
Brian G. Harris
Counsel for the NRC Staff
U.S. Nuclear Regulatory Commission
Mail Stop O-15 D21
Washington, DC 20555-0001
Telephone: (301) 415-1392
E-mail: brian.harris@nrc.gov

Dated at Rockville, Maryland
this 3rd day of May 2013

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
ENTERGY NUCLEAR OPERATIONS, INC.	)	Docket Nos. 50-247-LR/286-LR
	)	
(Indian Point Nuclear Generating Units 2 and 3)	)	

CERTIFICATE OF SERVICE

Pursuant to 10 C.F.R § 2.305 (revised), I hereby certify that "NRC STAFF'S REPLY TO STATE OF NEW YORK'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW FOR CONTENTION NYS-12/12A/12B/12C ("NYS-12C")" in the above-captioned proceeding have been served upon the Electronic Information Exchange, the NRC's E-Filing System, this 3rd day of May, 2013.

Signed (electronically) by
Brian G. Harris
Counsel for NRC Staff
U.S. Nuclear Regulatory Commission
Office of the General Counsel
Mail Stop – O-15D21
Washington, DC 20555
Telephone: (301) 415-1392
E-mail: brian.harris@nrc.gov
Date of signature: May 3, 2013