UNITED STATES
NUCLEAR REGULATORY COMMISSION

BEFORE COMMISSIONERS
KRISTINE L. SVINICKI,
WILLIAM D. MAGWOOD, IV,
GEORGE APOSTOLAKIS, AND
WILLIAM C. OSTENDORFF AND
CHAIRMAN ALLISON M. MACFARLANE

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In re:	Docket Nos. 50-247-LR; 50-286-LR
License Renewal Application Submitted by	ASLBP No. 07-858-03-LR-BD01
Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc.	DPR-26, DPR-64 May 22, 2014

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STATE OF NEW YORK REPLY IN SUPPORT OF PETITION FOR REVIEW OF ATOMIC SAFETY AND LICENSING BOARD'S NOVEMBER 27, 2013 PARTIAL INITIAL DECISION CONCERNING CONSOLIDATED CONTENTION NYS-12C

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GLOSSARY OF TERMS, ACRONYMS, & ABBREVIATIONS

Board	Atomic Safety and Licensing Board
CDNFRM	MACCS2 input parameter for the nonfarmland decontamination cost
Decision	*Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), LBP-13-13, 78 N.R.C. __, slip op. (Nov. 27, 2013) (ML13331B465)
Entergy Answer	Applicant's Answer Opposing the State of New York's Petition for Review of the Board's Partial Initial Decision (LBP-13-13) (Apr. 28, 2014) (ML14119A003)
Generic EIS	NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants Vol. 1-2* (May 1996) (NRC000002)[1] (NYS00131A-I)
ISR	International Safety Research, Inc.
Lemay Rebuttal Test.	Pre-filed Rebuttal Testimony of NYS Expert Lemay on Contention NYS-12C (Jun. 29, 2012) (NYS000420)
Limerick	*Limerick Ecology Action, Inc. v. NRC*, 869 F.2d 719 (3d Cir. 1989)
MACCS2	MELCOR Accident Consequence Code Systems Version 2
MELCOR	Methods for Estimation of Leakages and Consequences of Releases
NCF	Non-Containment Failure
NEPA	National Environmental Policy Act
NRC	Nuclear Regulatory Commission
NRC Staff Answer	NRC Staff's Answer to "State of New York Petition for Review of Atomic Safety and Licensing Board Decision LBP-13-13 With Respect to Consolidated Contention NYS-12C" (Apr. 28, 2014) (ML14119A001)
NUREG/CR-3673	NUREG/CR-3673, *Economic Risks of Nuclear Power Reactors Accidents* (May 1984) (NRC000058)

[1] NRC000002 is a one-page exhibit that "[i]ncorporates New York Exhibit NYS00131A-I."

GLOSSARY OF TERMS, ACRONYMS, & ABBREVIATIONS

NUREG-1150	NUREG-1150, *Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants* (Dec. 1990) (NYS00252A-D)
NYS-12C	Consolidated Contention NYS-12/12A/12B/12C
OECR	Offsite Economic Cost Risk
SAMA	Severe Accident Mitigation Alternatives
Sandia	Sandia National Laboratories
State Petition	State of New York Petition for Review of Atomic Safety and Licensing Board Decision LBP-13-13 With Respect to Consolidated Contention NYS-12C (Feb. 14, 2014) (ML14045A412)
State Proposed Findings	State of New York's Proposed Findings of Fact and Conclusions of Law for Contention NYS-12/12A/12B/12C (Mar. 22, 2013) (ML13081A757)
State Reply Proposed Findings	State of New York's Reply to NRC Staff's and Entergy's Proposed Findings of Fact and Conclusions of Law for Contention NYS-12/12A/12B/12C ("NYS-12C") (May 3, 2013) (ML13123A467)
TIMDEC	MACCS2 input parameter for the time required for completion of decontamination levels
Tr.	Transcript of Evidentiary Hearing before Atomic Safety and Licensing Board, Docket Nos. 50-247-LR & 50-286-LR, ASLBP No. 07-858-03-LR-BD01

Pursuant to 10 C.F.R. § 2.341 and the Secretary's April 22, 2014 Order, the State of New York submits this reply to Entergy and Staff's April 28, 2014 answers to the State's petition to the U.S. Nuclear Regulatory Commission for review of the Atomic Safety and Licensing Board's November 27, 2013 Partial Initial Decision concerning Consolidated Contention NYS-12C.

ARGUMENT

Various cost inputs for NRC Staff's computer-based analysis of the means to mitigate a severe accident at the Indian Point power plants lack an adequate source and are neither realistic nor rational given the specific characteristics of the unique host communities and resources surrounding the Indian Point site. The Board's finding that Staff's review of the Severe Accident Mitigation Alternatives ("SAMA") analysis complied with the National Environmental Policy Act ("NEPA") is not even plausible in light of the record evidence, much of which was overlooked by the Board. The Commission should reverse the Board's clear error.

The United States has 100 different power reactors at 60 different sites. The profiles of those host sites differ markedly from one another — with respect to population, building density, infrastructure, vegetation, drinking water reservoirs, natural resources, iconic historical sites, topography, prevailing wind direction, and seismic hazards. Similarly, power plants at the same site can differ in terms of licensing conditions, core damage frequencies, and exemptions.

In light of these differences, NRC must analyze the impacts of severe accidents in a manner that is specific for each nuclear power plant as well as the specific means to mitigate such impacts for each plant. This analysis of the impacts and the mitigation alternatives involves a cost-benefit analysis in which, for each plant, the specific impacts or costs of an accident scenario are identified as are the specific benefits of avoiding or mitigating those accidents and impacts. NRC Staff relies on a computer code, known as MACCS2, developed by Sandia National Laboratories to identify the impacts or costs of a severe accident for each plant. To

perform its site specific analysis for each plant, that computer code, in turn, relies on various input values keyed in by the code operator. New York challenged the severe accident analysis for the Indian Point plants asserting that the analysis underestimated the costs to decontaminate the unique New York City metropolitan area. The State identified various deficient cost-related inputs including, but not limited to, the cost to decontaminate non-farm property (CDNFRM) and the time to effectively cleanup the contaminated area (TIMDEC) following an accident that deposits radioactive material in the unique host communities beyond the plants' boundaries.

NRC Staff identifies one document, NUREG/CR-3673 (NRC000058), as the root source for the CDNFRM and TIMDEC input values. That document was prepared and published by Sandia in 1984 in the wake of the 1979 Three Mile Island accident and should be read in that context. With respect to decontamination time, NUREG/CR-3673 (at 4-5) contains an illustrative timeline of protective actions related to an undefined accident, but it provides no source for the 120-day decontamination program (30 days of planning followed by 90 days of cleanup work) that appears in that timeline. Turning to the cost to decontaminate property, NUREG/CR-3673 points to a reference ("Os84") that NRC, Sandia, and Entergy have not produced and which may have never been published, if it ever existed.

In an effort to support the inputs that it used for the Indian Point plants' severe accident analysis, NRC Staff identifies a second document, NUREG-1150 finalized in 1990 (NYS00252A-D). However, the evidentiary record is clear that NUREG-1150 did not vet or include an independent searching reevaluation and verification of the TIMDEC and CDNFRM values. Rather, with respect to those values, NUREG-1150 essentially repeats and carries forward what appeared in NUREG/CR-3673 without any explanation. Moreover, when alerted by a comment on NUREG-1150 that cost documentation was missing and that source of certain

decontamination values may have been from desert-based weapons testing events, NRC did not dispute the comment. Instead, NRC affirmatively stated that decontamination values and cost-benefit analyses would need to be developed in the context of a specific regulatory activity (NYS00252D at D-31- D-32) — such as this relicensing proceeding.

When Sandia developed MACCS2 for NRC, it also provided sample problems as a way for computer operators to check that the code was in working order. Sample Problem A includes values for TIMDEC and CDNFRM, and Entergy along with NRC Staff relied on the Sample Problem A values. The Sample Problem A values for TIMDEC and CDNFRM trace back to NUREG/CR-3673.

Entergy's Answer (at 37) tries to support NRC Staff and the Board by arguing that the TIMDEC and CDNFRM values used for Indian Point have a "well-established pedigree." But it is nothing of the sort. In 2011, a NRC staff member correctly stated that "the pedigree of some of those [Sample Problem A] input values is not known." NYS000441. In 1990, NRC also contracted for and received a report outlining methods to examine the site specific impacts of various severe accident scenarios at the Indian Point site, NUREG/CR-5148 (Tawil 1990, (NYS000424A-BB)). Tawil 1990 also provided the ability to identify in detail the various surfaces in each grid element that could be contaminated. NRC Staff did not factor these items into its analysis (or disclose them to New York) and did not affirmatively scrutinize the validity of the various input values to ensure that they were appropriate today for a site specific analysis for the Indian Point site — in the wake of Fukushima. For NYS-12C, instead of a well-established pedigree, NRC Staff and Entergy essentially argue that "we've always done it this way." Repetition, however, does not plausibly constitute the required "hard look" under NEPA. The root reference for the values, Os84, is non-existent and no other document reviews the

values. Moreover, regardless of what has occurred in other proceedings, here the State has presented evidence that the inputs for the Indian Point analysis are neither rational nor realistic. NUREG/CR-3673 and NUREG-1150 cannot support the Staff's action and the Board's decision with respect the TIMDEC and CDNFRM input values.

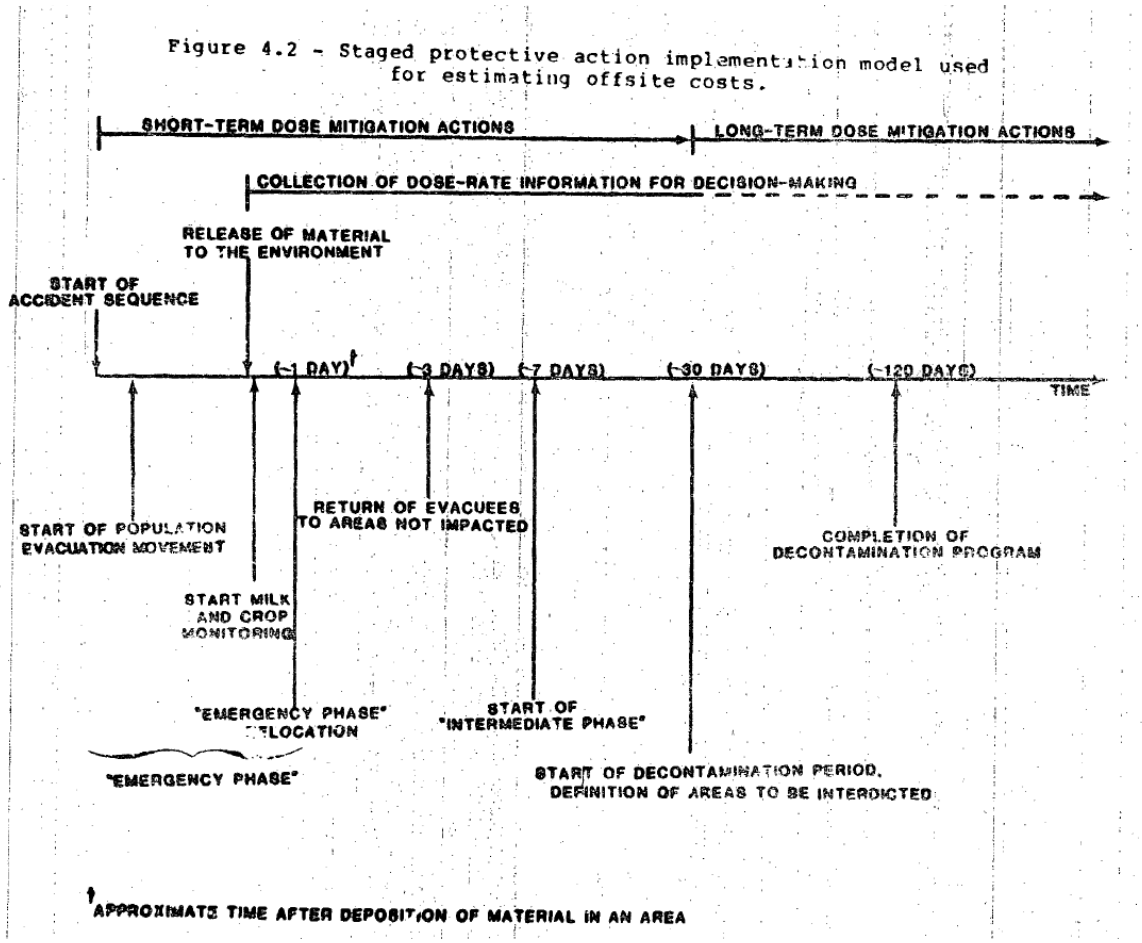
I. NUREG/CR-3673 Cannot Support Staff's Action or the Board's Decision

As the Board recognized, the ultimate source of NRC Staff and Entergy's TIMDEC and CDNFRM inputs is a 1984 contractor report, NUREG/CR-3673. NUREG/CR-3673 was prepared by Sandia in the wake of the Three Mile Island accident and includes discussion of replacement power and other economic costs to plant owners when a plant is off line due to an outage or an accident similar to the 1979 Three Mile Island Unit 2 event.

With respect to decontamination time, NUREG/CR-3673 does not identify any basis for a 90 day decontamination period or Staff and Entergy's postulated "average of 90 days." NRC000058 at 4-5, 6-24, 6-25. The report assumes in a single sentence "a mean time to completion of 90 days for the decontamination efforts." *Id*. at 6-25. Staff points to this single sentence in NUREG/CR-3673. Tr. 2249:13-15 (Harrison) (the NUREG/CR-3673 authors "just have a sentence that says the mean time to decontamination is 90 days.").

Yet nothing in NUREG/CR-3673 shows that 90 days represents anything close to the Board's definition of TIMDEC as "the mean annual consequences of numerous postulated accident scenarios, spanning a spectrum of potential initiating events, accident sequences, and severity of consequences" (Decision at 283). Nowhere does NUREG/CR-3673 engage in a mathematical process to calculate a "mean" or an "average" value based on identifiable data.

NUREG/CR-3673 contains a timeline illustrating the relative sequence of different protective actions "used for estimating offsite costs," but this in no way explains the genesis of a 90 day decontamination period. *Id.* at 4-5, Figure 4.2, reproduced below.



An illustrative timeline from 1984, where decontamination begins at day 30 and ends at day 120, is not enough to justify the use of 60 and 120 day decontamination times at Indian Point in 2014.

While it provides no basis for the 90 day number, NUREG/CR-3673 does support the position of the State and its expert Dr. Lemay in another respect. The report notes that "manpower limitations may force an extended period for completion of the offsite decontamination program after large releases of radioactive material." *Id.* at 6-25. The State's expert determined that applying the assumptions used for the cleanup scenario in NUREG/CR-3673 to Indian Point would require deployment of *1.5 million workers* for 90 days, which is entirely unrealistic and unreasonable. NYS000420 Lemay Rebuttal Test. at 22; *see also*

NYS000431.[1] Even extending the cleanup to one year would require 363,000 workers, which is also unrealistic and unreasonable. NYS000420 Lemay Rebuttal Test. at 23. Such real world "manpower limitations" should have "extended [the] period for completion of offsite decontamination" in the site specific Indian Point NEPA analysis. Entergy's unsupported assertion that an "average" cleanup would only require "about 60,000 to 80,000 people" (Entergy Answer at 31) is based on an off-the-cuff statement by one of its witnesses at the hearing (Tr. at 2191:2-6 (Teagarden)). Neither Entergy nor Staff produced any calculations supporting this number. This unreliable comment should be disregarded by the Commission.

With respect to CDNFRM, discussed in III. below, NUREG/CR-3673 with its citation to the non-existent "Os84" cannot support the input values accepted by NRC Staff and the Board.

II. Entergy and Staff Perpetuate the Board's Decontamination Time (TIMDEC) Errors

The Board provided three reasons for its conclusion regarding TIMDEC: (1) "analysis of Chernobyl . . . is for a single scenario of an extreme case;" (2) "NRC has examined decontamination times for more than 37 years;" and (3) decontamination times represent the average over all the modeled severe accidents." Decision at 285-86. Neither Entergy nor Staff can explain away the Board's errors of fact, law, and procedure contained in these three reasons.

A. Neither Entergy Nor Staff Deny That Entergy Chose to Model Fukushima-Like Accidents as a "Severe" Accident and Not a Worst-Case Scenario

By focusing on Chernobyl, the Board's first reason avoids the severe accidents at the GE-designed nuclear power plants at Fukushima Dai-ichi. Staff admits that "the SAMA analysis performed by Entergy and accepted by the Staff modeled severe accidents with larger releases

[1] NUREG/CR-3673 anticipates that military and disaster relief personnel would perform the decontamination work. NRC000058 at 4-20. For comparison purposes, according to the Department of Defense's Manpower Data Center, the nation's armed forces include approximately 1.3 million military personnel. *See* DMDC, *Total Military Personnel and Dependent End Strength By Service, Regional Area, and Country as of March 31, 2014*, available at https://www.dmdc.osd.mil/appj/dwp/reports.do?category=reports&subCat=milActDutReg (last visited May 22, 2014).

than Fukushima Dai-ichi." Staff Answer at 20. Entergy does not deny that three out of the eight accidents Entergy modeled in the SAMA analysis are comparable to, or more severe than Fukushima. *See* Entergy Answer at 32. Thus, Staff and Entergy's answers underscore the State's point — Fukushima is not a "worst-case scenario," but is well within the range of "severe" accidents that Entergy chose to model for the SAMA analysis.

Putting aside Entergy and Staff's own characterization of Fukushima-like accidents as "severe," Entergy, Staff, and the Board try to label such accidents as "worst case scenarios" in an attempt to avoid NEPA's requirement that agencies analyze "impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason." 40 C.F.R. § 1502.22(b)(4); *cf. New York v. NRC*, 681 F.3d 471, 482 (D.C. Cir. 2012) ("Only if the harm in question is so 'remote and speculative' as to reduce the effective probability of its occurrence to zero may the agency dispense with the consequences portion of the [NEPA] analysis."); *Limerick Ecology Action, Inc. v. NRC*, 869 F.2d 719, 740, n.26 (3d Cir. 1989).

Entergy relies upon Commission decisions from Pilgrim and Vogtle (Entergy Answer at 21, n.120, and 32, n.188) that are not relevant to the State's Fukushima evidence. In those decisions, interveners "raised generalized, speculative claims regarding the Fukushima accident" (*see, e.g.*, *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-12-15, 75 N.R.C. 704, 728 (2012)), unlike the State's detailed challenge to inputs like TIMDEC that are supported by Fukushima-related evidence. The Commission has emphasized that "we do not require petitioners to run their own computer models at the contention admissibility stage," but that "a contention challenging a SAMA analysis nonetheless must be tethered to the computer

modeling and mathematical aspects of the analysis." *FirstEnergy Nuclear Operating Co.* (Davis-Besse Nuclear Power Station), CLI-12-8, 75 N.R.C. 393, 415 (2012). The State exceeded this standard here by using Fukushima-related evidence to show that the 60 and 120 day TIMDEC values are altogether unreasonable, and thus Entergy's citations are not relevant.

B. NRC Staff Does Not Deny That, Contrary to the Board's Finding, It Has Not Been Examining Decontamination Times for 37 Years

As discussed above, the Board's "reasonableness" finding for TIMDEC rests on three reasons, the second of which is that "NRC has *examined* decontamination times for more than 37 years." Decision at 285 (emphasis added). As an initial matter, Staff's claim that the Board's 37-year statement was "harmless and not material to the issue before the Board or the reasonableness of the selected inputs" (Staff Answer at 15) is simply false. The Board's factual error regarding Staff's experience and support for TIMDEC led the Board to incorrectly conclude that Staff's TIMDEC values were reasonable under NEPA. This error was hardly harmless and should be reversed by the Commission.

Tellingly, Staff does not express clear disagreement with the State's position that "the Board should have found that the NRC stopped examining decontamination times in 1984." Staff Answer at 14. Rather, Staff argues that the State "ignores the NRC's continuing effort to protect public health and safety, and its long-standing use . . . for the past several decades" of the 60 and 120 day TIMDEC values. *Id.* Repeating the same values for decades, *i.e.* Staff's asserted "long-standing use," is not the same as examining and scrutinizing those values. Staff's empty assurances regarding its "continuing effort to protect public health and safety" do not translate into continuous focused analysis to support the Board's conclusion.

The D.C. Circuit rejected similar empty assurances in the context of spent nuclear fuel pool leaks, holding that NRC's ongoing efforts at monitoring and regulatory compliance merely

"amount[ed] to a conclusion that leaks will not occur because the NRC is 'on duty.'" *New York v. NRC*, 681 F.3d 471, 480 (D.C. Cir. 2012). The D.C. Circuit found that NRC violated NEPA because, "[w]ith full credit to the Commission's considerable enforcement and inspection efforts, merely pointing to the compliance program is in no way sufficient to support a scientific finding." *Id.* Likewise here, merely pointing to generalized, "continuing effort to protect public health and safety" is in no way sufficient to support the finding that 60 and 120 days are reasonable TIMDEC values for the current Indian Point SAMA analysis.

In sum, as NRC stated after a recent trip to the Fukushima Prefecture, "Safety is not a stagnant endpoint."[2] Continuing to use an illustrative number that appeared in a 1984 report without any supporting citation or discussion is unreasonable under NEPA. One of NEPA's stated purposes is "to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the *health and welfare* of man." 42 U.S.C. § 4321 (emphasis added).[3] NEPA charges the federal government "to use all practicable means, consistent with other essential considerations of national policy" to "assure for all Americans *safe, healthful*, productive and aesthetically and culturally pleasing surroundings." 42 U.S.C. § 4331 (emphasis added).[4] The Commission should firmly reject any attempt by NRC Staff or Entergy to

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[2] NRC, Reflections on Fukushima: NRC Senior Leadership Visits Japan, at http://www.youtube.com/watch?v=W9OjCCS24kc&feature=youtu.be (published May 8, 2014), beginning at approximately minute 5:37).

[3] Senator Henry Jackson, the Senate author of NEPA, explained, "An environmental policy is a policy for people. Its primary concern is with man and his future. The basic principle of the policy is that we must strive in all that we do, to achieve a standard of excellence in man's relationships to his physical surroundings." 115 Cong. Rec. 40,416 (1969) (statement of Sen. Jackson).

[4] NEPA's implementing regulations also require consideration of human health and safety by calling for the analysis of "ecological, aesthetic, historic, cultural, economic, social, or *health*, whether direct, indirect, or cumulative" effects. 40 C.F.R. § 1508.8 (emphasis added). Furthermore, in determining whether an effect is significant, an agency must evaluate the "degree to which the proposed action affects *public health or safety*." *Id.* § 1508.27 (emphasis added).

minimize the importance of complying with NEPA, or to diminish NEPA's mandate to consider public health and safety.

C. Energy and Staff Perpetuate the Board's <u>Fundamental Misunderstanding of Averaging</u>

As the State's petition explains, the Board's decision relies upon an incorrect understanding of how "averaging" is used in the MACCS2 code and SAMA analysis. Both Staff and Entergy perpetuate that misunderstanding in their answers. *See, e.g.*, Staff Answer at 13; Entergy Answer at 31. The record is clear that the SAMA analysis does not rely on a simple mean or average. *See, e.g.*, NYS000241 Lemay Test. at 25; ENT000464 at 11; Tr. 1913:9-13 (Teagarden). Instead, it relies on *frequency-weighted* costs that take different accident scenarios into account. ENT000464 at 11. First, Entergy ran the MACCS2 code separately for each accident scenario. *See, e.g.*, Tr. 2178:19-2180:2 (Lemay).[5] Only then did Entergy take the average of those separate MACCS2 outputs, weighting each consequence value by that accident's frequency to develop an overall cost per year. *Id; see also* State Petition at 27-30.

Using a small TIMDEC value for the severe accident scenarios involving larger releases artificially minimizes the accident costs flowing from those scenarios. If the inputs contained in the 1984 NUREG/CR-3673 ever had any value, at most they might infom the less severe accidents Entergy modeled, such as no containment failure (NCF). Certainly, based on the experience from Chernobyl and Fukushima, 60 and 120 days are inappropriate for use in the MACCS2 runs of the Fukushima-like and other more severe accidents of the most severe release categories — EARLY HIGH, EARLY MEDIUM, LATE HIGH, and LATE MEDIUM —

[5] This reflects a correction to the transcript adopted by the Board. *See Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Order (Adopting Proposed Transcript Corrections with Minor Edits), at 24 (Dec. 27, 2012) (ML12362A278

which, even using Entergy's calculations, contribute over 90% of the offsite severe accidents costs (OECR) used in the SAMA analysis.

III. Entergy and Staff Perpetuate the Board's Decontamination Cost (CDNFRM) Errors

A. NRC's Use of a Decontamination Cost That Lacks a Source Is Unreasonable, Unrealistic, and Arbitrary

Entergy and Staff attempt to minimize the gaping hole in their decontamination costs — the basis of the values does not exist. Nor is the basis of the values reported or reviewed in any other document. NUREG-3673 refers the reader to Os84. Entergy's characterization of Os84 as "present[ly] unavailab[le]" is misleading. There is no evidence, other than unsupported conjecture, that the document was ever available. NRC Staff's response is worse yet, calling it "New York's missing reference." NRC Staff Answer at 25. These characterizations attempt to convince the Commission that Os84 is not important. To the contrary, Os84 stands as the root of the CDNFRM values because none of the documents cited by Staff and Entergy, including NUREG/CR-3673 and NUREG-1150, provide an explanation of how CDNFRM was calculated. *See* State Petition at 30-46; State Proposed Findings at ¶¶ 153-194.

Instead of explaining why their use of undocumented and unreasonable input values to estimate the severe accident costs is sufficient under NEPA, NRC Staff and Entergy present broad assertions, unsupported by evidence in the record in an attempt to buttress the NUREG/CR-2673 and NUREG-1150 and the pedigree of the inputs. It was clear error for the Board to ground its holding in the conclusory statements of witnesses without "engag[ing] in a 'searching and careful' inquiry of the record," to "consider whether the agency considered the relevant factors and whether a clear error of judgment was made." *Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402, 416 (1971).

As an initial matter, NRC Staff and Entergy's witnesses Dr. Ghosh, Mr. Harrison, Mr. Jones, Dr. Bixler, Dr. O'Kula, Mr. Teagarden, and Ms. Potts have knowledge and experience gaps because they did not work on developing the Sample Problem A values Entergy used, or on Os84, NUREG/CR-3673, or NUREG-1150. Given this lack of personal knowledge, the Board should have disregarded their testimony.[6] For example, Entergy and Staff witnesses referenced the peer review process for NUREG-1150, but failed to acknowledge that those efforts were focused on accident probability and sequence progression issues and not a critical evaluation of CDNFRM and TIMDEC, as discussed in III.B. below. Additionally, for the reasons set forth in prior pleadings, although CDNFRM is entered on a dollars per person basis and Entergy did use a site specific population input, that population input does not transform Entergy's use of a baseless CDNFRM value into a reasonable, site specific SAMA analysis. *See, e.g.*, State Petition at 52-55.

B. NRC Staff and Entergy Embrace the Board's <u>Incorrect "Secondary Peer Review" Concept</u>

The Board used the term "secondary peer review" (Decision at 289) *sua sponte* as no party used that term in briefing. Nor does the term appear in federal or NRC case law. It is not clear what the Board meant by "secondary peer review," but if the Board was referring to NUREG-1150's peer review process, that process did not include a peer review of

[6] *See Duke Energy Corp.* (Catawba Nuclear Station, Units 1 and 2), 60 N.R.C. 21, 29 (2004) ("Gaps in specific knowledge may go to the 'weight' of the expert testimony rather than to its admissibility."). Additionally, it was clear error for the Board to rely on any witness' unsupported assumptions and conclusions in defense of Entergy's SAMA analysis. *See Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 N.R.C. 287, 315 (Mar. 26, 2010) ("unsupported reasoning and computations, are insufficient" and should be afforded little or no weight); *South Carolina Elec. & Gas Co.* (Virgil C. Summer Nuclear Station, Unit 1), 14 N.R.C. 1140, 1163 (1981) ("in all circumstances the Board has the right, indeed the duty, to satisfy itself that the conclusions expressed by expert witnesses on significant safety or environmental questions have a solid foundation"); *Cf. Amorgianos v. Amtrak*, 303 F.3d 256, 266 (2d Cir. 2002) ("Thus, when an expert opinion is based on data, a methodology, or studies that are simply inadequate to support the conclusions reached, . . . [the testimony is] unreliable opinion testimony.").

decontamination costs or the CDNFRM value. The State does not dispute that NUREG-1150 underwent a peer review and while there are many important aspects of NUREG-1150,

> what NUREG-1150 doesn't do is validate the input parameters that were used in the Indian Point SAMA analysis. And you can search all the volumes of NUREG-1150. I certainly did. The only references to decontamination costs are the two references I found [NUREG/CR-3673 and Os84]. So it leads me to believe that [] a very specific part of the economic cost assessment was not peer reviewed, at least in the sense that U.S. NRC staff defines it.

Tr. 2175:17-25 (Lemay); *see also* State Petition at 37-39. As further support for the fact that the CDNFRM values were not peer reviewed, none of the expert panels reviewing NUREG-1150 were tasked with reviewing the consequence assessment in any depth. *See* NUREG-1150, Volume 1 (NYS00252A) at xviii- xix; Volume 2, Appendix A (NYS00252B) at A-43 – A-45.

If the Board's use of the term "secondary peer review" refers to the use of the NUREG-1150/Sample Problem A values in other SAMA analyses, such repetition does not mean the values were reviewed or are appropriate for this specific proceeding. In fact, while there is overwhelming evidence that these values were repeated, there is no evidence that they were ever once meaningfully reviewed. In conclusion, the Board's purported secondary peer review does not pass muster under NEPA, which requires a "hard look" and "scientific integrity." Relying upon decontamination costs and time estimates used for other plants, without even attempting to verify the reasonableness that data, violates NEPA, especially given the uniquely high population and building density in the 50-mile radius surrounding Indian Point. *See, e.g.*, State Proposed Findings ¶¶ 135-140. As the State has explained throughout this proceeding, these values are not default values and should not be used as such. *See, e.g.*, State Proposed Findings ¶¶ 143-44.

C. <u>New York's Expert Presented a Well-Sourced Report and Transparent Analysis</u>

The State retained experts Dr. Francois Lemay and International Safety Research, Inc. to determine whether the MACCS2 input values related to economic costs at Indian Point were

reasonable. *See* NYS000420 Lemay Rebuttal Test. at 5-8. Because the data source for the decontamination cost (CDNFRM) input values is not available or explained in any reference, ISR benchmarked Entergy and Staff's values against values it developed with different sources of relevant, available data including Sandia *Site Restoration*. *Id.* at 5; NYS000242 ISR Report; NYS000430 (updating certain tables from ISR Report).

Dr. Lemay's rebuttal testimony addressed, in detail, NRC Staff and Entergy's criticisms regarding the CDNFRM calculations. *See* NYS000420 Lemay Rebuttal Test. at 35-47. For a detailed response to Entergy and Staff's criticisms, the Commission is directed to State Proposed Findings ¶¶ 207-263 and State Reply Proposed Findings at 23-30, which also discuss Dr. Lemay's response to the Board's questions at the hearing and are hereby incorporated by reference. In particular, Staff's and Entergy's allegations regarding conservation of mass are unfounded. *See* State Proposed Findings ¶¶ 258-263. Furthermore, NEPA and the Administrative Procedure Act place the burden of proof squarely on NRC Staff. The missing Os84 document and Staff's own failure to benchmark the values show that the agency has failed to meet its burden of proof.

IV. The State Did Not Waive Its Challenges to Other MACCS2 Inputs Such as the Value of Nonfarm Wealth and the Cost of Relocation

Staff incorrectly asserts that the State waived any challenge to the Indian Point SAMA analysis inputs other than TIMDEC and CDNFRM. First, Staff misquotes the hearing testimony. Second, the State's evidence, including its pre-filed submissions, hearing testimony, and proposed findings of fact and conclusions of law maintained these challenges to inputs such as VALWNF and POSCST. *See* NYS000430 at 6, Table 13; State Petition at 58-59 (summarizing these challenges). While these inputs were not the focus of Board's questions during the evidentiary hearing, neither the State nor its expert waived these challenges.

V. The State's Petition Raises Substantial Policy and Public Interest Questions

Contrary to Entergy's assertion (Entergy Answer at 18-21), ensuring environmental impacts and mitigation measures are analyzed in a realistic and accurate manner for the Indian Point site implicates substantial policy and public interest questions. In pursing this untenable litigation position, Entergy is unable to acknowledge the obvious: the Indian Point site is unique, with the highest surrounding population and building density of any U.S. site and only 38 miles from Wall Street. NRC has never conducted a site specific NEPA-based severe accident mitigation alternative analysis for the Indian Point facilities, even following the Three Mile Island accident, and this is the first time in a license proceeding that it is doing so. The requirement to conduct an accurate and meaningful SAMA analysis is rooted in *Limerick*, 869 F.2d 719, which held that NEPA requires NRC to examine the environmental effects of severe accidents at nuclear power plants and measures to mitigate those effects. The *Limerick* court recognized that SAMA analyses must be site-specific "[b]ecause the potential consequences [of a severe accident] will largely be the product of the location of the plant." *Id.* at 738. Nowhere is the site-specific requirement more important than at Indian Point where Entergy and NRC Staff's underestimation of severe accident costs is unsound, unreasonable, and deprives millions of New Yorkers and others living around Indian Point of the potential benefits of mitigation measures that could protect them and their property in the event of a severe accident. Tellingly, Staff didn't cite *Limerick* in its Answer.

Entergy improperly seeks to confuse matters when it argues at severe accident at a nuclear power plant will cause only a "small" impact. While NRC's Generic EIS for license renewal discussed impacts of severe accidents on a generic basis, that document did not — and could not — obviate the need for a site-specific analysis of alternative means to mitigate the impacts of a severe accident as mandated by *Limerick*. While the Generic EIS stated that severe

accident impacts are generically "small" for all plants, that was premised on the probability weighted likelihood of an accident occurring. 10 C.F.R. Part 51, Table B-1, Postulated Accidents, and n.3 ("For issues where probability is a key consideration (*i.e.*, accident consequences), probability was a factor in determining significance.").[7] Moreover, a site-specific analysis of severe accident impacts shows otherwise — even with the flawed underestimation of costs and the low probability of an accident, Entergy's SAMA analysis identified 22 cost-beneficial mitigation measures to protect New Yorkers and their environment.

Entergy takes issue with the State's assertion that public policy supports careful consideration of severe accident mitigation especially since NRC and the federal government might not provide funding for the restoration and remediation of contaminated areas under the Price Anderson Act or other programs. Entergy Answer at 19; State Petition at 2. The State cited a letter that, while not an exhibit for NYS-12C, discusses these concerns. NYS Letter to NRC Staff (Aug. 20, 2013) (included in ML13239A522) (cited in State Petition at 2, n.2). For example, the letter cites Commissioner Magwood's statement that "[t]here is no regulatory framework for environmental restoration following a major radiological release." *Id.* at 3. The letter also excerpted EPA statements that "NRC also indicated the Price Anderson Act would be unable to pay for environmental cleanup after a nuclear power plant incident." *Id.* at 6. *Entergy Nuclear Generating Co.* (Pilgrim Nuclear Power Station), CLI-12-10, 75 N.R.C. 479 (2012) is inapplicable here. In that case, the Commission rejected a late-filed contention referencing the EPA statements. *Id.* at 484-88. In contrast, the State did not offer the letter to support the

[7] Moreover, if a severe accident occurred, it could cause destabilizing or large environmental impacts. Tr. of Comm'r Briefing on Revised Generic EIS for License Renewal at 80 (Jan. 11, 2012) (ML120180209) ("if [a severe accident] happens, the consequences could actually be, you know, moderate, large, whatever" and "for severe accidents, 'small' means something very, very different. It means low probability.").

admission of a substantive contention. Rather, the letter's contents illustrate policy and public interest considerations that support the State's petition under 10 C.F.R. § 2.341(b)(4)(iii), (v).

A. The Board's Decision Allows Staff to Circumvent NEPA and Commission Goals for Scientific Integrity and Accuracy

Both NRC Staff and Entergy fail to even discuss NRC's policy goals cited in the State's petition, which include independence, openness, efficiency, clarity, and reliability. State Petition at 19 (citing NRC, *Principles of Good Regulation* and *Organizational Values*, http://www.nrc.gov/about-nrc/values.html (last updated Jan. 31, 2014)). They also give short shrift to NEPA's scientific integrity and accuracy requirements. Contrary to Entergy and Staff's view, NEPA's "rule of reason" does not relax the Administrative Procedure Act rationality standard or NEPA's requirement for scientific integrity and accuracy in the use of decisional inputs. *See* 40 C.F.R. § 1502.22(b)(4).

These policy considerations warrant review of the Board's mistaken finding that NRC has been reexamining input values for 30 years and its failure to discuss much of the State's evidence or critically scrutinize the appropriateness of thirty year old values for use in a site specific, computer based cost-benefit analysis in 2014. *See* State Petition at 7, 19, 40-41 (citing regulations and cases); *Oxygenated Fuels Assn., Inc. v. Pataki*, 293 F. Supp. 2d 170, 177 (N.D.N.Y. 2003) (scrutinizing expert's use of computer model and selection of input parameters). These policy and public interest issues also warrant review of the Board's factual, legal, and procedural errors as discussed in the State's petition.

B. The Commission Should Reject Any Attempt to Limit the Scope of NYS-12C

Entergy and Staff sought to artificially limit the scope of NYS-12C via in limine motions and arguments in other briefs. The Board denied these efforts and consistently upheld the State's evidence challenging CHRONC inputs to the MACCS2 code, including decontamination time,

finding that "[i]ssues like those delineated in New York's testimony relating to decontamination and clean up costs are the heart of NYS-12C, and all of the evidence filed by New York is within the scope of the admitted Contention's reasonably inferred bounds."[8]

Under a heading titled "Statement of the Case," Entergy revisits these issues (Entergy Answer at 3-13) even though Entergy did not file a petition for review of the Board's in limine rulings. Instead it claims that the recitation shows that New York had opportunity to present its arguments. *Id.* at 12. The Commission should not entertain this procedural recitation as an attempt to raise the bar on contention admissibility. Despite Staff's failure to comply with its disclosure obligations and the absence of depositions and document demands, the State met and exceeded contention admissibility standards years ago by submitting expert affidavits, numerous exhibits, and three updates to the original Contention NYS-12. Moreover, Entergy conflates the concepts of bases and supporting evidence. *Compare* 10 C.F.R. § 2.309(f)(1)(ii), *with* 10 C.F.R. § 2.309(f)(1)(v), (vi); s*ee* 54 Fed. Reg. 33,168, 33,171 (Aug. 11, 1989) ("The Commission expects that at the contention filing stage the factual support necessary to show that a genuine dispute exists need not be in affidavit or formal evidentiary form and need not be of the quality necessary to withstand a summary disposition motion.").[9] The State is allowed and expected to supplement its supporting evidence as the relicensing proceeding progresses.

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[8] *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), Order (Granting in Part and Denying in Part Applicant's Motions in Limine) at 6 (Mar. 6, 2012) (ML12066A170).

[9] The regulatory history of what is now 10 C.F.R. § 2.309(f)(1) confirms that factual support for a contention and its bases is distinct from the bases themselves. The 1989 changes overturned prior case law that allowed contentions to be accepted without supporting evidence. *See* 54 Fed. Reg. 33,168, 33,170 (Aug. 11, 1989). For a discussion of the difference between bases and supporting evidence, the Commission is directed to State of New York's Answer to Entergy's Mot. in Limine to Exclude Portions of Pre-Filed Test. and Exs. for Consolidated Contention NYS-12C at 4-6 (Feb. 17, 2012) (ML12048B412).

Neither the contention itself, the bases, nor the supporting evidence was ever limited to the single MACCS2 input parameter CDNFRM. At the evidentiary stage, the State built and expanded upon timing issues raised in Sandia *Site Restoration*, which New York cited in both its bases and supporting evidence for Consolidated NYS-12C. *Site Restoration* did discuss, among other things, decontamination time and the effectiveness (DF) and expense of decontamination efforts. *See, e.g.*, viii ("factors disfavoring prompt remediation [include] the lack of Federal plans for expedited cleanups of populated areas in the event of a nuclear accident"); ix, 5-1 (decontamination "could be very costly and require a long period of time"); *see also* NYS Answer to Entergy's Mot. in Limine at 20-21 (Feb. 17, 2012) (ML12048B412).

Likewise, Staff mischaracterizes both the State's evidence and the hearing testimony when it claims that the State's expert "took a different position" from the State's contention by allegedly "agreeing that the Site Restoration Study and other information related to nuclear weapon accident clean-up was not particularly useful for evaluating whether the decontamination values used by Entergy were appropriate" (Staff Answer at 8 citing Tr. at 2012). The State's expert report and pre-filed testimony presents a thorough discussion of *Site Restoration*. Dr. Lemay explained "It's not ideal, but it's a very well put together description of decontamination techniques." Tr. 2012:13-15 (Lemay). Dr. Lemay went on to explain that the state applied the data from several studies, including *Site Restoration*, with appropriate modifications to benchmark Entergy and NRC's decontamination cost input parameter (CDNFRM) — an input value that lacks any documented basis or rationale. *See* Tr. 2012:25-2013:24 (Lemay).

CONCLUSION

NEPA seeks to "ensure 'fully informed and well-considered' decisionmaking." *New York*, 681 F.3d at 476 (quoting *Vt. Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 558 (1978)); *accord Brodsky v. NRC*, 704 F.3d 113, 120 (2d Cir. 2013). By failing to require

Entergy to perform an accurate and realistic SAMA analysis for Indian Point, NRC Staff is failing to inform the public and the Commissioners of the correct number of cost effective mitigation measures and is failing to consider the full range of cost effective mitigation measures. Entergy concedes an 11% increase in severe accidents costs would render at least one additional mitigation measure cost beneficial.[10] The State's evidence shows that the costs are off by a factor of 3 to 7. NYS000340 at 6, Table 13. Thus, in its discretion under 10 C.F.R. 2.341(c)(2), the Commission should, as it deems appropriate, either require additional briefing or reverse LBP-13-13 and resolve NYS-12C in favor of the State.

Respectfully submitted,

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[10] *See* State Proposed Findings ¶¶ 285-89 (Mar. 22, 2013) (ML13081A757) (citing G. Teagarden, MACCS2 IP2 Population Sensitivity Case, Jan. 2012 (ENT000006); MACCS2 Sensitivity Analysis for NYS-16 Using Dr. Sheppard's Proposed Data, Oct. 9, 2012 (ENT000589); Entergy NYS-16B Test. (ENT000003) at 49-50 (A89) (O'Kula, Teagarden, Potts)).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSIONERS

In re:	Docket Nos. 50-247-LR and 50-286-LR
License Renewal Application Submitted by	ASLBP No. 07-858-03-LR-BD01
Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc.	DPR-26, DPR-64 May 22, 2014

CERTIFICATE OF SERVICE

I hereby certify that on May 22, 2014, copies of the State of New York Reply in Support of Petition for Review of Atomic Safety and Licensing Board's November 27, 2013 Partial Initial Decision Concerning Consolidated Contention NYS-12C were served electronically via the Electronic Information Exchange on the following recipients:

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