

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**BEFORE THE COMMISSION**

In the Matter of )	Docket Nos. 50-247-LR and
ENTERGY NUCLEAR OPERATIONS, INC. )	50-286-LR
(Indian Point Nuclear Generating Units 2 and 3) )	April 29, 2015
) )	

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**ENTERGY NUCLEAR OPERATIONS, INC., REPLY BRIEF RELATED TO  
COMMISSION QUESTIONS IN CLI-15-2 CONCERNING CONTENTION NYS-12C**

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## TABLE OF CONTENTS

	Page
TABLE OF AUTHORITIES .....	ii
I. INTRODUCTION .....	1
II. REPLIES TO NEW YORK’S RESPONSES TO COMMISSION QUESTIONS .....	3
A. Question 1 .....	3
1. Support for NUREG/CR-3673’s Use of 90-Day “Average” TIMDEC Value.....	3
2. Source Terms Considered in NUREG/CR-3673 .....	5
3. Uncertainties in NUREG/CR-3673 Decontamination Input Values .....	7
B. Question 2 .....	8
1. Peer Review of NUREG-1150 TIMDEC and CDNFRM Input Values .....	8
2. Use of One-Year Decontamination Period in Spent Fuel Pool Study .....	10
C. Question 3 .....	11
1. Reasonableness of NUREG-1150 TIMDEC and CDNFRM Input Values .....	11
2. Alleged Need for “Benchmarking” of NUREG-1150 Values .....	12
3. Pedigree of the NUREG-1150 Values .....	14
D. Question 4 .....	15
E. Question 5 .....	16
F. Question 6 .....	17
G. Question 7 .....	18
H. Question 8 .....	19
III. CONCLUSION.....	20

## TABLE OF AUTHORITIES

**Page(s)**

### U.S. Supreme Court Decisions

*Baltimore Gas & Elec. Co. v. Natural Res. Def. Council*, 462 U.S. 87 (1983).....9, 15

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*Ass'n of Pub. Agency Customers, Inc. v. Bonneville Power Admin.*,  
126 F.3d 1158, 1188 (9th Cir. 1997) .....10

*Izaak Walton League of Am. v. Marsh*, 655 F.2d 346, 377 (D.C. Cir. 1981), *cert. denied*, 454  
U.S. 1092 (1981).....10

*Lands Council v. Martin*, 529 F.3d 1219, 1226 (9th Cir. 2008). .....8

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*Trout Unlimited v. U.S. Dep't of Agric.*, 320 F.Supp.2d 1090, 1111 (D.Colo. 2004) .....10

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*Entergy Nuclear Generation Co. & Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power  
Station), CLI-10-11, 71 NRC 287 (2010).....7, 8, 10

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Station), CLI-10-15, 71 NRC 479 (2010).....7

*Entergy Nuclear Generation Co. & Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power  
Station), CLI-12-1, 75 NRC 39 (2012)..... 2, 3, 6, 9, 16-18

*Entergy Nuclear Generation Co. & Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power  
Station), CLI-12-10, 75 NRC 479 (2012).....18

*Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 & 3),  
CLI-15-2, 81 NRC \_\_\_, slip op. (Feb. 18, 2015).....1, 19

*Fla. Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 & 4),*  
CLI-01-17, 54 NRC 3 (2001).....10

*Honeywell Int’l, Inc. (Metropolis Works Uranium Conversion Facility),*  
CLI-13-1, 77 NRC 1 (2013).....14

*NextEra Energy Seabrook, LLC (Seabrook Station, Unit 1),*  
CLI-12-5, 75 NRC 301 (2012).....2, 8

*Southern Nuclear Operating Co. (Early Site Permit for Vogtle ESP Site),*  
CLI-10-5, 71 NRC 90 (2010) .....10

**Atomic Safety and Licensing Board**

*Entergy Nuclear Operations, Inc. (Indian Point Nuclear Generating Units 2 & 3),* LBP-13-13, 78  
NRC 246 (2013)..... *passim*

**Federal Regulations**

10 C.F.R. Part 51.....10

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U.S. Mark I Boiling Water Reactor (Oct. 2013).....10, 11

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Experience*, Report of the Chernobyl Forum Expert Group Environment, International Atomic  
Energy Agency (Apr. 2006).....12

Letter from K. Holt, Sandia National Laboratories, to M. O’Neill, Cellular Engineering, with  
encl. “Testing for Radiological Decontamination Strippable Coating for Cellular Bioengineering,  
Inc. (Cs-137, Pu-239, Am-241)” (Oct. 7, 2007) .....12

NUREG-1150, “Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants”  
(Dec. 1990) ..... 3, 4, 7-15

NUREG-1437, Supp. 38, “Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3, Final Report” (Dec. 2010) .....	1
NUREG-1935, “State-of-the-Art Reactor Consequence Analyses (SOARCA) Report, Draft Report for Public Comment” (Jan. 2012) .....	4, 7, 8, 12, 13
NUREG/CR-2239, “Technical Guidance for Siting Criteria Development” (1982) .....	5
NUREG/CR-3673, “Economic Risk of Nuclear Power Reactor Accidents” (May 1984) .....	3, 4, 5, 6, 7, 9
NUREG/CR-4551, Vol. 2, Rev. 1, Part 7, “Evaluation of Severe Accident Risks: Quantification of Major Input Parameters” (Dec. 1990) .....	8, 9
NUREG/CR-6613, “Code Manual for MACCS2, Vol. 1, User’s Guide” (May 1998).....	4

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**ENTERGY NUCLEAR OPERATIONS, INC., REPLY BRIEF RELATED TO  
COMMISSION QUESTIONS IN CLI-15-2 CONCERNING CONTENTION NYS-12C**

**I. INTRODUCTION**

In accordance with Nuclear Regulatory Commission (“NRC” or “Commission”) Order CLI-15-2, Entergy Nuclear Operations, Inc. (“Entergy”) hereby files its reply to New York State’s (“New York” or “NYS”) responses to the Commission’s eight questions concerning Contention NYS-12C (“NYS-12C”).<sup>1</sup> NYS-12C concerns the adequacy of certain decontamination cost and time inputs to the severe accident mitigation alternatives (“SAMA”) analysis prepared by Entergy as part of the Indian Point Energy Center (“IPEC”) license renewal application,<sup>2</sup> and evaluated by the NRC Staff in its related final supplemental environmental impact statement (“FSEIS”).<sup>3</sup>

Throughout its Brief, New York argues that the Board’s merits decision in LBP-13-13 contains factual, legal, and procedural errors that warrant reversal by the Commission. It further accuses the Board of accepting allegedly speculative, unsupported statements by Entergy and Staff

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<sup>1</sup> See *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 & 3), CLI-15-2, 81 NRC \_\_\_, slip op. (Feb. 18, 2015); State of New York Response to Commission Order CLI-15-2 Requesting Further Briefing on Contention NYS-12C Concerning Site-Specific Severe Accident Mitigation Alternatives (Mar. 30, 2015) (“NYS Brief”).

<sup>2</sup> In the MACCS2 code used to perform the IPEC SAMA analysis, the nonfarm decontamination cost and decontamination time parameters identified in CLI-15-2 are called “CDNFRM” and “TIMDEC”, respectively.

<sup>3</sup> NUREG-1437, Supp. 38, “Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3, Final Report” (Dec. 2010) (“FSEIS”).

witnesses, while purportedly ignoring testimony and evidence proffered by New York. New York's claims of error, however, are grossly exaggerated and based on a flawed and myopic reading of the record. The Board's decision is fully supported by voluminous record evidence, well-reasoned, and consistent with direct Commission precedent governing SAMA analyses.

Namely, in LBP-13-13, the Board correctly found that Entergy and the NRC Staff met their respective burdens of proof under the National Environmental Policy Act ("NEPA").<sup>4</sup> Specifically, they demonstrated that the contested MACCS2 code inputs are reasonable and appropriate, as judged under NEPA's "rule of reason," and in view of the NRC's and industry's current state of knowledge and practice regarding SAMA analyses and other severe accident consequence assessments. They further demonstrated that New York's criticisms of Entergy's MACCS2 inputs do not "credibly render the SAMA analysis altogether unreasonable under NEPA standards."<sup>5</sup> Therefore, the Board was under no obligation to discuss the details of New York's alternate (untested and patently flawed) methodologies and MACCS2 input values in its decision.

In contrast, New York did not meet *its* burden to show that the IPEC SAMA analysis is unreasonable or insufficient under NEPA.<sup>6</sup> New York instead asked the Board to ignore NEPA's rule of reason by: (1) relying on irrelevant sources and data (*e.g.*, data that have not been reviewed or validated by the NRC or are not germane to postulated severe reactor accidents); (2) making technically-unjustified assumptions and ignoring established scientific principles; (3) modifying the MACCS2 source code to accept inputs that are incongruous with the code's internal

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<sup>4</sup> See generally *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 & 3), LBP-13-13, 78 NRC 246, 450-74 (2013). Again, NYS-12C concerns the NRC's compliance with NEPA. It is not a safety contention related to the NRC's duties under the Atomic Energy Act of 1954, as amended.

<sup>5</sup> *Entergy Nuclear Generation Co. & Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-12-1, 75 NRC 39, 57 (2012).

<sup>6</sup> See *NextEra Energy Seabrook, LLC* (Seabrook Station, Unit 1), CLI-12-5, 75 NRC 301, 323, 337 (2012) (stating 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," and that "Petitioners must provide factual or expert support that proposed alternatives are warranted because the analysis that was done is insufficient to satisfy NEPA.").

decontamination decision-making logic; and (4) undertaking unnecessary “benchmarking” exercises against various theoretical research papers and studies that are not related to reactor severe accident analyses. Individually, and in their totality, New York’s arguments directly contravene established law, including the Commission’s recent observations that NEPA does not require the NRC to modify the MACCS2 code or to engage in “worst case” analysis.<sup>7</sup> In essence, New York seeks to rewrite NEPA’s requirements rather than strictly apply those requirements to the facts of record. Thus, the Board’s decision must be sustained by the Commission.

## **II. REPLIES TO NEW YORK’S RESPONSES TO COMMISSION QUESTIONS**

### **A. Question 1**

#### **1. Support for NUREG/CR-3673’s Use of 90-Day “Average” TIMDEC Value**

In a gross exaggeration, New York claims that Entergy and the Staff cite “nothing” in NUREG/CR-3673 that supports using the 90-day average decontamination time period for the most severe reactor accident type.<sup>8</sup> It also falsely asserts that the Staff and Entergy do not explain how the 60- and 120-day values used in NUREG-1150 were derived from 90 days, and that there are “inconsistencies” in the time lines described in NUREG/CR-3673 and NUREG-1150.<sup>9</sup>

Entergy fully explained the basis for the 90-day “average” period used in NUREG/CR-3673 and its relationship to the 60-day and 120-day values used in the IPEC SAMA analysis in its Initial Brief.<sup>10</sup> The 90-day decontamination time period used in NUREG/CR-3673 reflects the authors’ staged approach to decontamination and re-habitation of interdicted areas following a postulated severe accident, and represents an “average” value that takes into account all of the

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<sup>7</sup> *Pilgrim*, CLI-12-1, 75 NRC at 53, 57. Nor does NEPA require the NRC to resolve all uncertainties. *Indian Point*, LBP-13-13, 78 NRC at 473 (citations omitted).

<sup>8</sup> NYS Brief at 2-3; NUREG/CR-3673, “Economic Risk of Nuclear Power Reactor Accidents” (May 1984) (NUREG/CR-3673”) (Ex. ENT000466).

<sup>9</sup> NYS Brief at 4-5; NUREG-1150, “Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants” (Dec. 1990) (Ex. NYS00252A-C).

<sup>10</sup> Entergy Nuclear Operations, Inc. Initial Brief in Response to Commission Questions in CLI-15-2 Concerning Contention NYS-12C at 9-15 (Mar. 30, 2015) (“Entergy Initial Brief”).



modeled severe accident scenarios, including ones requiring little decontamination.<sup>11</sup> Entergy's experts fully explained their conclusion that the 60-day and 120-day TIMDEC values used in NUREG-1150 and the IPEC SAMA analysis represent  $\pm 30$ -day sensitivity cases when compared to the 90-day base case from NUREG/CR-3673 and early MACCS code documentation.<sup>12</sup>

New York's claim of purported "inconsistencies" between the NUREG/CR-3673 and NUREG-1150 time lines is unfounded.<sup>13</sup> In MACCS2 modeling of severe accident consequences, the period following the postulated accidental release of a radioactive plume typically is divided into two phases: (1) an early/emergency phase and (2) a long-term phase.<sup>14</sup> MACCS2 allows for the modeling of an intermediate phase between the emergency and long-term phases.<sup>15</sup> In NUREG/CR-3673, the study team chose to model an intermediate phase defined to extend from 7 to 30 days post-accident.<sup>16</sup> In NUREG-1150 and the recent State-of-the-Art Reactor Consequence Analysis ("SOARCA") project, the study teams intentionally excluded the intermediate phase, and instead assumed that the long-term phase (including decontamination efforts) began at seven days after plume passage over a grid element.<sup>17</sup> Thus, the "inconsistency" alleged by New York simply reflects a difference in modeling choices, and is unrelated to the duration of the decontamination period (*i.e.*, TIMDEC value), as modeled in NUREG/CR-3673 (90 days) and NUREG-1150 (60

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<sup>11</sup> See Testimony of Entergy Witnesses Lori Potts, Kevin O'Kula, and Grant Teagarden on Consolidated Contention NYS-12C (Severe Accident Mitigation Alternative Analysis) at 80-86 (A105-A106) (Mar. 30, 2012) ("Entergy Testimony") (Ex. ENT000450); Oct. 18, 2012 Transcript ("Tr.") at 2153:24-2155:3 (O'Kula).

<sup>12</sup> See Entergy Testimony at 85 (A105) (Ex. ENT000450). NUREG/CR-3673 and NUREG-1150 support the conclusion that the two dose reduction factors ("DRFs") (3 and 15) and decontamination times (60 days and 120 days) defined in the IPEC SAMA analysis are appropriate to model early efforts within days to weeks after plume deposition, and before weathering and human activities (both planned and inadvertent) significantly affect the distribution of the contamination. See *id.* 86-87 (A107); Oct. 18, 2012 Tr. at 2186:20-2187:7 (Teagarden).

<sup>13</sup> NYS Brief at 4, 5.

<sup>14</sup> See Entergy Testimony at 30 (A45), 80-83 (A105) (including Fig. 5) (Ex. ENT000450).

<sup>15</sup> See *id.* at 82 (A105); NUREG/CR-6613, "Code Manual for MACCS2, Vol. 1, User's Guide" at 7-2 (May 1998) (Ex. NYS000243).

<sup>16</sup> NUREG/CR-3673 at 4-5 (Fig. 4-2) (Ex. ENT000466).

<sup>17</sup> See Entergy Testimony at 86 (A106) (Ex. ENT000450); NUREG-1150, Vol. 3, App. D at D-30 ("The decontamination efforts were assumed to commence at the end of the 7-day emergency phase.").

days for DRF = 3 and 120 days for DRF = 15). As such, it does not suggest any lack of support for the TIMDEC values used in those studies, nor a fatal flaw under NEPA's rule of reason.

## 2. Source Terms Considered in NUREG/CR-3673

In criticizing the Board's reliance on NUREG/CR-3673, New York argues that the report was prepared in the wake of the "no containment failure" accident at Three Mile Island, and before the Chernobyl and Fukushima accidents.<sup>18</sup> The implication is that NUREG/CR-3673 considered only the least severe type of reactor accident, and nothing on the scale of the releases associated with Chernobyl or Fukushima. That is simply not true.

As the Board correctly noted, NUREG/CR-3673 identified the time to complete decontamination efforts to be about 90 days or less when averaged over all scenarios of severe reactor accidents, including the most severe type of reactor accident (*i.e.*, an "SST1" accident source term as defined in the 1982 Sandia Siting Study (Ex. ENT000453)).<sup>19</sup> NUREG/CR-3673 states that the SST1 – SST3 accident source terms were defined in the 1982 Sandia Siting Study to represent the range of potential releases of radioactive materials resulting from core-melt accidents with *containment failure*.<sup>20</sup> In fact, NUREG/CR-3673 uses SST1 as a basis for comparing the economic model described therein with the Sandia Siting Study (Table 6.6) and the predecessor CRAC2 model (Table 6.7).<sup>21</sup> Thus, there is no basis for New York's claim that NUREG/CR-3673 considered only a "no containment failure" accident source term.<sup>22</sup>

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<sup>18</sup> NYS Brief at 1, 3.

<sup>19</sup> *Indian Point*, LBP-13-13, 78 NRC at 469 (citing NRC Staff Testimony of Nathan E. Bixler, S. Tina Ghosh, Joseph A. Jones and Donald G. Harrison Concerning NYS' Contentions NYS 12/16 at 90 (A81) (Mar. 30, 2012) ("NRC Staff Testimony") (NRC000041)); NUREG/CR-2239, "Technical Guidance for Siting Criteria Development" (1982) ("Sandia Siting Study") (Ex. ENT000453).

<sup>20</sup> NUREG/CR-3673 at 2-10 (Ex. ENT000466). The SST1 release category included accidents that result in containment failure due to rapid overpressurization and release of a large fraction of the core inventory to the environment. *Id.* See also *id.* at 2-7, 6-22 to 6-25 (further describing the SST1 accident category and its use in NUREG/CR-3673).

<sup>21</sup> See *id.* at 6-23 (Tbl. 6.6), 6-24 (Tbl. 6.7).

<sup>22</sup> NYS Brief at 1.

On this same issue, New York claims that its expert used the same methodology used in NUREG/CR-3673 and determined that decontamination at Indian Point would require the deployment of 1.5 million workers for 90 days.<sup>23</sup> Based on that calculation, New York asserts that the assumption underlying NUREG/CR-3673’s 90-day decontamination time is unrealistic and unreasonable for the most severe type of reactor accident at Indian Point.<sup>24</sup>

New York ignores Entergy’s contrary expert testimony that a SAMA analysis considers a broad spectrum of release categories, including those that involve minimal or no failure of the containment, and thus lower accident source terms.<sup>25</sup> It is not concerned only with the most severe release category; *i.e.*, the “Early High” release category singled out by New York’s expert. Moreover, there are frequencies associated with each release category, and the lower magnitude release category frequencies make up a significant portion of the overall release frequency.<sup>26</sup> By focusing on the “Early High” release category in his decontamination worker calculation, New York’s expert essentially applied a worst-case assumption.<sup>27</sup> This is clearly contrary to NEPA.<sup>28</sup>

Using the NUREG/CR-3673 approach, but correctly accounting for the *full* spectrum of release categories and frequencies considered in the IPEC SAMA analysis, Entergy’s experts estimated that the “average” number of decontamination workers would be approximately 60,000 to 80,000 people—the number of people “that would fill Yankee Stadium on any given Sunday.”<sup>29</sup> This figure is comparable to the 46,000 workers cited in NUREG/CR-3763 and reinforces the

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<sup>23</sup> See *id.* at 3-4.

<sup>24</sup> See *id.* at 4.

<sup>25</sup> See Oct. 18, 2012 Tr. at 2153:24-2155:3 (O’Kula).

<sup>26</sup> See *id.* at 2190:23-2191:2 (Teagarden).

<sup>27</sup> See *id.* at 2184:23-24 (Lemay) (“What I would like you to note is that early high is worse than Fukushima.”).

<sup>28</sup> See *Pilgrim*, CLI-12-1, 75 NRC at 53-54, 56-57 (“While the potential worst-case consequences are factored into, and therefore help comprise, the mean values, they are not used as the baseline for the [SAMA] cost-benefit comparisons.”).

<sup>29</sup> *Id.* at 2191:2-8 (Teagarden). For this reason, New York’s later claim in its response to Question 4 that Entergy should develop ranges of values that consider “manpower” limitations (NYS Brief at 21) lacks merit. New York incorrectly assumes the validity of Dr. Lemay’s flawed decontamination worker calculation.

reasonableness of the 90-day average TIMDEC value discussed therein. This approach is consistent with NEPA’s rule of reason.

### 3. Uncertainties in NUREG/CR-3673 Decontamination Input Values

New York claims that due to “large uncertainties,” NUREG/CR-3673 recommended that the “results of future experimentation with decontamination techniques should be used to update models for decontamination.”<sup>30</sup> New York further contends that such “disclaimers and warnings” indicate that the NUREG/CR-3673 authors “did not expect that the reported [average decontamination period of] 90 days would be used decades later without any updating.”<sup>31</sup>

New York’s argument is both conjectural and irrelevant. It overlooks the fact that both the NUREG-1150 and NUREG-1935 (*i.e.*, SOARCA) study teams—in 1990 and 2012, respectively—viewed the use of 60-day and 120-day decontamination time periods (which are based on the 90-day period in NUREG/CR-3673) as reasonable and sufficient for their respective severe accident analyses.<sup>32</sup> Indeed, Entergy’s expert testified that “these values represent the best values that are available for a SAMA analysis,” and “[w]e know of no technically superior values to use for the MACCS code input for these [parameters].”<sup>33</sup> Thus, Entergy’s use of those values in the IPEC SAMA analysis is entirely reasonable under NEPA.<sup>34</sup>

Further, no “updating” of the MACCS2 decontamination models or the NUREG-1150 decontamination time values is necessary, as NEPA does not require Entergy or the NRC to

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<sup>30</sup> NYS Brief at 3.

<sup>31</sup> *Id.*

<sup>32</sup> See Entergy Initial Brief at 18-19, 21, 24 (including testimony and exhibits cited therein).

<sup>33</sup> Oct. 17, 2012 Tr. at 2040:2-5 (Teagarden).

<sup>34</sup> Even assuming “newer” or “better” values were available—which the record shows they are not—NEPA “does not require adherence to a particular analytic protocol.” *Ass’n of Pub. Agency Customers, Inc. v. Bonneville Power Admin.*, 126 F.3d 1158, 1188 (9th Cir. 1997). Further, “[t]here is no NEPA requirement to use the best scientific methodology.” *Entergy Nuclear Generation Co. & Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Station), CLI-10-11, 71 NRC 287, 315 (2010), *petition for reconsideration denied*, CLI-10-15, 71 NRC 479 (2010) (citation omitted).

engage in extensive research to satisfy its “hard look” requirements.<sup>35</sup> Nor does it require Entergy or the Staff to develop new codes and analytical tools to conduct their analysis.<sup>36</sup> In short, “NEPA does not require federal agencies to do the impractical.”<sup>37</sup>

**B. Question 2**

**1. Peer Review of NUREG-1150 TIMDEC and CDNFRM Input Values**

New York asserts that there is “no evidence” that the CDNFRM or TIMDEC values were reviewed as part of NUREG-1150’s peer review process.<sup>38</sup> As a threshold legal matter, NEPA imposes “no legal requirement that a methodology be peer-reviewed or published in a credible source.”<sup>39</sup> In any event, the record does not support New York’s assertion. NUREG-1150 was made available for public comment and subjected to multiple peer reviews that involved an “unprecedented” level of technical scrutiny.<sup>40</sup> Entergy’s experts testified that, “[t]o this day, NUREG-1150, and its supporting technical basis, NUREG/CR-4551, are widely regarded as seminal sources of information for Level-3 PRAs and associated cost-benefit analyses, including SAMA analyses.”<sup>41</sup> In point of fact, the NRC used NUREG-1150-based TIMDEC and CDNFRM values in the recent SOARCA project.<sup>42</sup> This fact alone establishes their continued applicability and the reasonableness of their use in a license renewal SAMA analysis performed under NEPA.

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<sup>35</sup> *Seabrook*, CLI-12-5, 75 NRC at 341.

<sup>36</sup> *Pilgrim*, CLI-10-11, 71 NRC at 315.

<sup>37</sup> *Lands Council v. U.S. Forest Serv.*, 88 F.3d 754, 764 (9th Cir. 1996).

<sup>38</sup> NYS Brief at 5-6, 9.

<sup>39</sup> *Lands Council v. Martin*, 529 F.3d 1219, 1226 (9th Cir. 2008) (internal quotation marks omitted).

<sup>40</sup> Oct. 18, 2012 Tr. at 2370:2-2372:9 (O’Kula); *see also* Entergy Testimony at 21-22 (A35), 55 (A72) (Ex. ENT000450); NRC Staff Testimony at 46 (A39) (Ex. NRC000041); NUREG-1150, Vol. 1 at 1-2 (Ex. NYS000252A). The numerous peer reviews of NUREG-1150 are described on pages 15-17 of Entergy’s Initial Brief.

<sup>41</sup> Entergy Testimony at 55 (A72) (Ex. ENT000450).

<sup>42</sup> *See* Entergy Testimony at 62 (A78) (Ex. ENT000450) (citing NUREG-1935, State-of-the-Art Reactor Consequence Analyses (SOARCA) Report, Draft Report for Public Comment, at 61, 63 (Jan. 2012) (Ex. ENT000455)); Oct. 17, 2012 Tr. at 1951:17-21 (Teagarden).

New York also argues that the Board relied on NUREG/CR-3673's "citation to the missing [Ostmeyer and Runkle] reference in concluding that CDNFRM was subject to secondary peer review."<sup>43</sup> However, New York's argument is based on a false factual premise. In referring to the "secondary peer reviews of the economic cost variables," the Board was referring to peer reviews conducted in connection with NUREG-1150 and its supporting technical basis document NUREG/CR-4551—not to NUREG/CR-3673 or the Ostmeyer report cited therein.<sup>44</sup>

Furthermore, the Board noted the unavailability of the Ostmeyer report (despite the parties' best efforts to locate it), and stated that it "does not find that the document's unavailability renders the NRC Staff's or Entergy's reliance on the NUREG-1150 decontamination cost values 'altogether unreasonable' under NEPA."<sup>45</sup> Based on Staff testimony, the Board found that the NUREG/CR-3673 authors had access to the Ostmeyer report when they prepared NUREG/CR-3673.<sup>46</sup> It further noted that NUREG/CR-3673 expressly states that Dr. Ostmeyer provided technical assistance and advice during the preparation of NUREG/CR-3673.<sup>47</sup> For these reasons, the Board "[did] not agree with New York that NUREG/CR-3673 is necessarily an unreliable source."<sup>48</sup> Moreover, it found that "the Applicant and the NRC Staff 'acted based on the best available information and analysis' in completing the SAMA evaluation."<sup>49</sup> In short, the unavailability of the Ostmeyer report does not render the Board's decision implausible from an

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<sup>43</sup> NYS Brief at 7 (internal quotation marks omitted). New York claims that the decontamination cost information used in NUREG/CR-3673 was obtained from a now-unavailable 1984 report prepared by Sandia National Laboratories, Ostmeyer, R.M. and G.E. Runkle, "An Assessment of Decontamination Costs and Effectiveness for Accident Radiological Releases" ("Ostmeyer report").

<sup>44</sup> See *Indian Point*, LBP-13-13, 78 NRC at 471-72. To put the missing reference in perspective, NUREG-1150 references NUREG/CR-4551, Vol. 2, Rev. 1, Part 7, "Evaluation of Severe Accident Risks: Quantification of Major Input Parameters" (Dec. 1990) (Ex. NYS000248). NUREG/CR-4551, in turn, references NUREG/CR-3673. The missing Ostmeyer report is one of many documents referenced by NUREG/CR-3673.

<sup>45</sup> *Indian Point*, LBP-13-13, 78 NRC at 472 (quoting *Pilgrim*, CLI-12-1, 75 NRC at 57).

<sup>46</sup> *Id.* (citing Oct. 17, 2012 Tr. at 2010:19-25 (Ghosh)).

<sup>47</sup> *Id.* at 473 (citing NUREG/CR-3673 at xix (Ex. ENT000466)).

<sup>48</sup> *Id.*

<sup>49</sup> *Id.* (quoting *Baltimore Gas & Elec. Co. v. NRDC*, 462 U.S. 87, 102 (1983)).

evidentiary standpoint or unreasonable under NEPA.<sup>50</sup> The Board acknowledged the unavailability of the Ostmeier report and explained why the report is not essential to a reasoned consideration of mitigation alternatives.<sup>51</sup> NEPA requires nothing more.<sup>52</sup>

## 2. Use of One-Year Decontamination Period in Spent Fuel Pool Study

New York also asserts that the NRC “changed course from TIMDEC values of 60 and 120 days and used a TIMDEC input value of 365 days” in a recent MACCS2 analysis of a spent fuel pool (“SFP”) severe accident.<sup>53</sup> The study to which New York refers is the NRC’s October 2013 SFP Consequence Study, a product of the Commission’s ongoing post-Fukushima review.<sup>54</sup>

New York’s argument is misplaced for reasons explained by Entergy and the NRC Staff in their oppositions to New York’s second petition for review of LBP-13-13. New York ignores the critical distinction between a SFP accident (as postulated in the SFP Consequence Study) and a severe reactor accident (as postulated in a SAMA analysis).<sup>55</sup> The SFP Consequence Study focused on a *single, low-probability SFP accident* scenario initiated by a very challenging seismic event.<sup>56</sup> Dr. Ghosh explained the Staff’s rationale for applying a 365-day TIMDEC value in the

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<sup>50</sup> See *S. Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), CLI-10-5, 71 NRC 90, 98-99 (2010) (stating that the Commission is “disinclined” to overturn a Board’s factual findings “where a Board has weighed arguments presented by experts and rendered reasonable, record-based findings”). In ruling on NYS-12C, the Board did not overlook or misunderstand important evidence, or make a “clearly erroneous” finding. *Id.* at 99.

<sup>51</sup> Cf. *Trout Unlimited v. U.S. Dep’t of Agric.*, 320 F.Supp.2d 1090, 1111 (D.Colo. 2004) (holding that plaintiffs must show that the missing information is essential to a “reasoned decision” between the alternatives, and that the public was unaware of the limitations of the data relied on).

<sup>52</sup> As the Board noted in LBP-13-13, “NEPA does not require agencies to resolve all uncertainties, including, in this case, uncertainties associated with the NUREG-1150 values used in the IPEC SAMA analysis.” *Indian Point*, LBP-13-13, 78 NRC at 473 (citing *Izaak Walton League of Am. v. Marsh*, 655 F.2d 346, 377 (D.C. Cir. 1981), *cert. denied*, 454 U.S. 1092 (1981)).

<sup>53</sup> NYS Brief at 9.

<sup>54</sup> Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor (Oct. 2013) (“SFP Consequence Study”) (Encl. 1 to SECY-13-0112 (Oct. 9, 2013)) (ML13256A334) (package).

<sup>55</sup> The NRC customarily has studied reactor accidents and spent fuel accidents separately, and the reference to SAMAs in 10 C.F.R. Part 51 applies to reactor accidents—not to spent fuel pool accidents. See, e.g., *Pilgrim*, CLI-10-11, 71 NRC at 312-13; *Fla. Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), CLI-01-17, 54 NRC 3, 21-22 (2001).

<sup>56</sup> See SFP Consequence Study at v, 19.

SFP Consequence Study and emphasized the disparate objectives of that study and a license renewal SAMA analysis (which makes use of Level-3 probabilistic risk assessment, or PRA).<sup>57</sup> In short, she noted that “[i]t is reasonable to choose a longer time (one year) than has been used historically for reactor PRAs, given the significantly larger source term and contaminated land areas calculated, compared to the spectrum projected from reactor PRAs.”<sup>58</sup>

Thus, as the Board correctly concluded, the SFP Consequence Study has no relevance to a license renewal probabilistic SAMA analysis, which considers a spectrum of reactor severe accident scenarios, the most probable of which do not result in large areas of contaminated land.<sup>59</sup> The Commission similarly should reject New York’s argument as groundless.

**C. Question 3**

**1. Reasonableness of NUREG-1150 TIMDEC and CDNFRM Input Values**

New York contends that there is no evidence showing that the NUREG-1150 CDNFRM and TIMDEC values continue to reflect reasonable estimates for severe accident decontamination costs and times today.<sup>60</sup> It further claims that Entergy and Staff have not addressed how difficult and costly it would be to achieve the heavier decontamination effort resulting in a DRF of 15.<sup>61</sup>

Entergy’s response to Question 3 in CLI-15-2 fully explains that the NUREG-1150 CDNFRM and TIMDEC values appropriately account for decontamination times and costs in the IPEC SAMA analysis, including for the heavier (DRF of 15) decontamination effort.<sup>62</sup> In short, the values are reasonable because they are based on the highest quality information currently

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<sup>57</sup> See Affidavit of S. Tina Ghosh in Support of the NRC Staff’s Opposition to State of New York Motion to Reopen the Record and for Reconsideration on Contention NYS-12C (Dec. 23, 2013) (“December 2013 Ghosh Affidavit”) (ML13357A777).

<sup>58</sup> December 2013 Ghosh Affidavit at 2.

<sup>59</sup> See Licensing Board Order (Denying New York’s Motion to Reopen the Record; Setting Deadline for New or Amended Contention) at 3 (Apr. 1, 2014) (unpublished) (ML14091A319).

<sup>60</sup> See NYS Brief at 10.

<sup>61</sup> See *id.*

<sup>62</sup> See Entergy Initial Brief at 19-25.



available (*i.e.*, NUREG-1150 and other NRC-approved documents supporting its development).<sup>63</sup> Standard MACCS2 modeling for NRC severe accident assessments (including the SOARCA study) uses NUREG-1150 input values due to their well-established pedigree within the PRA community.<sup>64</sup> In fact, there is no NRC-accepted alternative to the NUREG-1150 values.<sup>65</sup>

Insofar as New York suggests that DRFs of 15 or greater are not feasible, it ignores record evidence. For example, the 2006 IAEA Report cited by New York summarizes decontamination experiences following the Chernobyl accident, and states that DRFs up to 15 were achieved without resorting to demolition.<sup>66</sup> Section 4.2.3 of the report details decontamination technologies applicable to urban surfaces and presents achievable factors for dose rate reduction (see Table 7 on page 71 of Entergy's Testimony (Ex. ENT000450)).<sup>67</sup> It indicates that DRFs exceeding 15 may be achieved using fairly common decontamination techniques like hosing, sandblasting, and sweeping/vacuuming.<sup>68</sup> Accordingly, there is no basis for New York's claim that Staff and Entergy did not address the feasibility or cost of "heavier" decontamination efforts.

## 2. Alleged Need for "Benchmarking" of NUREG-1150 Values

New York criticizes Entergy and the NRC Staff for not "benchmarking" the NUREG-1150-based CDNFRM values used as inputs to the IPEC SAMA analysis, and purports to have

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<sup>63</sup> Entergy Testimony at 13-16 (A26), 38 (A51), 52 (A70) (Ex. ENT000450); NRC Staff Testimony at 46 (A39), 86 (A77), 89-90 (A81) (Ex. NRC000041).

<sup>64</sup> See Entergy Testimony at 72 (A95) (Ex. ENT000450); Oct. 17, 2012 Tr. at 1951:21-1952:1 (Teagarden); NRC Staff Testimony at 69 (A61) (Ex. NRC00041); Oct. 18, 2012 Tr. at 2158:13-2161:25 (Harrison); *id.* at 2251:13-24 (Jones) (responding to question from Judge Kennedy).

<sup>65</sup> Oct. 17, 2012 Tr. at 1951:13-16 (Teagarden); Oct. 18, 2012 Tr. at 2158-60 (Harrison).

<sup>66</sup> See Entergy Testimony at 70-72 (A92) (ENT000450) (discussing *Environmental Consequences of the Chernobyl Accident and their Remediation: Twenty Years of Experience*, Report of the Chernobyl Forum Expert Group Environment, International Atomic Energy Agency at 73-74 (Apr. 2006) ("IAEA Report") (Ex. NYS000263)).

<sup>67</sup> See *id.*

<sup>68</sup> See *id.* & Tbl. 7, "Achievable Decontamination Factors for Various Urban Surfaces." Another study cited by New York, the "Holt" study, which examined a decontamination technique that uses strippable coatings, showed that, depending on the material being decontaminated, DRFs exceeding 15 could be readily achieved for cesium-137. Entergy Testimony at 104-08 (A131-A132) (Ex. ENT000450) (discussing Letter from K. Holt, Sandia, to M. O'Neill, Cellular Engineering, with encl. "Testing for Radiological Decontamination Strippable Coating for Cellular Bioengineering, Inc. (Cs-137, Pu-239, Am-241)" (Oct. 7, 2007) (Ex. NYS000259)).

performed benchmarking of its own.<sup>69</sup> However, under New York’s own definition of benchmarking, *i.e.*, “establishing points of reference by comparing one’s current practices with what others in the field are doing,”<sup>70</sup> it is clear that Entergy and the Staff have “benchmarked” the contested NUREG-1150 values. Specifically, the NUREG-1150 values have been well-vetted by the nuclear industry, the national laboratories, and the NRC since their inception;<sup>71</sup> used in all NRC-approved SAMA analyses to date;<sup>72</sup> and applied in the NRC’s SOARCA project.<sup>73</sup>

New York also states that its expert (Dr. Lemay) benchmarked Entergy’s and Staff’s values against values that his firm (ISR) developed with several different sources of purportedly relevant data, and that the available data sources resulted in CDNFRM values much higher than Entergy’s values.<sup>74</sup> New York accuses the Board of overlooking this evidence. However, the Board fully discussed Dr. Lemay’s alternative CDNFRM values, and explained why they did not alter the Board’s ultimate conclusion; *i.e.*, that Entergy’s CDNFRM values are reasonable under NEPA.<sup>75</sup> It emphasized that New York had not proposed the alternate CDNFRM values as “replacement values.”<sup>76</sup> Instead, New York claimed only that Dr. Lemay’s proposed CDNFRM values undermined the reasonableness of Entergy’s values. The Board disagreed, and found that none of New York’s arguments rendered Entergy’s selected CDNFRM values “altogether

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<sup>69</sup> NYS Brief at 10-12.

<sup>70</sup> Pre-Filed Written Rebuttal Testimony of Dr. François J. Lemay Regarding Consolidated Contention NYS-12C (NYS-12/12A/12B/12C) at 7:9-11 (June 29, 2012) (Ex. NYS000420).

<sup>71</sup> See Entergy Testimony at 52-58 (A71-72), 59-62 (A76-78) (Ex. ENT000450).

<sup>72</sup> See *id.* at 14 (A26).

<sup>73</sup> See *id.* at 14 (A26), 85-86 (A106). The NRC initiated the SOARCA project in 2006 to develop revised best estimates of the offsite radiological health consequences of severe reactor accidents by including significant plant improvements and updates not reflected in earlier NRC assessments. *Id.* at 26 (A41).

<sup>74</sup> See NYS Brief at 11.

<sup>75</sup> See *Indian Point*, LBP-13-13, 78 NRC at 463-64, 473-74. As reflected in the transcript of the October 18, 2012 hearing, the Board and parties’ witnesses discussed Dr. Lemay’s various approaches and associated assumptions at length. See, *e.g.*, Oct. 18, 2012 Tr. at 2105-170, 2352-369.

<sup>76</sup> *Indian Point*, LBP-13-13, 78 NRC at 473.

unreasonable under NEPA.”<sup>77</sup> Thus, the Board reasonably determined that there was no need to further discuss Dr. Lemay’s alternate approaches and values in its decision.<sup>78</sup>

### 3. Pedigree of the NUREG-1150 Values

New York argues that an internal NRC e-mail questions the “pedigree” of the NUREG-1150 values, and the Board’s failure to acknowledge and discuss that one document constitutes reversible error.<sup>79</sup> Again, New York’s argument fails to accurately reflect the evidentiary record.<sup>80</sup>

As NRC Staff witness Dr. Tina Ghosh explained, the referenced e-mail related to a research proposal submitted by a now-deceased NRC Staff member in late 2010 as part of the NRC’s FY 13 Long-Term Research Program (“LTRP”).<sup>81</sup> A review committee of senior NRC Staff members evaluated the proposal and excluded it from the FY 13 LTRP, assigning it one of the lowest score in the “technical gap” element (meaning that the members concluded that the proposal identified no important technical gap in NRC’s existing regulatory tools and practices).<sup>82</sup> The referenced e-mail thus does not support New York’s claim that use of the NUREG-1150 values is unreasonable, or that the Board committed clear error.

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<sup>77</sup> *Id.* at 472.

<sup>78</sup> In any event, the record makes clear that Dr. Lemay’s decontamination cost estimates (*i.e.*, ISR Approaches A through D) are not reasonable and appropriate benchmarks. For reasons explained by Entergy’s and Staff’s experts, Dr. Lemay’s four cost estimating methodologies are based on inapplicable data and flawed assumptions and do not provide viable alternatives or reasonable comparison points, much less bear the imprimatur of NRC review and approval like NUREG-1150. *See generally* Entergy Testimony at 89-123 (A110-A151), 128-32 (A160) (Ex. ENT000450); NRC Staff Testimony at 69-94 (A62-A84) (Ex. NRC000041).

<sup>79</sup> NYS Brief at 12-13. The cited e-mail contains a statement by an NRC Staff member that the pedigree of some MACCS2 Sample Problem A input values (which are derived from NUREG-1150) is unknown.

<sup>80</sup> Importantly, “the Board was not required to address every piece of record evidence. Its decision not to do so here does not constitute clear error, nor does it indicate that the Board did not take that evidence into account.” *Honeywell Int’l, Inc.* (Metropolis Works Uranium Conversion Facility), CLI-13-1, 77 NRC 1, 27 (2013). Further, the Board fully explained the bases for its conclusion that Entergy’s reliance on input values based on NUREG-1150 was reasonable under NEPA. *See Indian Point*, LBP-13-13, 78 NRC at 467-74.

<sup>81</sup> *See* 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 (Sept. 28, 2012) (“September 2012 Ghosh Affidavit”) (Ex. NRC000164); Oct. 18, 2012 Tr. at 2328:11-24 (Ghosh).

<sup>82</sup> September 2012 Ghosh Affidavit at 4 (Ex. NRC000164).

**D. Question 4**

New York contends that a sensitivity analysis is appropriate for determining the effects that ranges of reasonable, site-specific input values would have on the SAMA analysis.<sup>83</sup> It suggests that Entergy and Staff could use a range of inputs developed based on more recent data sources that its expert used (in ISR Approaches A through D) to calculate alternative nonfarm decontamination cost (CDNFRM) values.<sup>84</sup>

New York’s argument is both legally and factually flawed. Entergy and the Staff relied on well-established and time-tested MACCS2 input values derived from NUREG-1150—or, as the Board correctly put it, “the best available information and analysis.”<sup>85</sup> Those values are not outdated. Further, based on substantial record evidence, the Board found that because the CDNFRM input parameter is a per capita number, the “ultimate decontamination cost estimate (that results from multiplying the per capita input values by the site-specific IPEC region population) results in a site-specific decontamination cost estimate.”<sup>86</sup>

Contrary to New York’s assertions, its expert did not develop “a range of appropriate CDNFRM and TIMDEC inputs” specific to Indian Point.<sup>87</sup> The principal sources of information on which Dr. Lemay relied in ISR Approaches A and B focus on cleanup and decontamination following: (1) a plutonium dispersal event and (2) detonation of a radiological dispersion device—both of which differ in major respects from cleanup of fission products from a severe

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<sup>83</sup> See NYS Brief at 15. New York suggests that Entergy “embrace[d] the appropriateness of a sensitivity analysis” in its testimony on SAMA contention NYS-16B, which challenged Entergy’s population projections. *Id.* at 16. That argument is misleading. In the latter case, Entergy’s experts performed two simple sensitivity cases to evaluate the potential impacts of the population increases posited by New York due to alleged census undercount and commuter inflows. For the reasons discussed in Entergy’s Initial Brief and herein, the CDNFRM and TIMDEC parameters are not so conducive to meaningful sensitivity analyses, especially where New York claims Entergy should use alternate values that fall outside of the MACCS2 code’s accepted ranges and are orders of magnitude larger than the NUREG-1150-based values used in the IPEC SAMA analysis.

<sup>84</sup> See NYS Brief at 18 (listing sources relied on by New York).

<sup>85</sup> See *Indian Point*, LBP-13-13, 78 NRC at 473 (quoting *Baltimore Gas*, 462 U.S. at 102).

<sup>86</sup> *Id.* at 467.

<sup>87</sup> NYS Brief at 17.

reactor accident.<sup>88</sup> Dr. Lemay himself described them as “not ideal.”<sup>89</sup> ISR Approaches C and D also are unreliable because they fail to account for mass conservation principles, as applied in MACCS2, and the non-uniform nature of contamination within a building.<sup>90</sup> Thus, New York’s claim that Entergy and the NRC Staff underestimated the offsite economic risk by a factor of two to seven assumes that Dr. Lemay’s assumptions and calculations are valid, which they are not.<sup>91</sup>

In short, Entergy used reasonable, site-specific decontamination cost values. The alternate values proposed by New York are neither reasonable nor applicable to Indian Point, and any sensitivity cases based on those values would not be useful, technically justified, or required under NEPA. “There is questionable benefit to spending considerable agency resources in an attempt to fine-tune a NEPA mitigation analysis” that the existing record demonstrates is reasonable.<sup>92</sup>

#### **E. Question 5**

New York asserts that the TIMDEC input values used in MACCS2 should “align with the more severe release categories.”<sup>93</sup> Entergy fully refuted that argument in its initial briefs in response to CLI-15-2.<sup>94</sup> By design, a SAMA analysis considers a broad spectrum of accident

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<sup>88</sup> See Entergy Testimony at 25 (A40), 68-69 (A90) (Ex. ENT000450); NRC Staff Testimony at 13 (A6a), 75-78 (A69) (Ex. NRC000041).

<sup>89</sup> Oct. 17, 2012 Tr. at 2012:11-13 (Lemay).

<sup>90</sup> NRC Staff Testimony at 78 (A69), 83 (A74) (Ex. NRC000041).

<sup>91</sup> New York also claims that Entergy and Staff could use the methodology outlined in Draft NUREG/CR-5148 (or “Tawil 1990”)—which was never approved or published as final by the NRC—to develop sensitivity analysis values. NYS Brief at 19-20 (citing Tawil, J.J. & Bold, F.C., NUREG/CR-5148 (PNL-6350), “Property-Related Costs of Radiological Accidents” (Feb. 1990) (Ex. NYS00424A-BB)). Draft NUREG/CR-5148 is not an “Indian Point-specific case study” (NYS Brief at 20), as the draft report itself states: “The results that are reported should *not be considered as representative* of reactor accident consequences either for pressurized water reactors (PWR) in general or *for the Indian Point reactors.*” Draft NUREG/CR-5148 at 1.11 (emphasis added). New York’s own expert conceded that “many of the parameters that are in [Draft NUREG/CR-5148] are wrong,” and that “I’m not advocating this particular example as a NEPA-type and site-specific analysis for Indian Point.” Oct. 18, 2012 Tr. at 2257:8-14 (Lemay). See also Entergy’s Reply to New York State’s Proposed Findings of Fact and Conclusions of Law For Contention NYS-12C (Severe Accident Mitigation Alternatives Analysis Decontamination Costs ) at 40-44 (¶¶ 63-66) (May 3, 2013) (summarizing testimony explaining why the methodology and assumptions used in Draft NUREG/CR-5148 are inapplicable to the IPEC SAMA analysis).

<sup>92</sup> *Pilgrim*, CLI-12-1, 75 NRC at 57.

<sup>93</sup> NYS Brief at 25.

<sup>94</sup> See Entergy Initial Brief at 28-31 (including testimony and evidence cited therein).

scenarios and release categories, including those involving minimal to no containment failure.<sup>95</sup>

Therefore, the TIMDEC inputs to MACCS2 must be representative of *all* of the modeled accidents—from the least to the most severe accidents.<sup>96</sup> An approach that focuses solely on the latter, as proposed by New York, is inconsistent with the goals of a best-estimate SAMA analysis and established NEPA principles, and should be rejected as such.<sup>97</sup>

**F. Question 6**

New York asserts that decontamination times would exceed one year in view of the Fukushima and Chernobyl accidents, and that the SAMA analysis should use TIMDEC values of at least one year because MACCS2 accepts TIMDEC values up to one year.<sup>98</sup> In addition, New York claims to have made only a “modest modification” to the MACCS2 source code.<sup>99</sup>

Entergy has fully explained why the use of TIMDEC values greater than one year is contrary to NEPA’s rule of reason.<sup>100</sup> First, the current, configuration-controlled MACCS2 code does not accept TIMDEC values larger than one year.<sup>101</sup> Second, a SAMA analysis determines mean annual consequences from a spectrum of frequency-weighted release categories and, therefore, is not based on a single radiological release event (like the Fukushima or Chernobyl accidents) under specific meteorological conditions at a single moment in time.<sup>102</sup>

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<sup>95</sup> See Oct. 18, 2012 Tr. at 2153:24-2155:3 (O’Kula); NRC Staff Testimony at 90 (A81) (Ex. NRC000041); *Indian Point*, LBP-13-13, 78 NRC at 468-70.

<sup>96</sup> See Oct. 18, 2012 Tr. at 2153:24-2155:3 (O’Kula); NRC Staff Testimony at 90 (A81) (Ex. NRC000041) (explaining that the MACCS2 TIMDEC value must be a single average value that is representative of all postulated severe accident scenarios).

<sup>97</sup> See *Pilgrim*, CLI-12-1, 75 NRC at 56-57 (stating that NEPA does not require a “worst case” inquiry).

<sup>98</sup> See NYS Brief at 25, 30.

<sup>99</sup> *Id.* at 28.

<sup>100</sup> See Entergy Initial Brief at 31-33 (including testimony and evidence cited therein).

<sup>101</sup> See Entergy Testimony at 73-75 (A97-A99) (Ex. ENT000450).

<sup>102</sup> See *Indian Point*, LBP-13-13, 78 NRC at 457 (citing Entergy Testimony at 18 (A31) (Ex. ENT000450)). With regard to Fukushima, New York states that the cleanup duration has been dictated by the time needed to develop a decontamination plan and to secure approvals from local communities to store waste. Importantly, a SAMA analysis is not directed to specific actions that authorities may take following an actual severe accident, which

Third, the decontamination factor, cost, and time form a “suite of variables” that reflect how MACCS2 models decontamination,<sup>103</sup> such that the code user should not alter one of these variables without evaluating the impact of the change on the other, related variables—something New York failed to do.<sup>104</sup> Finally, while New York describes its modifications to the MACCS2 source code as “modest,” making such modifications without independent verification of proper code functionality is counter to standard industry configuration control and software quality assurance practices.<sup>105</sup> Additionally, forcing a decontamination period beyond a year in the MACCS2 analysis via the TIMDEC variable (as New York’s expert did) is inconsistent with the code’s internal decision-making logic, because it precludes proper modeling of the resettlement of interdicted persons following the cessation of decontamination activities.<sup>106</sup> Again, New York asks the Commission to venture “far beyond NEPA requirements.”<sup>107</sup>

**G. Question 7**

New York tries to cast aside as “vague” and “conclusory” NRC Staff expert Dr. Ghosh’s testimony that existing margin in the IPEC SAMA analysis envelops uncertainties related to decontamination cost estimates.<sup>108</sup> It also argues that Entergy’s uncertainty factors do not account for Level 3 PRA uncertainties.<sup>109</sup> However, the record evidence, as summarized in Entergy’s

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will be “based on the nature of the specific accident or on other real-time information and considerations.” *Entergy Nuclear Generation Co. (Pilgrim Nuclear Power Station)*, CLI-12-10, 75 NRC 479, 486 (2012). Instead, a SAMA analysis models, in an integrated fashion, numerous accident release conditions that could, based on probabilistic analysis, occur at any time under varying weather conditions during a one-year period. *See Indian Point*, LBP-13-13, 78 NRC at 457 (citing Entergy Testimony at 18 (A31) (Ex. ENT000450)).

<sup>103</sup> See Oct. 18, 2012 Tr. at 2200:15-2201:5, 2209:6-20 (Bixler); *see id.* at 2227:8-16 (Teagarden).

<sup>104</sup> *Id.* at 2248:2-9 (Teagarden); *see also id.* at 2269:15-22 (Teagarden). The fact that MACCS2 can accept TIMDEC values of up to one year does not by itself provide a valid technical basis for using a value of one year in a nuclear power plant SAMA analysis.

<sup>105</sup> See Entergy Testimony at 74-77 (A99-A101) (Ex. ENT000450).

<sup>106</sup> *See id.* at 77-80 (A102-A103).

<sup>107</sup> *Pilgrim*, CLI-12-1, 75 NRC at 60.

<sup>108</sup> NYS Brief at 30.

<sup>109</sup> *See id.* at 31-32.

Initial Brief, paints a very different picture.<sup>110</sup> In short, in testifying that the “existing margin” in the IPEC SAMA analysis accommodates uncertainties of various types, including those associated with the Level 3 PRA,<sup>111</sup> Dr. Ghosh explained that the theoretical benefit of actually implementing all of the twenty-two IP2 and IP3 SAMAs identified by Entergy as potentially cost-beneficial would exceed the maximum attainable benefit (*i.e.*, eliminate the baseline risks of plant operation) for IP2 and IP3, and, in the case of IP2, eliminate the baseline risks twice over.<sup>112</sup> As discussed on pages 34-37 of Entergy’s Initial Brief, the existing margin in the IPEC SAMA analysis reflects the numerous conservatisms embedded in the analysis, one of which includes the use of an uncertainty factor or multiplier (estimated as the ratio of the 95th percentile core damage frequency (“CDF”) to the mean CDF). Dr. Ghosh testified that “this multiplier is meant to account for analysis uncertainties generally, not just uncertainties in the level 1 PRA.”<sup>113</sup> This testimony is fully consistent with the Commission’s previous observation that, as in the IPEC SAMA analysis, “[t]he *final cost-benefit comparisons* are based not on the baseline analysis results, *but on revised results that take into account an uncertainty factor.*”<sup>114</sup>

#### **H. Question 8**

New York asserts that, to properly rely on the *Site Restoration Report*, its expert “modified the cost of decontamination values using information from Luna’s *Survey of Costs* and U.S. Census data to calculate CDNFRM.”<sup>115</sup> Contrary to New York’s claim, neither the *Site Restoration Report* nor Luna’s *Survey of Costs* provides any support for New York’s claims in NYS-12C. The Luna paper, like the *Site Restoration Report*, concerns small-scale, non-reactor

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<sup>110</sup> See Entergy Initial Brief at 33-37 (Entergy response to Question 7 in CLI-15-2).

<sup>111</sup> See Oct. 18, 2012 Tr. at 2235:5-10 (Ghosh).

<sup>112</sup> *Id.* at 2163:10-2166:8 (Ghosh).

<sup>113</sup> NRC Staff Testimony at 93-94 (A84) (Ex. NRC000041).

<sup>114</sup> *Pilgrim*, CLI-12-1, 75 NRC at 58 (emphasis added).

<sup>115</sup> NYS Brief at 37.



dispersion events (*i.e.*, events involving radiological dispersion devices) and, therefore, lacks applicability in the present context.<sup>116</sup> Furthermore, as discussed in considerable detail on pages 92 to 116 of Entergy's prefiled testimony on NYS-12C (ENT000450), Dr. Lemay's related assumptions and calculations in ISR Approaches A and B contain numerous significant errors.<sup>117</sup>

### III. CONCLUSION

New York's brief fails to demonstrate any clear error in the Board's decision on NYS-12C. Therefore, the Commission should affirm that decision based on the current adjudicatory record.

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Dated in Washington, D.C.  
this 29th day of April 2015

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<sup>116</sup> See Entergy Testimony at 92-93 (A119) (Ex. ENT000450).

<sup>117</sup> See also *id.* at 129-132 (A160) (summarizing the numerous flawed assumptions and errors in Dr. Lemay's alternative nonfarm decontamination cost values, as based on ISR Approaches A through D).

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**BEFORE THE COMMISSION**

In the Matter of	)	Docket Nos. 50-247-LR and
	)	50-286-LR
ENTERGY NUCLEAR OPERATIONS, INC.	)	
	)	
(Indian Point Nuclear Generating Units 2 and 3)	)	April 29, 2015
	)	

**CERTIFICATE OF SERVICE**

I hereby certify that on this date a copy of “Entergy Nuclear Operations, Inc. Reply Brief Related to Commission Questions in CLI-15-2 Concerning Contention NYS-12C” was submitted through the NRC’s E-filing system.

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