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STATE OF NEW YORK
OFFICE OF THE ATTORNEY GENERAL

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ATTORNEY GENERAL

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DIVISION OF SOCIAL JUSTICE
ENVIRONMENTAL PROTECTION BUREAU

VIA OVERNIGHT COURIER

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Rulemaking, Directives, and Editing Branch
Division of Administrative Services
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U.S. Nuclear Regulatory Commission
11555 Rockville Pike
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April 15, 2010

12/31/2008
73 FR 80440
32

Re: *Supplemental Comments Concerning Indian Point Draft SEIS*

Dear Chief Lesar:

On March 19, 2010 the State of New York submitted supplemental comments (including an attachment) concerning the Draft Supplemental Environmental Input Statement (DSEIS) concerning the renewal of the operating licenses for the Indian Point reactors and associated facilities. A copy of that submission is attached for your convenience.

In its March 19 submission, the State requested (at p. 37-38) that NRC Staff notify the State whether or not Staff would issue a supplemental DSEIS and seek additional public comment on that document. The State requested a response by March 29, 2010. To date, the State has not received a response to the State's inquiry.

The State reiterates its request and requests the courtesy of a response.

Respectfully,

John Sipos
Assistant Attorney General
(518) 402-2251

enclosure: March 19, 2010 State of New York Submission and Attachment

cc: Joan Matthews
Janice Dean

SUNSI Review Complete

*E-RIDS = ADM-03
Call = A. Stoyenberg (A153)*

Template = ADM-013

**STATE OF NEW YORK
SUPPLEMENTAL SUBMISSION CONCERNING
DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT
STATEMENT REGARDING THE LICENSE RENEWAL OF
INDIAN POINT UNITS 2 AND 3, AND RECENT EVENTS INCLUDING
THE DECEMBER 2009 REANALYSIS OF
SEVERE ACCIDENT MITIGATION ALTERNATIVES ANALYSIS AND THE FEDERAL
GOVERNMENT'S DECISION TO WITHDRAW THE APPLICATION FOR YUCCA MOUNTAIN**

March 19, 2010

The State of New York respectfully provides this supplemental submission: (1) to emphasize the magnitude of the changes made to the Severe Accident Mitigation Alternatives ("SAMA") analysis recently submitted by Entergy; (2) to emphasize the need for NRC Staff to order Entergy to complete the cost-benefit analysis or to complete the cost-benefit analysis itself; (3) to emphasize how those changes, and the completed cost-benefit analysis should impact the positions taken by NRC Staff in the Draft Supplemental Environmental Impact Statement ("DSEIS") regarding the adequacy of Entergy's SAMA analysis and the adequacy of the actions Entergy has committed to take in light of the SAMA analysis, and (4) to request that, given these substantial changes to the SAMA analysis, NRC Staff issue a supplement to the DSEIS related to the SAMA analysis.

In addition, the State calls NRC Staff's attention to the fact that the United States Department of Energy ("DOE") recently filed a motion to withdraw its application for a permit to construct and operate a long-term high-level radioactive waste disposal site at Yucca Mountain, Nevada. Now, more than ever, NRC Staff must examine the environmental impacts of the indefinite storage of high-level waste at Indian Point.

The President's Council on Environmental Quality's ("CEQ") regulations, which NRC has committed to obey, require NRC to prepare a supplement to the DSEIS to address these issues. See 40 C.F.R. Section 1502.9(c)(a)(ii)(supplemental DSEIS required if "[t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts"); *Marsh v. Oregon Natural Resources Council* 490 U.S. 360, 374 (1989); *Limerick Ecology Action, Inc., v. NRC*, 869 F.2d 719, 725 (3d Cir. 1989).

SIGNIFICANT NEW INFORMATION

On December 14, 2009, Entergy submitted to the Atomic Safety and Licensing Board ("ASLB"), the State of New York, and the other parties in the Indian Point Units 2 and 3 relicensing proceeding an entirely new SAMA analysis which modified various inputs and outputs in the original SAMA analysis ("December 2009 SAMA Reanalysis") ML093620026. The new December 2009 SAMA Reanalysis is not merely a minor alteration in the previous analysis, but represents an entirely new SAMA analysis using different assumptions and input values and producing markedly different results. The new analysis does not merely modify a few parts of the prior analysis but, rather, replaces that prior analysis.

Review of the December 2009 SAMA Reanalysis and its supporting documentation reflects that many modifications were made in the MACCS2 and SAMA reanalysis. For example, Entergy not only substantially altered the meteorological inputs to account for an erroneous wind direction in the initial SAMA, it also chose to

use one year, the year 2000, as the only year of meteorological inputs rather than its previous approach of averaging five years (years 2000-2004). December 2009 SAMA Reanalysis at 4-5. It further incorporated in the "base case" analysis additional factors related to lost tourism and business as the result of a severe accident. *Id.* at 5. It ran new sensitivity analyses incorporating a new severe accident scenario. *Id.* at 4. It also recalculated the costs for several previously-identified SAMAs by engaging in more detailed engineering cost analyses of proposed mitigation measures. *Id.* at 7-8. It appears that Entergy may also have corrected a formatting error when it prepared the December 2009 SAMA Reanalysis, a formatting error that significantly altered the cost-benefit analysis by greatly understating the benefit of various mitigation measures. *See* March 11, 2010 Statement of David Chanin, ¶ 11 (attached). The 2009 SAMA Reanalysis reflects substantial increases in population dose risk and off site economic cost risk. *See id.* at ¶¶ 8-10. It appears the correction of this error in the December 2009 SAMA Reanalysis increased the value of "non-farm wealth" and, in turn, contributed to the increase of economic costs that would be avoided if certain mitigation measures were adopted. *Id.*

A result of these changes in the new SAMA reanalysis is that nine new mitigation measures that were previously reported not to be cost-effective - five for Unit 2 and four for Unit 3 - may now be cost-effective. Nine other SAMAs that were found to be marginally cost-effective in the original SAMA analysis are now, in the December 2009 SAMA Reanalysis, substantially more cost-effective. *See and Compare*

Environmental Report ("ER"), Appendix E, at 4-74 to 4-78 *with* December 2009 SAMA Reanalysis, at 10-28. In short, the December 2009 SAMA Reanalysis reflects a "do over" of the Severe Accident Mitigation Alternative analysis required by 10 C.F.R. § 51.53 (c)(3)(ii)(L) and identifies, or increases the viability of, eighteen mitigation alternatives to Entergy's proposed license renewal.

One serious deficiency in the December 2009 SAMA Reanalysis was the failure to fully complete the cost-benefit analysis for the SAMAs which are shown to be cost-effective. Before NRC Staff can complete the NEPA impact statement process, it must either require Entergy to complete the cost-benefit analysis for all potentially cost-effective SAMAs or NRC Staff must complete the cost-benefit analysis itself.

**NRC STAFF SHOULD ORDER ENTERGY TO COMPLETE
THE COST-BENEFIT ANALYSIS OR SHOULD COMPLETE
THE COST-BENEFIT ANALYSIS ITSELF**

The December 2009 SAMA Reanalysis asserts that the newly-discovered, potentially cost-effective SAMAs need not be implemented as part of license renewal (and thus that the cost-benefit analysis need not be completed) since the measures outlined in the integrated plant assessment are sufficient to manage the effects of aging during the license renewal period without them, pursuant to 10 C.F.R. Part 54. December 2009 SAMA Reanalysis, at 32. But Part 54 specifically requires full compliance with the requirements of 10 C.F.R. Part 51 (*see* 10 C.F.R. § 54.29(b)), and the SAMA analysis is conducted pursuant to Part 51, particularly 10 C.F.R.

§ 51.53(c)(3)(ii)(L), as well as the legal obligations imposed by the United States Court of Appeals for the Third Circuit in *Limerick Ecology Action, Inc. v. NRC*, 869 F.2d 719 (3d Cir. 1989). Those authorities do not grant an exemption from consideration in a license renewal proceeding to any mitigation measure. By considering those measures in the SAMA analysis, both Entergy and NRC Staff essentially concede as much.¹

Nothing in Part 54 justifies the failure to complete the engineering cost analyses. Part 51 requires that “[i]f the staff has not previously considered severe accident mitigation alternatives for the applicant's plant in an environmental impact statement or related supplement or in an environmental assessment, a consideration of alternatives to mitigate severe accidents must be provided.” 10 C.F.R. § 51.53 (c)(3)(ii)(L).

The State is concerned that the December 2009 SAMA Reanalysis reflects a view fundamentally at odds with NEPA and the Third Circuit's ruling in *Limerick Ecology. Limerick Ecology Action, Inc. v. NRC*, 869 F.2d 719 (3d Cir. 1989), is the most significant court case that bears on the issue of whether a SAMA analysis can ignore the full analysis of mitigation alternatives based on the assertion that such full analysis can be.

¹ The only prohibition on consideration of issues in a license renewal proceeding is contained in 10 C.F.R. § 54.30. That section merely prohibits consideration of issues related to an applicant's non-compliance with its current licensing basis (“CLB”). That consideration is unrelated to the SAMA analysis which is focused on imposition of additional safety requirements not because of non-compliance with the CLB but because, under an appropriate NEPA alternatives analysis, an alternative license, with more safety requirements, is deemed preferable to the proposed action because the human, economic and environmental consequences of a severe accident will be reduced and the reduction will be cost-effective.

avoided because the mitigation measures alternatives are barred from consideration in license renewal by safety regulations (*i.e.*, Part 54). *Limerick* held, in pertinent part:

Although NEPA imposes responsibilities that are purely procedural, *see Vermont Yankee*, 435 U.S. at 558, there is no language in NEPA itself that would permit its procedural requirements to be limited by the AEA. Moreover, there is no language in AEA that would indicate AEA precludes NEPA.

[C]ourts have repeatedly held that, as suggested by the legislative history, compliance with NEPA is required unless specifically excluded by statute or existing law makes compliance impossible. *See, e.g., Public Service Co. of New Hampshire v. NRC*, 582 F.2d 77, 81 (1st Cir.) ("The directive to agencies to minimize all unnecessary adverse environmental impact obtains except when specifically excluded by statute or when existing law makes compliance with NEPA impossible."), *cert. denied*, 439 U.S. 1046, 99 S. Ct. 721, 58 L. Ed. 2d 705 (1978). Accordingly, "unless there are specific statutory provisions which necessarily collide with NEPA, the Commission was under a duty to consider and, to the extent within its authority, minimize environmental damage. . . ." *Public Service*, 582 F.2d at 81 (footnote omitted). On the basis, therefore, of the language of NEPA and AEA, the legislative history of NEPA, and the existing case law, we find no intent by Congress that the AEA preclude application of NEPA.

Id. at 729-730 (footnotes omitted).

The *Limerick* court also reaffirmed the obligation on NRC to take a "hard look" at alternatives to the proposed action by thoroughly discussing those alternatives:

to qualify, the [final environmental statement] must contain sufficient discussion of the relevant issues and opposing viewpoints to enable the decisionmaker to take a "hard look" at the environmental factors and to make a reasoned decision. *Kleppe v. Sierra Club*, 427 U.S. 390, 410 n.21, 49 L.

Ed. 2d 576, 96 S. Ct. 2718 (1976). The impact statement must be sufficient to enable those who did not have a part in its compilation to understand and consider meaningfully the factors involved. *Environmental Defense Fund, Inc. v. Corps of Engineers*, 492 F.2d 1123, 11367 (5th Cir. 1974). Cf. *Dunlop v. Bachowski*, 421 U.S. 560, 572, 44 L. Ed. 2d 377, 95 S. Ct. 1851 (1975) (noting that a statement by an agency of the reasons for its determination is crucial to effective judicial review). Here, as we discussed *supra* ... the FES neither considered nor specifically rejected [severe accident mitigation design alternatives].

Id. at 737 (footnotes omitted). Failing to complete the economic analysis necessary to determine whether a mitigation measure is cost-effective prevents a "hard look" at the alternative.

NRC Staff Guidance for conducting the SAMA analysis is contained in Reg.

Guide 4.2, Supplement 1 (September 2000) and provides that the SAMA analysis should include the following information:

4. Estimate the value of the reduction in risk. Value is usually calculated for public health, occupational health, offsite property, and onsite property. A detailed discussion of calculating values is found in Chapter 5 of NUREG/BR-0184.
5. Estimate the approximate cost of each modification and procedural and administrative change found to reduce the dose consequence risk of severe accidents. Potential SAMAs that are not expected to be cost beneficial, even when uncertainties in the analysis (e.g., a factor of 10) are taken into consideration, may be screened out based on a bounding analysis.
6. Perform a more detailed value-impact analysis for remaining SAMAs to identify any plant modifications and

procedural changes that may be cost-effective (see Chapter 5 of NUREG/BR-0184).

7. List plant modifications and procedural changes (if any) that have or will be implemented to reduce the severe accident dose consequence risk.

Id. at 4.2-S-50.

NRC Staff has acknowledged that the additional steps needed to complete the SAMA analysis are the very steps the December 2009 SAMA Reanalysis asserts are allowed to be postponed to some future date, outside the relicensing process:

The final step in the process is a more detailed analysis of the SAMAs that were identified as being potentially cost-beneficial in the steps above. This may include a more detailed (*i.e.*, more realistic and less bounding) evaluation of the potential benefits of the SAMA (*i.e.*, rather than assuming that the SAMA eliminates all CDF contributors, only those sequences relevant to the SAMA are included). It may also include a more detailed development of the cost associated with the proposed modification (including such things as engineering support, training, hardware costs, and implementation costs).

See Ghosh, Tina; Palla, Robert; and Helton, Donald; Perspectives on Severe Accident Mitigation Alternatives for U.S. Plant License Renewal (ML092750488) at 5.

Rather than “perform[ing] a more detailed value-impact analysis for remaining SAMAs to identify any plant modifications and procedural changes that may be cost-effective” as required by Reg. Guide 4.2, Supplement 1, thereby enabling NRC Staff to determine the appropriateness of “plant modifications and procedural changes (if any) that have or will be implemented to reduce the severe accident dose consequence risk,”

the December 2009 SAMA Reanalysis indefinitely postpones the engineering cost-benefit analyses required to determine whether a proposed mitigation measure is cost-effective and, thus, will be implemented. December 2009 SAMA Reanalysis at 32.

The failure to properly conduct the SAMA analysis also prevents NRC Staff from making the necessary findings in the SEIS as identified in the Standard Review Plans for Environmental Reviews for Nuclear Power Plants – Supplement 1: Operating License Renewal, NUREG-1555 (Oct. 1999) (“NRC Standard Review Plan”), which provides in pertinent part:

If the reviewer determines that there was no previous consideration of SAMAs for the plant, then the reviewer should prepare a statement for the SEIS similar to the following:

The staff has concluded that the applicant completed a comprehensive, systematic effort to identify and evaluate the potential plant enhancements to mitigate the consequences of severe accidents. The staff has considered the robustness of this conclusion relative to critical assumptions in the analysis – specifically the impact of uncertainties in the averted offsite risk estimates and the use of alternative benefit-cost screening criteria. The staff has concluded that the findings of the analysis would be unchanged even considering these factors. *Therefore, the staff concludes that the mitigation alternatives committed to by the applicant are appropriate, and no further mitigation measures are warranted.*

NRC Standard Review Plan at 5.1.1-7 to 5.1.1-8 (emphasis added). As the italicized sentence illustrates, NRC Staff recognizes that once a SAMA analysis is properly

completed, it is required to compel an applicant to commit to implement those SAMA mitigation measures that are "warranted," *i.e.*, those that are found to be sufficiently cost-effective. Stated differently, this NRC document confirms that before a SEIS for a license renewal application is complete, NRC and its staff must ensure, based on the SAMA analysis, that the applicant has committed to implement all sufficiently cost-effective mitigation measures revealed by that analysis and that, because of that binding commitment, no further mitigation measures are warranted. The NRC Standard Review Plan makes clear that a SAMA analysis is not a mere academic exercise with no consequences in the real world; rather, the SAMA analysis is an integral and substantive part of the license renewal process whose results bind the applicant to implement sufficiently cost-effective mitigation measures. Since the December 2009 SAMA Reanalysis does not contain a completed engineering cost analysis for all potentially cost-effective SAMAs, it cannot be used to determine which mitigation alternatives are actually cost-effective. Thus, NRC Staff cannot make a finding that the "mitigation alternatives committed to by [Entergy] are appropriate, and no further mitigation measures are warranted." *Id.*

The State's position is also supported by the Nuclear Energy Institute ("NEI"), the trade association for the nuclear industry, which has also developed guidance for conducting a SAMA analysis (*see* NEI 05-01(Rev. A) Severe Accident Mitigation Alternatives (SAMA) Guidance Document ("NEI 05-01(Rev. A)")), and which was formally approved by NRC Staff for use in conducting SAMA analyses. *See* 74 Fed.

Reg. 45466 (Notice of Availability of the Final License Renewal Interim Staff Guidance LR-ISG-2006-03: Staff Guidance for Preparing Severe Accident Mitigation Alternatives Analyses) (Aug. 14, 2007) (“The NRC staff recommends that applicants for license renewal follow the guidance provided in Nuclear Energy Institute (NEI) 05-01, ‘Severe Accident Mitigation Alternatives (SAMA) Analysis – Guidance Document,’ Revision A, when preparing their SAMA analyses”). NEI 05-01(Rev. A) provides in relevant part that:

As SAMA analysis focuses on establishing the economic viability of potential plant enhancement when compared to attainable benefit, often detailed cost estimates are not required to make informed decisions regarding the economic viability of a particular modification. SAMA implementation costs may be clearly in excess of the attainable benefit estimated from a particular analysis case. For less clear cases, engineering judgment may be applied to determine if a more detailed cost estimate is necessary to formulate a conclusion regarding the economic viability of a particular SAMA. *Nonetheless, the cost of each SAMA candidate should be conceptually estimated to the point where economic viability of the proposed modification can be adequately gauged.*

Id. at 28 (emphasis added). Entergy is a member of NEI and holds a position on NEI’s Executive Committee.² Although the December 2009 SAMA Reanalysis asserts that it follows NEI guidance and even quotes this same portion of the NEI guidance document, it is evident that the SAMA Reanalysis has not been completed to the point where the “economic viability of the proposed modification can be adequately gauged”

² http://www.nei.org/resourcesandstats/documentlibrary/how_it_works/reports/governance-and-member-roster (last visited March 19, 2010).

since the Reanalysis acknowledges that further engineering cost analysis is required. *Id.* at 8 and 32.

Entergy's December 2009 SAMA Reanalysis specifically rejects the NEI guidance and chooses instead to postpone to an indefinite future date the necessary cost-benefit analysis to allow the potential mitigation alternative to "be adequately gauged" (NEI 05-01(Rev. A) at 28). *Id.* at 32.

NRC guidance documents related to the proper methodology for conducting a regulatory analysis cost-benefit evaluation provide further confirmation of the obligation to conduct a complete cost-benefit evaluation as part of a SAMA analysis and to commit to implement those measures which, following such an analysis, are found to be sufficiently cost-effective. Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission NUREG/BR-0058, Revision 4 (September 2004) set forth the guidelines to be used for determining when a safety measure – which is not otherwise required to be implemented – should be implemented because it is deemed cost-effective. The Regulatory Analysis includes the following:

[T]he principal purposes of a regulatory analysis are to help ensure the following:

- The NRC's regulatory decisions made in support of its statutory responsibilities are based on adequate information concerning the need for and consequences of proposed actions.
- Appropriate alternative approaches to regulatory objectives are identified and analyzed.
- *No clearly preferable alternative is available to the proposed action.*
- Proposed actions subject to the backfit rule (10 CFR 50.109),

and not within the exceptions at 10 CFR 50.109(a)(4), provide a substantial³ increase in the overall protection of the public health and safety or the common defense and security and that the direct and indirect costs of implementation are justified in view of this substantial increase in protection.

³The Commission has stated that "substantial" means important or significant in a large amount, extent, or degree (Ref. 21)[³]. Applying such a standard, the Commission would not ordinarily expect that safety-applying improvements would be required as backfits that result in an insignificant or small benefit to the public health and safety, regardless of costs. On the other hand, the standard is not intended to be interpreted in a manner that would result in disapprovals of worthwhile safety or security improvements having costs that are justified in view of the increased protection that would be provided. This approach is flexible enough to allow for qualitative arguments that a given proposed rule would substantially increase safety.

Id. at 4 (emphasis added).

Since the NRC Staff portion of the SAMA analysis will require it to determine whether a clearly preferable alternative exists to the proposed relicensing, *i.e.*, whether a new license should include additional safety measures to be undertaken by Entergy as a condition of obtaining a license to operate another 20 years, it must have a full cost-benefit analysis to make that determination.

NRC Staff has acknowledged that the guidance provided in NUREG/BR-0058 is directly relevant to conducting SAMA analyses. "To identify SAMAs that may be cost-

³ Reference 21 is "S. Chilk, Staff Requirements Memorandum to J.M. Taylor and W.C. Parler, 'SECY-93-086 – Backfit Considerations,' June 30, 1993." As of March 10, 2010, this SRM document was not available on the public version of ADAMS; its microfiche PDR Accession No. 9307300095 930630.

beneficial, the net value of each SAMA is estimated. The NRC maintains two documents that provide guidance in this area: NUREG/BR-00586 and NUREG/BR-0184 [Regulatory Analysis Technical Evaluation Handbook, U.S. Nuclear Regulatory Commission, January 1997].” Ghosh, Tina; Palla, Robert; and Helton, Donald; Perspectives on Severe Accident Mitigation Alternatives for U.S. Plant License Renewal (ML092750488) at 4.

NRC Staff has an obligation to evaluate the SAMAs submitted by an applicant to determine whether the applicant’s proposed mitigation measures are “appropriate” and whether any other mitigation measures are “warranted.” See NRC Standard Review Plan for Environmental Reviews for Nuclear Power Plants – Supplement 1: Operating License Renewal (Oct. 1999) at 5.1.1-9. Moreover, NRC staff has stated that the Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission apply to evaluating SAMAs; under those guidelines SAMAs should be implemented if they provide a “substantial benefit. See NUREG/BR-0058, Revision 4 (September 2004). Therefore, a cost-benefit analysis is required in order to permit NRC Staff to evaluate an applicant’s choice of mitigation measures and to order implementation of those which are sufficiently cost-effective and which an applicant has not agreed to implement. Because agencies must provide a rational basis for their actions, a refusal to compel implementation of a mitigation measure which provides a substantial benefit that far exceeds its cost will violate the obligations of the Administrative Procedure Act. *Bowman Transp., Inc. v. Arkansas-Best Freight System, Inc.* 419 U.S. 281, 285-286 (1974).

quoting *Burlington Truck Lines v. United States*, 371 U.S. 156, 168 (1962)(the “agency must articulate a ‘rational connection between the facts found and the choice made’”); *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 57 (1983).

The December 2009 SAMA Reanalysis identified several potentially cost-effective measures that could reduce the risk to the State of New York and its citizens in the event of a severe accident at Indian Point and that were not previously identified as potentially cost-effective.⁴ However, contrary to the above-referenced requirements, the cost estimates for these safety measures have not been completed. Rather, the December 2009 SAMA Reanalysis has identified SAMAs which are only “potentially” cost-effective, and stated that it will conduct another step, an engineering project cost-benefit analysis, at some undetermined time in the future, outside of this proceeding to determine whether these measures are actually cost-effective. *Id.* at 32. In doing so, the December 2009 SAMA Reanalysis has deprived NRC Staff of the ability to evaluate, and render a rational decision regarding which mitigation measures, if any, are sufficiently

⁴ Several mitigation measures previously identified as not cost-effective and now found to be cost-effective were not included in the list of such mitigation measures provided by Entergy in its December 2009 SAMA Reanalysis. *See, e.g., compare* December 2009 SAMA Reanalysis at 31-32 (listing IP2 SAMAs 021, 022, 062 and IP3 SAMAs 007, 018, 019 as cost-effective) *with* Entergy’s Environmental Report, Attachment E at E.2-38 (where IP2 SAMA 009 was initially identified as “Not cost-effective”) and December 2009 SAMA Reanalysis at 11 (now listing IP2 SAMA 009 as cost-effective and now identifying it as a SAMA to be “retain[ed]”). In addition, Entergy’s Environmental Report initially listed IP2 SAMA 053 and IP3 SAMA 053 as not cost-effective, but the December 2009 SAMA Reanalysis now indicates that these measures are cost-effective and states that they should be “retain[ed].” *See* December 2009 SAMA Reanalysis at 17, 27. Nine other mitigation measures are now substantially

cost-effective that their inclusion as a condition for an extended operating license period and a new operating license is warranted. NRC Staff should direct Entergy to complete the required cost-benefit analyses, or, in order to assure that it meets its obligations under NEPA, NRC Staff must complete the cost-benefit analysis itself.

**THESE SAMAS, IF ADOPTED, WOULD
SIGNIFICANTLY REDUCE THE ENVIRONMENTAL
EFFECT OF THE PROPOSED ACTION IN A
MANNER NOT PREVIOUSLY CONSIDERED**

The December 2009 SAMA Reanalysis has identified nine SAMAs that, while previously marginally cost-effective, are now substantially cost-effective. The Reanalysis discloses that IP2 SAMAs 028 and 044 and IP3 SAMA 055 have now become cost-effective for the baseline benefit comparison and not just for the benefit with uncertainty comparison. In addition, IP2 SAMA 028 has been subjected to an upwardly revised cost estimate. See December 2009 SAMA Reanalysis at 7-9, 14 and the note at the bottom of 19. Thus, these SAMAs are more likely to remain cost-effective even after further upward ratcheting of the cost estimate.

There are six other SAMAs where the differences between the original calculation and the new calculation are dramatic, particularly the sheer dollar value of the difference - *e.g.*:

- IP2 SAMA 054, where the baseline benefit is now \$5.4 million greater than the estimated cost, which was only \$1.2 million greater before;
- IP2 SAMA 060, where the baseline benefit is now six times greater than

more cost-effective than originally determined in the initial SAMA analysis.

the cost (\$1.275 million to \$216,000) which was only \$160,000 greater before;

- IP2 SAMA 061, where the baseline benefit is now over 14 times greater than the cost compared to a mere \$800,000 difference between benefit and cost (less than twice as much);
- IP3 SAMA 061, where benefit now exceeds the cost by more than \$3.75 million, which is 8 times the cost while previously the benefit exceeded the cost by less than \$1 million and less than 3 times; and
- IP3 SAMA 062 where the benefit is now more than \$4.1 million greater than the cost, which is 21 times the cost compared to a mere \$1.1 million before only 6 times the cost.

These nine SAMAs are in addition to the nine SAMAs that have been identified, for the first time as cost-effective. Thus, the December 2009 SAMA Reanalysis has identified 18 SAMAs that are cost-effective for the first time or are substantially more cost-effective than previously determined in the original SAMA analysis.

The magnitude of the changes to the viable alternatives made by the December 2009 SAMA Reanalysis are graphically represented in the following tables which illustrate, first, that the consequences of a severe accident have increased almost four fold and second, that the economic benefit to be achieved by implementing certain mitigation measures has increased dramatically in comparison to the cost of the mitigation measure.

COMPARISON OF 2007 AND 2009 SAMA ANALYSIS				
Consequence	Reactor Unit	2007 SAMA	December 2009 SAMA	Difference
Mean Population Dose Risk (PDR)	IP2	2.20 x 10 ¹	8.74 x 10 ¹	3.97x
	IP3	2.45 x 10 ¹	9.48 x 10 ¹	3.87x
Mean Off-site Economic Cost Risk(OECR)	IP2	4.49 x 10 ⁴	2.12 x 10 ⁵	4.72x
	IP3	5.28 x 10 ⁴	2.61 x 10 ⁵	4.95x

Source: Entergy Engineering Report IP-RPT-09-00044 (Dec. 3, 2009), Tables 1 & 2, p. 11 of 39
 Entergy NL-09-165, (Dec. 11, 2009), Tables 1 & 2, p. 6 of 33
 Entergy Environmental Report, Attachment E (April 2007), p. E.1-92 to 93
 Entergy Environmental Report, Attachment E (April 2007), p. E.3-86 to 87

COMPARISON OF CHANGES IN BENEFITS AND COST CALCULATIONS BETWEEN 2007 AND 2009 SAMA ANALYSIS						
SAMA Number and Description	Original Baseline Benefit	New Baseline Benefit	Original Baseline Benefit with Uncertainty	New Baseline Benefit with Uncertainty	Original Cost	New Cost
IP2 SAMA 028: Provide a portable diesel-driven battery charger.	\$420,459	\$1,357,046	\$885,176	\$2,856,939	\$494,000	\$938,000
IP2 SAMA 044: Use fire water system as backup for steam generator inventory.	\$984,503	\$2,350,530	\$2,072,638	\$4,948,485	\$1,656,000	\$1,656,000
IP2 SAMA 054: Install flood alarm in the 480VAC switchgear room.	\$1,722,733	\$5,591,781	\$3,626,807	\$11,772,170	\$200,000	\$200,000
IP2 SAMA 060: Provide added protection against flood propagation from stairwell 4 into the 480VAC switchgear room.	\$387,828	\$1,275,337	\$816,481	\$2,684,920	\$216,000	\$216,000

**COMPARISON OF CHANGES IN BENEFITS AND COST CALCULATIONS
BETWEEN 2007 AND 2009 SAMA ANALYSIS**

(continued)						
IP2 SAMA 061: Provide added protection against flood propagation from the deluge room into the 480V switchgear room.	\$853,187	\$2,754,991	\$1,796,183	\$5,799,982	\$192,000	\$192,000
IP2 SAMA 065: Upgrade the ASSS to allow timely restoration of seal injection and cooling.	\$1,722,733	\$5,591,781	\$3,626,807	\$11,772,170	\$560,000	\$560,000
IP3 SAMA 055: Provide hardwired connection to one SI or RHR pump from the Appendix R bus (MCC 312A).	\$1,274,884	\$4,073,152	\$1,847,657	\$5,903,118	\$1,288,000	\$1,288,000
IP3 SAMA 061: Upgrade the ASSS to allow timely restoration of seal injection and cooling.	\$1,365,046	\$4,359,371	\$1,978,328	\$6,317,929	\$560,000	\$560,000
IP3 SAMA 062: Install flood alarm in the 480VAC switchgear room.	\$1,365,046	\$4,359,371	\$1,978,328	\$6,317,929	\$196,800	\$196,800

Source: Entergy December 2009 SAMA Reanalysis, NL-09-165, (Dec. 11, 2009) at 10-28.

Another illustrative difference between the December 2009 SAMA Reanalysis and the SAMA analysis submitted with the ER and reviewed by NRC Staff in the DSEIS is reflected in the population dose results from various accident sequences or release modes. For example, comparing the collective dose resulting from the "Early High" Release Mode accident sequence in the December 2009 SAMA Reanalysis to the earlier SAMA analysis demonstrates that the collective dose increased by a factor of

approximately 4.1 when compared with the initial SAMA analysis. Changes of similar magnitudes occurred for the "Early High" Release Mode accident sequence for IP3 and the "Early Medium" Release Mode accident sequences for IP2 and IP3. These illustrative changes are reflected in the following chart:

COMPARISON OF POPULATION DOSE RESULTS BETWEEN 2007 AND 2009 SAMA ANALYSES			
Accident/Release Mode	2007 SAMA	December 2009 SAMA	Difference
"Early High" Accident Scenario for IP2	1.58×10^5	6.51×10^5	4.12x
"Early Medium" Accident Scenario for IP2	4.86×10^4	1.94×10^5	3.99x
"Early High" Accident Scenario for IP3	1.31×10^5	5.08×10^5	3.87x
"Early Medium" Accident Scenario for IP3	5.13×10^4	2.00×10^5	3.89x

Source: Entergy Engineering Report No. IP-RPT-09-00044 (December 3, 2009) at 11 of 39
 Entergy December 2009 SAMA Reanalysis, NL-09-165 (Dec. 11, 2009) at 6 of 33
 Entergy Environmental Report, Attachment E (April 2007), p. E.1-93

Thus, the changes made in the SAMA analysis demonstrate (1) that the human and environmental consequences of a severe accident at Indian Point would be greater, by a factor of 4, than originally presented in the first SAMA analysis and (2) that the benefit of implementing the eighteen identified SAMAs, which would reduce the risk of the consequences of a severe accident by over 40% in some cases, have increased substantially because the consequences of the severe accident have been recalculated and increased substantially.⁵

⁵ The interaction between the likelihood of a severe accident and the consequences of such an accident is explained in the original Environmental Report

This new information substantially broadens the number of alternatives that are viable and that need to be carefully evaluated as a part of the NEPA process, alternatives that have not been accorded a "hard look" in the Environmental Report or the DSEIS. Since a final EIS has yet to be issued and the proposed major federal action has not occurred - *i.e.*, there has not been approval of the proposed license extension - NRC Staff is obligated, by well-established case law, to prepare a supplemental DSEIS.

NEPA does require that agencies take a "hard look" at the environmental effects of their planned action, even after a proposal has received initial approval. . . . Application of the "rule of reason" thus turns on the value of the new information to the still pending decisionmaking process. In this respect the decision whether to prepare a supplemental EIS is similar to the decision whether to prepare an EIS in the first instance: If there remains "major Federal actio[n]" to occur, and if the new information is sufficient to show that

("ER"):

SAMA evaluation relies on Level 3 PRA results to measure the effects of potential plant modifications. A Level 3 PRA model using the most recent version (version 1.13.1) of MACCS2 [Reference E.1-6] was created for IP2. This model, which requires detailed site-specific meteorological, population, and economic data, estimates the consequences in terms of population dose and offsite economic cost. Risks in terms of population dose risk (PDR) and offsite economic cost risk (OECR) were also estimated in this analysis. Risk is defined as the product of consequence and frequency of an accidental release.

Id., Appendix E, Attachment E at E.1-86. Thus, while the probability of the severe accident is essentially unchanged in the December 2009 SAMA Reanalysis the benefit that would be obtained by using a particular mitigation measure has increased dramatically because the consequences of the severe accident have increased dramatically.

the remaining action will "affect the quality of the human environment" in a significant manner or to a significant extent not already considered, a supplemental EIS must be prepared.

Marsh v. Oregon Natural Resources Council 490 U.S. 360, 374 (1989)(footnote and citation omitted). NRC Staff has not considered the new potentially cost-effective SAMAs or the SAMAs whose cost-effectiveness has increased substantially from the original SAMA in its DSEIS and the public has not had an opportunity to comment on these new or more cost-effective SAMAs.

The magnitude of the potential environmental impact which could be avoided if any one of these 18 measures were adopted is illustrated in the following chart which reflects the percentage risk reduction in the population dose risk and the off-site economic cost risk:

SAMA Number and Description	New 2009 PDR Risk Reduction	New 2009 OECR Reduction
IP2 SAMA 009 Create a reactor cavity flooding system.	47.03%	34.43%
IP2 SAMA 021 Install additional pressure or leak monitoring instrumentation for interfacing system loss of coolant accidents (ISLOCAs)	11.33%	14.62%
IP2 SAMA 022 Add redundant and diverse limit switches to each containment isolation valve	5.72%	7.55%
IP2 SAMA 028 Provide a portable diesel-driven battery charger.	9.38%	7.08%
IP2 SAMA 044 Use fire water system as backup for steam generator inventory.	14.19%	9.91%
IP2 SAMA 053 Keep both pressurizer PORV block valves open.	3.32%	1.89%

SAMA Number and Description	New 2009 PDR Risk Reduction	New 2009 OECR Reduction
(continued)		
IP2 SAMA 060 Provide added protection against flood propagation from stairwell 4 into the 480VAC switchgear room.	8.92%	6.60%
IP2 SAMA 061 Provide added protection against flood propagation from the deluge room into the 480V switchgear room.	19.34%	14.15%
IP2 SAMA 062 Provide a hard wired connection to a safety injection (SI) pump from the alternate safe shutdown system (ASSS) power supply	6.06%	4.25%
IP2 SAMA 065 Upgrade the ASSS to allow timely restoration of seal injection and cooling.	39.24%	28.77%
IP3 SAMA 007 Create a reactor cavity flooding system;	24.16%	14.94%
IP3 SAMA 018 Route the discharge from the main steam safety valves through a structure where a water spray would condense the steam and remove most of the fission products (cost beneficial in TI SGTR sensitivity in Section [8])	11.08%	13.41%
IP3 SAMA 019 Install additional pressure or leak monitoring instrumentation for ISLOCAs.	7.07%	8.43%
IP3 SAMA 053 Install an excess flow valve to reduce the risk associated with hydrogen explosions.	2.07%	1.51%
IP3 SAMA 055 Provide hardwired connection to one SI or RHR pump from the Appendix R bus (MCC 312A).	18.35%	11.49%
IP3 SAMA 061 Upgrade the ASSS to allow timely restoration of seal injection and cooling.	19.73%	12.26%
IP3 SAMA 062 Install flood alarm in the 480VAC switchgear room.	19.73%	12.26%

Source: December 2009 SAMA Reanalysis NL-09-165 (Dec. 11, 2009), at 10-28 of 33.

These risk reductions, while essentially unchanged from the initial SAMA analysis, have become extremely relevant now that the December 2009 SAMA

Reanalysis demonstrates, for the first time, that either they are preliminarily cost-effective or that the magnitude of their cost-effectiveness has increased dramatically, making them, for the first time, viable alternatives to the proposed action. However, there has not been a "hard look" taken at these eighteen SAMAs as a result of the completely new December 2009 SAMA Reanalysis.

**THE MAJOR CHANGES REFLECTED IN THE DECEMBER
2009 SAMA REANALYSIS HAVE YET TO BE SUBJECTED TO
A "HARD LOOK" BY NRC, NOR HAS THE PUBLIC HAD AN
OPPORTUNITY TO OFFER ITS COMMENT ON THEM**

In addition, because NRC has not had the opportunity to take a "hard look" at these eighteen newly viable alternatives in the DSEIS, the public has also not had the opportunity to comment on them and meaningfully participate in the process of considering these eighteen SAMAs as alternatives to the license renewal proposal now before NRC. Public participation is one of NEPA's cornerstones. As the Commission has observed, public participation "is a vital ingredient to the open and full consideration of licensing issues and in establishing public confidence in the sound discharge of the important duties which have been entrusted" to the Commission. *N. States Power Co. (Prairie Island Nuclear Generating Plant, Units 1 and 2), CLI-75-1, 1 NRC 1, 2 (1975).*

The importance of facilitating public participation in NEPA to assist the agency in reaching its final decision has been emphasized in numerous court decisions:

The statutory requirement that a federal agency contemplating a major action prepare such an environmental impact statement serves NEPA's "action-forcing" purpose in

two important respects. See *Baltimore Gas & Electric Co. v. Natural Resources Defense Council, Inc.*, 462 U.S. 87, 97, 103 S.Ct. 2246, 2252, 76 L.Ed.2d 437 (1983); *Weinberger v. Catholic Action of Hawaii/Peace Education Project*, 454 U.S. 139, 143, 102 S.Ct. 197, 201, 70 L.Ed.2d 298 (1981). It ensures that the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts; it also guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision.

Robertson v. Methow Valley Citizens Council 490 U.S. 332, 349 (1989)(emphasis added); see also *South Fork Band Council of Western Shoshone of Nevada v. U.S. Dept. of Interior*, 588 F.3d 718, 725 (9th Cir. 2009)(“ An adequate EIS is essential to informed agency decision-making and informed public participation, without which the environmental objectives of NEPA cannot be achieved”); *State of California v. Block* 690 F.2d 753, 761 (9th Cir. 1982)(emphasizing NEPA’s obligation to “foster . . . informed public participation”).

In its regulations, CEQ requires that all federal agencies, to “the fullest extent possible . . . [e]ncourage and facilitate public involvement in decisions which affect the quality of the human environment” (40 C.F.R. § 1500.2(d)) and “[m]ake diligent efforts to involve the public in preparing and implementing their NEPA procedures” (40 C.F.R. § 1506.6(a)).⁶

⁶ The Supreme Court has recognized that CEQ regulations are entitled to substantial deference in evaluating agency compliance with NEPA. “In *Andrus v. Sierra Club*, 442 U.S., at 358, 99 S.Ct., at 2341, we held that CEQ regulations are entitled to substantial deference.” *Robertson v. Methow Valley Citizens Council* 490 U.S. at 355. As noted above, the *Limerick* Court recognized that NRC had agreed to be bound by the CEQ regulations.

Unless and until NRC has completed the cost-benefit analysis for the potentially cost-effective SAMAs, has subjected that completed analysis to a "hard look" and invited public participation and input on its proposed actions in light of the substantial new information contained in the December 2009 SAMA Reanalysis, NRC will not have fulfilled its obligations under NEPA.

**INDIAN POINT WARRANTS AN EVEN MORE THOROUGH CONSIDERATION
OF SEVERE ACCIDENT MITIGATION ALTERNATIVES
BECAUSE IT IS MORE VULNERABLE TO A SEVERE ACCIDENT
AND BECAUSE THE CONSEQUENCES OF A SEVERE ACCIDENT WOULD
BE SUBSTANTIALLY GREATER
THAN AT OTHER NUCLEAR PLANT LOCATIONS**

The previous discussion demonstrates that, based on the December 2009 SAMA Reanalysis, there are eighteen potential SAMAs that appear to be cost-effective and that will, if implemented, substantially mitigate the consequences of severe accidents. In fact, there are at least nine cost-effective mitigation measures that should be implemented as a condition of any license renewal based on the existing data which demonstrates that it is highly unlikely that further economic analysis will significantly reduce their cost-effectiveness. In addition, there are other compelling reasons why these eighteen measures should be fully evaluated and why nine of them should be implemented for Indian Point.

Of all the power reactors in the United States, the Indian Point reactors have the highest surrounding population both within a 50-mile radius and a 10-mile radius. *See, e.g.,* AEC, Population Distribution Around Nuclear Power Plant Sites, Figure 2: Typical Site Population Distribution (5-50 Miles) (April 17, 1973); FEMA, Nuclear Facilities &

Population Density Within 10 Miles (June 2005). With more than 17 million people living within 50 miles of Indian Point, no other operating reactor site in the country comes close to Indian Point in terms of surrounding population - and attendant potential risk. The Indian Point reactors and spent fuel pools are approximately 24 miles north of the New York City line, and approximately 37 miles north of Wall Street, in lower Manhattan. The U.S. Census Bureau recognizes that New York City is the largest city in the Nation with an estimated resident population of 8,214,426 (as of 2006).⁷ The facilities are approximately 3 miles southwest of Peekskill, with a population of 22,441; 5 miles northeast of Haverstraw, with a population of 33,811, 16 miles southeast of Newburgh, with a population of 31,400, and 17 miles northwest of White Plains, with a population of 52,802. Indian Point is also 23 miles northwest of Greenwich, Connecticut, 37 miles west of Bridgeport, Connecticut and 37-39 miles north northeast of Jersey City and Newark, New Jersey. Portions of four New York counties - Westchester, Rockland, Orange, and Putnam - fall within the inner 10-mile Emergency Planning Zone. Additional population centers in New York, such as New York City's five boroughs and Nassau County, lie within the 50-mile Emergency Planning Zone, as do significant population centers in Connecticut and New Jersey. Entergy projects that population for the 50-mile Emergency Planning Zone will grow to 19 million people by

⁷ New York City experiences a substantial influx of additional people each day. See U.S. Census Bureau, Census 2000 PHC-T-40, Estimated Daytime Population and Employment-Residence Ratios: 2000.

2035.⁸ In 1979, NRC's Director of State Programs said of the Indian Point site "I think it is insane to have a three-unit reactor on the Hudson River in Westchester County, 40 miles from Times Square, 20 miles from the Bronx."⁹ Under NRC's current siting

⁸ The State believes that Entergy undercounts the population within the 50-mile Emergency Planning Zone. The December 2009 SAMA Reanalysis projections of the 2035 population likely to be living within 50 miles of Indian Point are suspect and underestimate the potential exposed population. For example, Table 2-5 State and County Population, 50-Mile Radius of IP2 and IP3 on page 2-36 of the ER contains a projection that in 2035 the population of New York County (Manhattan) will be 1,570,657. The United State Census Bureau estimates that in 2008 Manhattan's population was 1,634,795, over 60,000 more than what the ER asserts would be at risk 27 years later. See, e.g., U.S. Department of Commerce, U.S. Census Bureau, State and County QuickFacts, New York County, New York, available at <http://quickfacts.census.gov/qfd/states/36/36061.html> (last visited on Mar. 10, 2010). NRC Staff questioned Entergy about the assumptions concerning permanent and transient population and economic impact of lost tourism and business contained in the original SAMA analysis. The December 2009 SAMA Reanalysis relies, in part, on a revised analysis prepared by Entergy's consultant, Enercon. See Enercon Site Specific MACCS2 Input Data for Indian Point Energy Center, Revision 1, (Dec. 1, 2009) IPEC00208853. The December 2009 SAMA Reanalysis does not adequately take into account tourists and daily commuters - individuals who are not included in New York City's resident population, but who nevertheless could be affected by a severe accident while they are in the City. The U.S. Census Bureau estimates that New York City's daytime population as of 2000 was approximately 8,570,000 people - reflecting a daily influx of approximately 563,000 people in addition to the City's resident population. In addition, New York City estimates that 47 million tourists (domestic and foreign) visited the City in 2008. See U.S. Department of Commerce, U.S. Census Bureau, Census 2000 PHC-T-40, Estimated Daytime Population and Employment-Residence Ratios: 2000; see also New York City tourism data available at <http://www.nycgo.com>. By way of further example, the seating capacity at various New York metropolitan area arenas (Madison Square Garden, Citi Field, Yankee Stadium, Nassau Coliseum) is approximately 130,000 persons. The December 2009 SAMA Reanalysis does not adequately take into account such additional people and thus further underestimates the population that would be exposed to a severe accident release of radiation and the benefit of any mitigation measure that would reduce such exposure.

⁹ Robert Ryan, NRC Director of State Programs, *quoted in* Staff Reports to the President's Commission on the Accident at Three Mile Island, Report of the Office of

regulations, which were not in place when AEC approved the Indian Point site in 1956, it is highly unlikely that the Indian Point reactors would or could be located today in this densely populated area. *See* 10 C.F.R. § 100.21(h).

The three power reactors located at Indian Point were not subjected to a severe accident mitigation alternatives analysis when AEC and NRC issued the construction permits and operating licenses for those facilities. According to AEC and NRC documents, the Consolidated Edison Company (“ConEd”) received the following construction permits and operation licenses on the following dates:

	CONSTRUCTION PERMIT ISSUED	OPERATING LICENSE ISSUED
IP Unit 1	May 4, 1956	March 26, 1962
IP Unit 2	October 14, 1966	September 28, 1973
IP Unit 3	August 13, 1969	December 12, 1975

Source: Federal Register and NRC Information Digest.¹⁰

Moreover, the Indian Point site was selected by the Consolidated Edison Company in 1955 and approved by AEC in 1956, before the AEC had implemented siting design criteria that would likely have made this heavily populated and potentially seismically active site unacceptable for a nuclear facility. It was also

Chief Counsel on Emergency Preparedness (1979), at p. 8; *see also id.*, at p. 40-41, n. 23.

¹⁰ *See* 21 Fed. Reg. 3,085 (May 9, 1956); 31 Fed. Reg. 13,616-17 (Oct. 21, 1966); 34 Fed. Reg. 13,437 (Aug. 20, 1969); NUREG-1350, Volume 20, 2008 - 2009 *Information Digest*, at 103, 113 (Aug. 2008).

approved before the Windscale (1957), Three Mile Island (1979), and Chernobyl (1986) events. The 1955 selection of Indian Point also came before Congress enacted NEPA (1970), the promulgation of CEQ regulations (1978), the Third Circuit's *Limerick* decision (1989), and NRC promulgation of the 10 C.F.R. § 51.53 regulation (1996) that requires an analysis of ways to mitigate the impacts of severe accidents during license renewal proceedings. The fact that a commitment was made to the Indian Point site before these statutes and regulations were enacted does not excuse Entergy or NRC today from the fullest possible compliance with the statutes and regulations when taking a major federal action related to Indian Point. See *Calvert Cliffs' Coordinating Comm. v. AEC*, 449 F.2d 1109, 1128-29 (D.C. Cir.1971).

As a result of all these factors, Indian Point has a higher risk of a severe accident than plants whose construction and/or operation were approved after the promulgation of siting and design criteria and the occurrence of incidents like TMI, whose design was more compatible with various backfit requirements implemented as a result of those events.¹¹ In addition, because of the greater population concentration

¹¹ By way of example, the Indian Point facilities today continue to rely on the 1950s era systems, structures, and components within the Indian Point Unit 1 facility. AEC approved the construction of IP1 before the promulgation of seismic regulations. As the Atomic Licensing Appeal Board ruled in 1977: "This plant [Unit 1] was built prior to any specific requirement for earthquake protection and is not designed to withstand a 0.15g acceleration." *In re Consolidated Edison Co.*, (Indian Point Units 1, 2 and 3), 6 NRC 547, 585 (ALAB 1977). In a submission to NRC about a spent fuel crane, Entergy stated: "No response spectra were specifically generated for the Unit 1 site during original design." Entergy Reply to Request for Additional Information (RAI) Regarding Indian Point 1 License Amendment Request for Fuel Handling Building

in the vicinity of the plant, a percentage reduction in the population dose risk or the offsite economic cost risk at Indian Point would have a profoundly larger impact than the same risk percentage reduction at other facilities. In the case of Indian Point, such reductions literally impact millions of people and hundreds of billions of dollars of economic investment. Thus, there is even less of a rational basis to refuse to implement a mitigation measure, such as installing a flood alarm in the 480V switchgear room (SAMA 054 for IP2), which is estimated to reduce population dose risk by almost 40% and off-site economic cost risk by almost 29% (December 2009 SAMA Reanalysis at 17) than if that same mitigation measure were available at any other plant even with the same risk reduction.

NRC has not established a quantitative measure of when a mitigation measure is sufficiently cost-effective that its implementation is required. However, the Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission NUREG/BR-0058, Revision 4 (Sept. 2004) discuss the concept of "substantial" benefit:

[T]he principal purposes of a regulatory analysis are to help ensure the following:

- The NRC's regulatory decisions made in support of its statutory responsibilities are based on adequate information concerning the need for and consequences of proposed actions.
- Appropriate alternative approaches to regulatory objectives are identified and analyzed.
- *No clearly preferable alternative is available to the proposed action.*

Crane, p. 12 of 24 (Oct. 3, 2007), Indian Point, Unit No.1, Docket No. 50-003, ML073050247.

- Proposed actions subject to the backfit rule (10 CFR 50.109), and not within the exceptions at 10 CFR 50.109(a)(4), provide a substantial³ increase in the overall protection of the public health and safety or the common defense and security and that the direct and indirect costs of implementation are justified in view of this substantial increase in protection.

³The Commission has stated that “*substantial*” means *important or significant in a large amount, extent, or degree* (Ref. 21)[¹²]. Applying such a standard, the Commission would not ordinarily expect that safety-applying improvements would be required as backfits that result in an insignificant or small benefit to the public health and safety, regardless of costs. On the other hand, *the standard is not intended to be interpreted in a manner that would result in disapprovals of worthwhile safety or security improvements having costs that are justified in view of the increased protection that would be provided. This approach is flexible enough to allow for qualitative arguments that a given proposed rule would substantially increase safety. . . .*

Id. at 4 (emphasis added).

NRC Staff has stated that the Regulatory Analysis Guidelines are applicable to evaluating SAMAs. “To identify SAMAs that may be cost-beneficial, the net value of each SAMA is estimated. The NRC maintains two documents that provide guidance in this area: NUREG/BR-0058 and NUREG/BR-0184 [Regulatory Analysis Technical Evaluation Handbook, U.S. Nuclear Regulatory Commission, January 1997].” Ghosh, Tina; Palla, Robert; and Helton, Donald; Perspectives on Severe Accident Mitigation Alternatives for U.S. Plant License Renewal (ML092750488) at 4 (footnotes omitted).

¹² As noted above, Reference 21 is “S. Chilk, Staff Requirements Memorandum to J.M. Taylor and W.C. Parler, ‘SECY-93-086 – Backfit Considerations,’ June 30, 1993.”

Even though the engineering cost analysis has not been fully completed for any SAMAs (*see* December 2009 SAMA Reanalysis at 8), and a more complete cost analysis may add substantially to the cost of a SAMA, the December 2009 SAMA Reanalysis concluded that a number of previously marginally beneficial SAMAs (including SAMAs that were only beneficial when the “benefit with uncertainty” figure was used) are now beneficial by a much larger margin and with the standard benefit calculation. Thus, should no further cost-benefit analysis be conducted by Entergy or NRC Staff, the failure to commit to implement those SAMAs – which now, for the first time, have been shown to provide both a substantial increase in safety *and* where there is significant margin of benefit over cost – must be added as conditions to the proposed license extension.¹³

**NRC SHOULD ACKNOWLEDGE THAT THE
DEPARTMENT OF ENERGY HAS DECIDED THAT
YUCCA MOUNTAIN SHOULD NOT BE USED FOR THE
LONG-TERM DISPOSAL OF HIGH-LEVEL RADIOACTIVE
WASTE AND EXAMINE THE IMPACTS OF THAT DECISION
ON STORAGE OF WASTE AT INDIAN POINT**

Earlier this month, the United States Department of Energy moved to withdraw its pending license application for a permanent geologic repository at Yucca Mountain, Nevada. DOE Motion to Withdraw, filed in *In re U.S. Department of Energy* (High-Level

¹³ In today’s comments, the State of New York focuses on SAMAs for which the benefit is substantially greater than the cost; however, the State does not take the position that these are the only SAMAs which should be implemented. Once the full SAMA economic analysis is completed other SAMAs may emerge that also provide a substantial increase in safety and are cost-effective and those SAMAs should also be required to be implemented.

Waste Repository), ASLBP No. 09-892-HLW-CAB04 (Mar. 3, 2010), ML100621397. DOE asked the Atomic Safety and Licensing Board to dismiss its application with prejudice and to impose no additional terms of withdrawal. DOE's motion makes clear that "the Secretary of Energy has decided that a geologic repository at Yucca Mountain is not a workable option for long-term disposition of these materials." DOE Motion, at 1. No other option for long term storage and disposal of spent fuel from Indian Point, other than to keep it at the Indian Point site, is available and none is suggested in the DSEIS. Thus, it is now clear that radioactive wastes will remain at the Indian Point site after the plant is shut down, and that the presence of that waste on the site will have significant environmental impacts. If NRC renews one or both of the operating licenses, the volume of high-level waste being stored at the site will increase. Thus, even if some stop-gap measures for off-site disposal or storage of spent fuel are available in the next 10 to 15 years, the more waste generated by Indian Point, the greater the flow of such wastes would have to be to an off-site location. Producing more waste only increases the probability that some waste will remain at Indian Point for a much longer time as off-site capacity, if ever available, is built and operated.¹⁴

¹⁴. The Atomic Safety and Licensing Board in the Indian Point relicensing proceeding recently certified to the Commission the admissibility of Hudson River Sloop Clearwater's proposed contention regarding the continued viability of 10 C.F.R. § 51.23; the Commission is currently considering that regulation's status. *See In the Matter of Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), ASLBP No. 07-858-03-LR-BD01, Memorandum and Order (Certification to the Commission of a Question Relating to the Continued Viability of 10 C.F.R. § 51.23(b) Arising From Clearwater's Motion for Leave to Admit New Contentions)(Feb. 12, 2010).

Once Indian Point is shut down – whether in 2013 and 2015, or 2033 and 2035 – its value to the local community as a source of taxes will essentially be eliminated since only a non-income generating waste disposal/storage facility will remain. Thus, the longer the wastes remain at the site, the longer the period of time that the local communities will be burdened with reduced tax revenue and the loss of the use of the site for a higher and more taxable purpose.¹⁵

The problem of indefinite on-site storage of spent fuel at the Indian Point site not only will drastically and adversely impact tax revenues for the local communities, it will also have a profound impact on land use in the vicinity of the site. Because land use will remain limited until the Indian Point site has been fully decommissioned and returned to unrestricted use, indefinite storage of spent fuel at the site will postpone indefinitely the resurgence of property values in the areas surrounding the plant, a resurgence that has been conservatively estimated to increase land values by over

¹⁵ This problem is made even more severe by Entergy's recently-announced intent to maintain the Indian Point facility in SAFSTOR for 50 years after plant shutdown, thus assuring that the value of the site for tax purposes will remain depressed for at least 30, and maybe 50, years after the end of an extended license. While the Commission has recently made clear that Entergy's announcement of this expanded SAFSTOR plan and the Staff's acceptance of it does not constitute an action which amends its license (and thus apparently not an action which finally accepts the SAFSTOR option chosen as acceptable since the requirements of 10 C.F.R. Section 50.82(a)(4) still must be met)(see March 16, 2010 Letter from the NRC Secretary to Susan Shapiro, ML100750700) its stated intent forms an adequate basis for an evaluation of the environmental impacts, including tax and land use impacts, of a decision to extend the presence of the plant at the site for at least 30 years, and maybe as much as 50 years, after operations cease.

\$575,000,000. See November 29, 2007 Declaration and Report of Stephen Sheppard, Ph.D. (ML073400193) at p. 6. This adjacent land, were it to increase in value, would also increase the taxable property values for the surrounding communities by over \$575,000,000. This number will increase by \$300-400 million if a renewed operating license is issued, and following cessation of operation spent fuel remains on the site indefinitely. See Declaration and Report of Stephen Sheppard, Ph.D. (Feb. 26, 2009)(ML090690303).

The DSEIS does not consider the implications of the long-term or indefinite storage of spent fuel at the Indian Point site including its impact on tax revenues and land use in the area. It appears that there may be a discrepancy between existing regulations (which indicate that waste will be removed from the site by 2025) and real world conditions (which, in the absence of Yucca Mountain, provide no alternative waste storage option for Indian Point's spent fuel). Accordingly, Staff must prepare a supplemental DSEIS which includes an analysis of the environmental impacts associated with the issuance of two new operating licenses for Indian Point Unit 2 and Unit 3 examining the environmental impacts associated with the indefinite storage of high level radioactive waste in Westchester County, New York, as has become a likely possibility given recent DOE pronouncements.

CONCLUSION

Now that the original SAMA analysis has been changed in such a fundamental way by the recently filed December 2009 SAMA Reanalysis, NRC is obligated to prepare a supplemental DSEIS that addresses these changes and the proposed eighteen alternatives that could, if implemented, substantially mitigate the consequences of a severe accident. In that way NRC Staff will meet its obligation imposed by CEQ Regulations and court decisions like *Marsh v. Oregon Natural Resources Council*.

Because the supplemental DSEIS will be limited to the SAMA analysis, the State of New York believes it would be appropriate to allow only a 30 day comment period and a single public meeting. If NRC Staff proceeds diligently with this process, there is no reason why it should delay the NRC Staff in meeting its projected date for publication of the SEIS of the end of May 2010.¹⁶

The State of New York seeks a timely and thorough resolution of the pending request for the renewal of the operating licenses for Indian Point. To that end, the State requests that NRC Staff indicate no later than March 29, 2010, whether it will issue a supplemental DSEIS to address the significant new matters disclosed by the December

¹⁶ The State of New York can foresee, but seeks to avoid, the delay that could result from the admission in the current Indian Point relicensing proceeding of a contention based on Staff's failure to issue a supplemental draft DSEIS and based on Staff's final position on the SAMA analysis in the SEIS. Since any delay that admission of such a contention would cause in the licensing process would be attributable to the NRC Staff's refusal to issue a supplemental DSEIS, delay would not be a basis for rejecting such a contention. In addition, a reviewing court may determine that the entire NEPA process was defective and require a completely new DSEIS and SEIS, thus

2009 SAMA Reanalysis.

For all these reasons, and in the interest of justice and efficiency, the State urges NRC Staff to publish a supplemental DSEIS addressing the issues raised by the December 2009 SAMA Reanalysis, to include in the supplemental DSEIS a completed cost-benefit analysis for all eighteen potentially cost-effective SAMAs and direct Entergy to implement all of the SAMAs that are cost-effective and will substantially mitigate the consequences of the severe accident.¹⁷ The DSEIS should also examine the consequences for the Indian Point site that flow from DOE's decision to withdraw the Yucca Mountain application.

Respectfully submitted,

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Dated: March 19, 2010

conceivably delaying a final decision in this proceeding considerably longer.

¹⁷ The State refers to NRC Staff to Contentions 35 and 36 filed on March 11, 2010 and hereby incorporates the contents of those contentions by reference.

ATTACHMENT

MARCH 11, 2010 STATEMENT OF DAVID CHANIN CONCERNING
THE DECEMBER 2009 SAMA REANALYSIS

**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD**

-----X
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, DPR-26, DPR-64
Entergy Nuclear Indian Point 3, LLC, and
Entergy Nuclear Operations, Inc. March 11, 2010
-----X

STATEMENT OF DAVID CHANIN

Summary of Experience

1. I have more than 25 years of professional experience in the development, application, maintenance, and verification/validation of large scientific codes, primarily for assessing the environmental impacts of radiological releases, and have worked with various federal agencies and contractors, including the United States Department of Energy (DOE), the United States Nuclear Regulatory Commission (NRC), and Sandia National Laboratories, as a senior risk analyst, project leader, and as a consulting expert, to review, evaluate, and develop risk models to assess the economic and environmental impacts of radiological releases in commercial, military, and government sectors.

2. I also consult as an independent expert to assess the consequences of accidental or intentional releases of radioactive materials to the atmosphere.

3. Through Sandia National Laboratories, I was an architect and developer of the MACCS2 computer code, and I am familiar with the code. MACCS2 is used by the DOE, NRC staff, and NRC licensees to model the doses, health effects, and economic consequences that result from unintended radiological releases into the atmosphere. NRC and its licensees use the MACCS2 code as part of the Severe Accident Mitigation Alternatives (SAMA) analysis.

4. As a consultant to DOE, I was involved in the review and finalization of the MACCS2 Guidance Document and the Final MACCS2 SQA Gap Analysis. I also wrote the User's Guide Code Manual for MACCS2.

5. Along with a colleague, Walter Murfin, I pioneered a model for analyzing the economic impacts if land and structures were contaminated with plutonium from a weapons accident. *Site Restoration: Estimation of Attributable Costs from Plutonium-Dispersal Accidents*, SAND96-0957 (1996).

6. I have been the principal or collaborating author of a number of scientific and technical publications concerning nuclear risk modeling on behalf of Sandia National Laboratories, Los Alamos National Laboratory, American Nuclear Society Transactions, as well as for private industry and technical workshops.

Entergy's December 2009 SAMA Reanalysis

7. I have reviewed the December 2009 Severe Accident Mitigation Alternatives SAMA Reanalysis submitted by ENERCON and Entergy Nuclear Operations, Inc., as part of Entergy's application to NRC for permission to renew the operating licenses for the Indian Point power reactors, December 14, 2009 letter to ASLB Judges and Parties and December 11, 2009 letter to NRC from Fred Dacimo, Entergy, NL-09-165 (Entergy December 2009 SAMA Reanalysis). I have also compared Entergy's December 2009 SAMA Reanalysis filing with Entergy's initial SAMA/MACCS2 analysis that accompanied its 2007 license renewal application. I have also reviewed the following documents which support the December 2009 SAMA Reanalysis: Enercon, Site Specific MACCS2 Input Data for Indian Point Energy Center, Revision 1 (Dec. 1, 2009) IPEC00208853; Entergy, IP-CALC-09-00265, "Re-analysis of MACCS2 Models for IPEC" (Dec. 2, 2009); Energy, IP-RPT-09-00044, "Re-Analysis of IP2 and IP3 Severe Accident Mitigation Alternatives (SAMAs)" (Dec. 3, 2009); and various input (.inp) and output (.out) files in an attempt to understand the difference between the December 2009 SAMA Reanalysis and the initial SAMA analysis.

8. Entergy's December 2009 SAMA Reanalysis contains significant differences from the SAMA Analysis contained in Entergy's April 2007 Environmental Report. The December 2009 SAMA Reanalysis essentially replaces the original SAMA analysis and reflects a new analysis.

9. For example, when Entergy redid its SAMA analysis in December 2009, the population dose risk and off site economic cost risk both increased significantly. The December 2009 SAMA Reanalysis reflected a baseline population dose risk (PDR) to be 87.4 person - rem/year for IP2 and 94.8 person-rem/year for IP3. See IP-RPT-09-00044 (Dec. 3, 2009) at 11. This new result reflects increases of a factor of 3.97 and 3.87, respectfully, when compared to the initial 2007 SAMA analysis. Additionally, the December 2009 SAMA Reanalysis reflected baseline off-site economic cost risk (OECR) to be \$212,000/yr for IP2 and \$261,000 for IP3. See IP-RPT-09-00044, at 11. These new results reflect increases of a factor of 4.72 and 4.95, respectfully, when compared to the initial 2007 SAMA analysis. The following chart depicts these differences:

COMPARISON OF 2007 AND 2009 SAMA ANALYSIS				
Consequence	Reactor Unit	2007 SAMA	December 2009 SAMA	Difference
Mean Population Dose Risk (PDR)	IP2	2.20×10^1	8.74×10^1	3.97x
	IP3	2.45×10^1	9.48×10^1	3.87x
Mean Off-site Economic Cost Risk(OECR)	IP2	4.49×10^4	2.12×10^5	4.72x
	IP3	5.28×10^4	2.61×10^5	4.95x

Source: Entergy Engineering Report IP-RPT-09-00044 (Dec. 3, 2009), Tables 1 & 2, p. 11 of 39
 Entergy NL-09-165, (Dec. 11, 2009), Tables 1 & 2, p. 6 of 33
 Entergy Environmental Report, Attachment E (April 2007), p. E.1-92 to 93
 Entergy Environmental Report, Attachment E (April 2007), p. E.3-86 to 87

10. Another illustrative difference between the recent analysis and the earlier exercise is reflected in the population dose results from various accident sequences or release modes. For example, if one were to examine the collective dose resulting from the "Early High" Release Mode accident sequence in the December 2009 SAMA Reanalysis, one would see that the collective dose increased by a factor of approximately 4.1 when compared with Entergy's initial SAMA analysis. Changes of similar magnitudes occurred for the "Early High" Release Mode accident sequence for IP3 and the "Early Medium" Release Mode accident sequences for IP2 and IP3. These illustrative changes are reflected in the following chart: These illustrative changes are reflected in the following chart:

COMPARISON OF POPULATION DOSE RESULTS BETWEEN 2007 AND 2009 SAMA ANALYSES			
Accident/Release Mode	2007 SAMA	December 2009 SAMA	Difference
"Early High" Accident Scenario for IP2	1.58×10^5	6.51×10^5	4.12x
"Early Medium" Accident Scenario for IP2	4.86×10^4	1.94×10^5	3.99x
"Early High" Accident Scenario for IP3	1.31×10^5	5.08×10^5	3.87x
"Early Medium" Accident Scenario for IP3	5.13×10^4	2.00×10^5	3.89x

Source: Entergy Engineering Report No. IP-RPT-09-00044 (December 3, 2009), p. 11 of 39
 Entergy NL-09-165, (Dec. 11, 2009), p. 6 of 33
 Entergy Environmental Report, Attachment E.(April 2007), p. E.1-93

11. It also appears that a column formatting error contained in the initial SAMA analysis did not reappear in the December 2009 SAMA Reanalysis. This column error was contained in the "ECONOMIC COST" data block in the 2006 input file named "sitei.inp" that accompanied the initial SAMA analysis; the error appears to have resulted in a three column shift to the left that resulted in a smaller number being recognized by the MACCS2 code. Based on the text of the December 2009 SAMA Reanalysis, it is difficult to understand the reason for the column formatting/shifting error; it may relate to the issues related to the SECPOP2000 code (referenced in NRC RAI 4g), although Entergy stated that the "problems related to use of the SECPOP2000 code have no impact on the IP2 and IP3 SAMA analysis" (Response to SAMA RAI 4g). See Entergy Reply to NRC Requests for Additional Information, NL-08-028 (Feb. 5, 2008) ML080420264. In any event, it appears that this error was corrected in the 2009 input file named "siteiec.inp" that supported the December 2009 SAMA Reanalysis. Correction of this error in the December 2009 SAMA Reanalysis increased the value of "non-farm wealth" and, in turn, contributed to the increase of economic costs reflected in the December 2009 SAMA Reanalysis.

12. In addition, it appears that the December 2009 SAMA Reanalysis also reexamined the impact of lost tourism and business as a "baseline" or "base case" analysis in response to RAI 4e. See December 2009 SAMA Reanalysis, NL-09-165, at p. 5 of 33. The initial SAMA analysis addressed this issue as part of a sensitivity analysis. See generally

Entergy Reply to NRC Requests for Additional Information, NL-08-028 (Feb. 5, 2008) at p. 22 and 25 of 59.

13. Further examples of the differences contained in the December 2009 SAMA Reanalysis are the changes to the benefit and costs calculations in various specific SAMA mitigation measures. *See, e.g.*, IP2 SAMA 062, NL-09-165 (Dec. 11, 2009), at p. 18 of 33.

Albuquerque, New Mexico
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David D. Chanin