UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	
EXELON GENERATION COMPANY, LLC	)	**Docket No. 50-352-LR**
	)	**Docket No. 50-353-LR**
(Limerick Generating Station, Units 1 and 2)	)	

January 6, 2012

(License Renewal Application)

NATURAL RESOURCES DEFENSE COUNCIL ("NRDC") COMBINED REPLY TO EXELON AND NRC STAFF ANSWERS TO PETITION TO INTERVENE

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I. INTRODUCTION

On November 22, 2011 and pursuant to 10 C.F.R. § 2.309 and the notice published by the Nuclear Regulatory Commission ("Commission") at 76 Fed. Reg. 52992 (Aug.24, 2011), Petitioner Natural Resources Defense Council (NRDC) submitted a Petition to Intervene and Request for a Hearing in the above-captioned matter. NRDC seeks intervention in order to challenge various deficiencies in Exelon's Environmental Report. Pursuant to the schedule issued by the Commission on October 17, 2011, Exelon and the Nuclear Regulatory Commission Staff ("NRC Staff") filed separate responses to the Petition on December 20 and December 21, 2011, respectively. Pursuant an Order issued by the Board on December 22, 2011 Petitioners file this combined reply to Exelon's and NRC's responses.[1] A prehearing conference on the admissibility of NRDC's contentions has not been scheduled.

NRDC submitted its original four contentions because the project jeopardizes their environmental, safety, health-based and economic interests. The responses by Exelon and NRC fail to undercut NRDC's concerns and these contentions should be admitted.

II. STANDING

Exelon and NRC have not challenged NRDC's standing. As NRDC has demonstrated the requisite elements of injury-in-fact, causation and redressability, all stemming from plausible impacts Exelon's relicensing will have on the interests of NRDC's members, accordingly, the Board should permit NRDC to intervene and admit its four contentions.

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[1] A substantial portion of the arguments advanced by Exelon and NRC Staff are the same. To simplify this Reply, NRDC refers to the Exelon Answer when addressing issues raised by Exelon alone or by Exelon and NRC Staff. Where NRC Staff has advanced a different argument than Exelon, that argument is identified as originating from NRC Staff.

III. CONTENTIONS

Pursuant to 10 C.F.R. § 2.309, NRDC has offered four specific contentions it seeks to litigate. Each contention challenges the sufficiency of the application under NRC regulations, as specified therein, as well as its compliance with NEPA.

At the outset, NRDC observes that Exelon and the NRC Staff raise arguments that primarily address the merits of NRDC's contentions rather than their admissibility. But "in passing on the admissibility of a contention. . . 'it is not the function of a licensing board to reach the merits of [the] contention.'" *Sierra Club v. NRC*., 862 F.2d 222, 226 (9th Cir. 1988) *(quoting Carolina Power and Light Co.*, 23 N.R.C. 525, 541 (1986)). Instead, the Board evaluates the admissibility of contentions in a similar manner as a federal court's review of claims in a well-plead complaint:

> The relevant inquiry is whether the contention adequately notifies the other parties of the issues to be litigated; whether it improperly invokes the hearing process by raising non-justiciable issues, such as the propriety of statutory requirements or agency regulations; and whether it raises issues that are appropriate for litigation in the particular proceeding.

Sierra Club, 862 F.2d at 228 (*citing Tex. Utils. Elec. Co.*, 25 N.R.C. 912, 930 (1987) and *Phila. Elec. Co.*, 8 A.E.C. 13, 20-21 (1974)); *see also Entergy Nuclear Operations, Inc*. (Indian Point Nuclear Generating Units 2 and 3) LBP-08-13, 68 NRC 43, 63 (2008).

In spite of the law's clarity on this point, Exelon and NRC Staff raise arguments that would require NRDC to provide much more than a "brief explanation" of each contention and a "concise statement" of the facts supporting the contention. 10 C.F.R. § 2.309(f)(1). As their response briefs make clear, Exelon and the Staff would have an argument on the merits at this

stage of the proceeding when, in fact, each of NRDC's four contentions meet all the requirements of 10 C.F.R. § 2.309(f)(1). NRDC's arguments below will illustrate this point for each contention, and the Board should admit those contentions in turn.

A. CONTENTIONS 1-E, 2-E AND 3-E ARE ADMISSIBLE

1. Generic Errors In Exelon and NRC Staff Answers

a. The Answers ignore the central bases for the Contentions

Exelon's Answer Opposing NRDC'S Petition to Intervene ("Exelon Answer") and NRC Staff's Answer to Natural Resource Defense Council Petition to Intervene and Notice of Intention to Participate ("NRC Staff Answer") ignore three central theses of NRDC's Contentions 1-E, 2-E and 3-E:

1. Exelon is obligated by NRC Regulations to submit any "new and significant" information related to matters that were allegedly resolved in the past and upon which Exelon now relies. 10 C.F.R. § 51.53(c)(3)(iv). Exelon agrees this obligation applies to the previously conducted severe accident mitigation design alternative (NUREG-0974 Supplement Final Environmental Statement related to the operation of Limerick Generating Station, Units 1 and 2 ("1989 SAMDA") analysis. License Renewal Application, Appendix E (Environmental Report)("ER") at 5-2.

2. Exelon alleges that the requirements of 10 C.F.R. § 51.53(c)(ii)(L) to conduct a site-specific severe accident mitigation alternative ("SAMA") analysis are fulfilled by the 1989 SAMDA analysis. ER at 5-4.[2]

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[2] Exelon claims ". . . the NRC explicitly exempted plants for which an evaluation of alternatives to mitigate severe accidents was completed and included in a prior EIS or EIS supplement from this requirement (NRC, 1996a, Sec. 5.4.1.5). LGS [Limerick Generating

3. Whether Exelon meets any of the standards set forth in 10 C.F.R. § 51.53(c)(3)(ii) is appropriate for consideration in a license renewal proceeding so long as the challenge is not to the validity of the standard but focuses on whether applicant meets the standard.

Rather than address these issues, Exelon and NRC Staff create the straw person argument that NRDC is seeking, in violation of 10 C.F.C. § 51.53(c)(3)(ii)(L), to require Exelon to conduct a SAMA analysis when it has already met that obligation with the 1989 SAMDA analysis. The Answers go further and assert that whether the 1989 SAMDA analysis actually meets the criteria in the 1996 Regulations is not a legitimate issue for license renewal hearings. See Exelon Answer at 10-11 and NRC Staff Answer at 19-20.

b. NRDC does not contend that Exelon should do a "SAMA"

NRDC contentions do not implicate the question of whether, if Exelon meets the requirements of 10 C.F.R. § 51.53(c)(3)(ii)(L), it is exempt from having to do a SAMA nor does NRDC allege that Exelon must do a SAMA, as that term is currently used. Rather, Contention 1-E alleges that even if the 1989 SAMDA meets the regulatory requirement, Exelon must update its analysis of mitigation alternatives with new and significant information but it has failed to include all relevant new information and has provided a flawed analysis of why the new information it does include is not significant. Exelon essentially concedes that it is required to provide new and significant information regarding the 1989 SAMDA analysis and offers an analysis, relying on modern-day SAMA concepts, to show the new information is not significant

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Station] is a plant that qualifies for this exemption because, as discussed in Section 4.20, an evaluation of severe accident mitigation design alternatives was completed in the 'Final Environmental Statement Related to the Operation of Limerick Generating Station, Units 1 and 2' (NRC, 1989)"). ER at 5-4.

but nonetheless claims that its updating analysis is not subject to challenge. Exelon Answer at 26-34.

Contention 2-E alleges that the 1989 SAMDA cannot serve to fulfill the obligations imposed on Exelon pursuant to NRC Regulations 10 C.F.R. §§ 51.45, 51.53(c)(2) and 51.53(c)(3)(iii) and the National Environmental Policy Act ("NEPA") to thoroughly consider alternatives to the proposed action that will reduce the environmental impact of severe accidents.[3] Finally Contention 3-E challenges Exelon's assertion that the document produced in 1989 by NRC Staff and designated a SAMDA analysis is sufficient to meet the standards in 10 C.F.R. § 51.53(c)(3)(ii)(L) of being an analysis of "severe accident mitigation alternatives for the applicant's plant". *Id*.

If Exelon asserts in its ER that it has properly considered new and significant information or that it has thoroughly explored alternatives to mitigate the consequences or risks of severe accidents or that it is exempt from producing a SAMA analysis, neither Answer does, nor could, provide a legally defensible argument that NRDC is prohibited from challenging those assertions. Contentions 1-E, 2-E and 3-E directly challenge assertions that Exelon believes are essential to

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[3] As Exelon essentially acknowledges (Exelon Answer at 10), § 51.53(c)(3)(ii)(L) does not prohibit challenging an applicant for not doing a SAMA analysis even when an earlier analysis of mitigation alternatives was completed. It merely says an applicant is not required by that provision to conduct a SAMA analysis if it meets that precondition. However, as Contention 2-E demonstrates, the origin of the obligation to consider alternatives to the proposed action does not stem solely from § 51.53(c)(3)(ii)(L), but arises from the more general obligations imposed by NRC Regulations and NEPA to thoroughly consider alternatives to the proposed action. Where, as here, an analysis of severe accident mitigation alternatives, done for one proposed action, is demonstrably deficient for a new and different proposed action, NRC will not have taken the required "hard look" at the new proposed action and alternatives to it. *Kleppe v. Sierra Club*, 427 U.S. 390, 410 n.21 (1976) ("The only role for a court is to insure that the agency has taken a 'hard look' at environmental consequences.") Slapping a label on a deficient report does not convert the report into a legally sufficient analysis.

its effort to file a complete and accurate Application and are admissible. The material dispute with Exelon is factual, not legal, challenging the factual assertions made by Exelon in the ER.

c. NRDC's contention are based on assertions made in the ER

Exelon and Staff Answers ignore the statements made by Exelon in its Application that demonstrate the flaw in its assertion that "the 1989 SAMDA analysis is simply not at issue in this proceeding". Exelon Answer at 36.

In the ER Exelon asserts "no new and significant information has been found that would change the generic conclusion codified by the NRC that LGS need not reassess severe accident mitigation alternatives for license renewal [10 CFR 51.53(c)(3)(ii)(L)]". ER at 5-4. This statement is followed by an extended discussion in which Exelon attempts to demonstrate, using a number of current SAMA concepts and even relying on the SAMA analyses for other reactors, that four items of new information do not alter the 1989 SAMDA conclusions that there are no cost beneficial severe accident mitigation alternatives for LGS. ER at 5-4 to 5-9. The discussion concludes:

> The following four (4) items of new information were identified by comparing assumptions for the SAMDA assessment reported in that document with assumptions used for current-day assessments of severe accident mitigation alternatives:
>
> 1. Population increase
> 2. Consideration of offsite economic cost risk
> 3. Changed criteria for assigning cost per person-rem averted
> 4. Changed seismic hazard proposed by GI-199
>
> Each item of new information was reviewed to determine whether it would materially alter the NRC's conclusions, as documented in the Supplement to NUREG-0974. None of the items of new information was found to be significant. Hence, no new and

> significant information has been found that would change the *generic conclusion codified*[4] by the NRC that LGS need not reassess severe accident mitigation alternatives for license renewal [10 CFR 51.53(c)(3)(ii)(L)].

ER at 5-9 (emphasis and footnote added). Thus, contrary to the assertion in its Answer, Exelon made the 1989 SAMDA an issue in this proceeding by recognizing that new and significant could change the conclusion that "sever accident mitigation need not be reassessed for these plants at license renewal". Exelon Answer at 28 quoting the GEIS at 5-114. In Contention 1-E, NRDC properly challenges Exelon's assertion that it identified all relevant new information, that the new information was not significant and that it was not required to reassess severe accident mitigation alternatives in light of this information.

Exelon also recognized in the ER that its comparison of impacts of the new information with the 1989 SAMDA results was to be done by "comparing assumptions for the SAMDA assessment reported in that document with assumptions used for current-day assessments of severe accident mitigation alternatives". ER at 5-9. The adequacy of that comparison and the appropriateness of the methodology used to make that comparison furthers the extent to which Exelon has made the SAMDA an issue in this proceeding. NRDC Contention 2-E challenges Exelon's failure to utilize the assumptions and analyses used for current-day SAMAs to evaluate the feasibility of severe accident mitigation alternatives thus failing to meet NRC requirements for a thorough analysis of alternatives.

Exelon makes clear that the validity of the 1989 SAMDA is at the heart of its position that it need not conduct a SAMA analysis for license renewal:

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[4] Although Exelon refers to a "generic conclusion codified" by NRC there was no adjudicated conclusion nor was it generic nor was it codified by NRC. *See* discussion *infra*.

> Notwithstanding, NRC has explained that Severe Accident Mitigation Alternatives (SAMAs) for LGS do not need to be analyzed at the license renewal stage because NRC previously completed such a site-specific analysis in a supplement to the Final Environmental Impact Statement Related to the Operation of LGS Units 1 and 2 (NRC, 1996a; NRC, 1989). The regulatory text codified in 10 CFR 51.53(c)(3)(ii)(L) also supports this conclusion. Accordingly, no analysis of SAMAs for LGS is provided in this License Renewal Environmental Report as none is required as a matter of law.

ER at 4-49. NRDC Contention 3-E challenges the assertion that the 1989 SAMDA is "such a site-specific analysis" that qualifies for the exemption granted by 10 C.F.R. § 51.53(c)(3)(ii)(L).

d. Ongoing NRC Staff safety improvements are not a substitute for a proper analysis of severe accident mitigation alternatives as part of licensing renewal

NRC Staff offers a novel argument that relies on NRC Staff's ongoing programs to address severe accident consequences, along with the 1989 SAMDA, to attempt to demonstrate that no further severe accident mitigation alternative analysis is required, that new and significant information is irrelevant to the previous 1989 SAMDA and that when taken in combination all these programs demonstrates compliance with the requirement for exemption contained in 10 C.F.R. § 51.53(c)(3)(ii)(L). NRC Staff Answer at 23-29. The fundamental problem with this argument is that it has essentially been rejected by the Commission and finds no support in the actual language of the regulations.

As NRC Staff recognizes, the Commission was aware in 1996 of ongoing programs to address upgrades for severe accident mitigation. NRC Staff Answer at 26. In 2001 the Commission rejected a proposal from the Nuclear Energy Institute ("NEI") to eliminate the requirement for the SAMA review and one of the arguments advanced by NEI was the same as Staff's argument - i.e. Individual Plant Examination ("IPE") and Individual Plant Examination of

External Events ("IPEEE") reviews are already addressing mitigation alternatives on a plant-specific basis and thus the SAMA analysis can be classified as a Category 1 issue. 66 Fed.Reg. 10834 (June 20, 2001) Nuclear Energy Institute; Denial of Petition for Rulemaking (Docket No. PRM 51-7). The Commission held, contrary to NRC Staff's argument that:

> While the information developed in the IPE/IPEEE program provides a valuable starting point, considerable staff and contractor effort would be required to extend the conclusions resulting from the IPE/IPEEE reviews to draw generic conclusions regarding SAMAs. *This would include the need to evaluate changes in plant design and procedures since the IPEs/IPEEEs were completed, incorporate changes in the state of knowledge regarding certain severe accident issues, and to extend the IPE/IPEEE analyses to include offsite consequences. In addition, both benefit and cost considerations of potential plant improvements would need to be developed.* Further, there is uncertainty whether, at the conclusion of this effort, the staff would be successful in developing a sufficient technical basis to reclassify severe accidents as a Category 1 issue. Given the resources that would be required and the uncertainty in achieving a successful outcome, the staff does not believe it would be cost beneficial to pursue rulemaking at this time.

Id. 66 Fed.Reg. at 10838 (emphasis added).[5] Significantly many of the missing analyses identified by the Commission are analyses NRDC now contends have yet to be done with regard

[5] The draft of the regulations and the draft GEIS proposed precisely the line of argument now advanced by Staff and ultimately rejected by the Commission - i.e. that ongoing safety programs coupled with the low probability of severe accidents made further analysis of severe accident mitigation alternatives unnecessary. Environmental Review for Renewal of Nuclear Power Plant Operating Licenses (56 Fed.Reg. 47016 (September 17, 1991)) Proposed Action, Generic Environmental Impact Statement, Summary of Issues Analyzed in the GEIS at ¶ 9 ("since 1981, all plant FESs have included an analysis of severe accidents. In addition, in the past 10 years, extensive work has taken place on severe accident analysis and safety issue resolution. Therefore, the severe accident analyses done previously in support of FESs (a total of 27 FESs contain analyses of severe accidents) plus the results of other severe accident analyses done in the past were utilized and extrapolated to predict the severe accident environmental impacts for all plants at the midpoint of their license renewal period") and proposed Table B. 1.

to Limerick including new knowledge about severe accident issues and offsite consequences.

As a factual matter, the premise of NRC Staff's argument is also wrong. NRC Staff assumes that because of ongoing analyses, outside the NEPA/SAMA context, there are no mitigation measures that could be cost beneficial. However, SAMA analyses done for relicensing reviews are finding numerous cost beneficial, or potentially cost beneficial, mitigation measures that were not identified and/or implemented under ongoing program activities. NRDC Expert Declaration at ¶¶ 12-14; *see also Entergy Nuclear Operations, Inc.* (Indian Point Units 2 and 3), LBP-11-17, __ N.R.C. __ (July 14, 2011) Slip op. at 12-13 listing 20 SAMAs that are cost effective for Indian Point Units 2 and 3.

2. Contention 1-E Is Admissible

Contention 1-E is based on the obligation imposed on Exelon to consider new and significant information in its ER to update older information upon which it relies in its application. 10 C.F.R. § 51.53(c)(3)(iv). NRDC does not seek to use this new and significant information to convert a Category 1 issue into a Category 2 issue since consideration of alternatives to mitigate severe accidents is already a Category 2 issue, but rather to assure that Exelon's environmental review is based on the best available information. Although Exelon's ER purports to address this issue (ER at 5-4 to 5-9) Exelon now claims it need not provide new and significant information to update the 1989 SAMDA.

Exelon's attack on Contention 1-E, as well as its attack on Contentions 2-E and 3-E is based on two fundamental, and faulty, propositions. First, Exelon asserts that by doing the 1989 SAMDA the issue of severe accident mitigation alternatives was transformed from a Category 2 issue, to a Category 1 issue and that NRDC is seeking to convert the issue back to a Category 2

status. Second, Exelon asserts that the Commission has already determined that Exelon's 1989 SAMDA meets the standards of 10 C.F.R. § 51.53(c)(3)(ii)(L) and thus any questions about whether it relies on stale information are irrelevant. Both propositions are wrong, as the following discussion demonstrates.

a. The regulatory determination that severe accident mitigation alternatives is a Category 2 issue is controlling

1) The 1989 SAMDA was not a generic analysis of mitigation alternatives

Exelon does not dispute the fact that it is obligated to identify new and significant information relevant to the 1989 SAMDA. Rather, it asserts that when NRC Staff did a SAMDA analysis in 1989 it transformed the Category 2 issue of evaluating severe accident mitigation alternatives on a site-specific basis, into a Category 1 issue (Exelon Answer at 16)[6] and has thus insulated its deficient analysis of new and significant information from licensing board review.[7]

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[6] As discussed in detail *infra*. Exelon's effort to transform the analysis of severe accident mitigation alternatives into a Category 1 issue is a part of its strategy to compel NRDC to seek a waiver of that designation pursuant to 10 C.F.R. § 2.335(b). Regardless of whether NRDC, not yet a party, could now seek a waiver when the right is limited to someone who is a "party" - and Exelon reminds the Board that the Part 2 regulations are "strict by design" (Exelon Answer at 60) - no waiver petition would be ripe unless and until the Board were to rule that by doing a site-specific analysis of mitigation alternatives in 1989 that issue had been transformed into a Category 1 issue, an outcome that Exelon is hoping for but, as shown here, is without basis.

[7] Exelon also conflates the relief sought by NRDC in Contention 1-E, which is to take the new and significant information into account in determining whether there are cost beneficial mitigation alternatives, with an argument NRDC does not make in this Contention - i.e. that Exelon must do a SAMA. As the ER demonstrates, there are ways to consider new information short of conducting a SAMA (ER at 5-4 to 5-9) although Exelon has not done that analysis correctly. In the last analysis Exelon may decide it is more efficient and appropriate to do a SAMA but that is an issue that need not be reached now. For now the issue is whether Exelon has identified all relevant new information and has used an appropriate methodology to assess its significance.

There is no provision in the regulations that can change the category status of an issue as established in the GEIS except, as Exelon notes (Exelon Answer at 28-33), by rulemaking under 10 C.F.R. § 2.802 or by a request for waiver of the regulation filed pursuant to 10 C.F.R. § 2.335. Exelon has never sought such a change in status for the severe accident mitigation alternatives analysis for Limerick. Moreover, to qualify as a Category 1 issue, the issue must, *inter alia*, be one which is capable of generic resolution. 10 C.F.R. Part 51, Subpart A, Appendix B at n. 2. The 1989 SAMDA was a site-specific analysis applicable only to Limerick, was not a generic finding and could not have converted the mitigation alternatives analysis for Limerick into generic Category 1 status by having been completed. The 1989 SAMDA was, at most, a completed Category 2 analysis.

2) The GEIS and the Commission's statement of considerations demonstrate that an issue that is not resolved on a generic basis cannot be a Category 1 issue

Exelon insists that the GEIS, which is not a Commission regulation, and the Statement of Consideration supporting the adoption of the environmental regulations for license renewal demonstrate that if there is a completed severe accident mitigation alternative analysis, the Category 2 issue is transformed into a Category 1 issue.[8] However, the non-regulatory language cited by Exelon to support this assertion only indicates that if a prior, qualifying, mitigation alternative analysis has been completed, no new SAMA analysis is required, not that the issue has been transformed from a Category 2 to a Category 1 issue. The essence of the Commission's

[8] The Statement of Consideration for Environmental Review for Renewal of Nuclear Power Plant Operating Licenses ("SOC")(61 Fed.Reg. 28,467 (June 5, 1996)) discusses how the findings of the GEIS supported the classification of issues into Category 1 and Category 2 but the only portion of the GEIS that became a regulation was the table that is now Appendix B, Subpart A of Part 51. *See* 61 Fed.Reg. at 28,486-28,496.

designation of the characteristics of Category 1 and Category 2 issues is the nature of the issue, not the status of the analysis of that issue. When analyses of Category 2 issues are completed, they are not turned into a Category 1 issues.[9]

It is not credible that the Commission would create a regulation that classifies an issue as Category 2 because it is not capable of generic resolution and then provide, outside the regulatory language, that the issue changes its status from Category 2 to Category 1 if a site-specific analysis is conducted. The Commission long ago made clear that the focus of the classification of an issue as Category 1 is that it has been resolved on a generic basis:

> On many issues, the NRC found that it could draw generic conclusions applicable to all existing nuclear power plants, or to a specific subgroup of plants. Part 51 refers to these generic issues as "Category 1" issues. See 10 C.F.R. Part 51, Subpart A, App. B. Because *Category 1 issues involve environmental effects that are essentially similar for all plants*, they need not be assessed repeatedly on a site-specific basis, plant-by-plant.

Fla. Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 & 4), CLI-01-17, 54 N.R.C. 3, 12 (N.R.C. 2001)(emphasis added).

The Commission recently affirmed the concept that the bar on contentions based on new and significant information applies only to challenges to *generic* findings:

> Addressing similar claims of "new and significant" spent fuel pool information raised by the Attorney General of Massachusetts in this and the Vermont Yankee proceedings, we held that "[a]djudicating Category 1 issues site by site based merely on a claim of 'new and significant information,' would defeat the

[9] Exelon has one citation, GEIS at 5-116, where the Staff asserts, without analysis that the mitigation alternative analysis is Category 2 for plants that have not completed the analysis before license renewal thus possibly implying that for plants for which the analysis is completed the issue is Category 1. This statement does not support the broader conclusion Exelon seeks and, it is merely Staff's opinion, not a regulation.

> purpose of resolving generic issues in a GEIS." The United States Court of Appeals for the First Circuit affirmed our decision, finding that NRC regulations provide procedural channels through which new and significant information may be brought to the Staff's attention for review to determine if a generic Category 1 finding warrants modification.

Entergy Nuclear Generation Co. (Pilgrim Nuclear Power Station) CLI-10-14, 71 N.R.C. 449, 475-476 (2010)(footnotes omitted); *see also Entergy Nuclear Vermont Yankee* (Vermont Yankee Nuclear Power Station) LBP-06-20, 64 N.R.C. 131, 155-59 (2006) for a full analysis of the reasoning supporting excluding contentions that claim *generic* findings codified in 10 C.F.R. Part 51, Subpart A, Appendix B should be modified due to new and significant information.

Exelon confuses a challenge to whether an applicant qualifies for an exemption under Part 51, which is the thrust of NRDC's Contention 3-E, with the entirely different issue of whether there needs to be a waiver of the Commission Regulations to require consideration of new and significant information as the basis for converting a Category 1 issue into a Category 2 issue. NRDC does not make, nor does it need to make, the latter claim because the severe accident mitigation alternative analysis for Limerick has been, and remains, a Category 2 issue.

Exelon ends its exploration of the cases and regulatory history related to challenges to Category 1 status with the overbroad, and unsupported conclusion that:

> The regulatory history of Part 51 thus unequivocally demonstrates that the Commission did not intend Section 51.53(c)(3)(iv) to allow petitioners to challenge issues *precluded by rule* from consideration in an ER, absent a waiver from the Commission.

Exelon Answer at 32 (emphasis added). However, the cases and regulatory history which Exelon cites are limited to precluding new and significant issue challenges from consideration in license renewal only when the issue sought to be raised *is classified by rule as a Category 1 generic*

issue, without any reference to whether a challenge based on the failure to properly consider new and significant information is admissible where the subject is allegedly precluded from consideration in license renewal for another reason.[10]

3) New and significant information is essential to assure that NRC does not rely on stale information in its environmental analysis

The core of the principles behind requiring analysis of new and significant information at the time of a license renewal application was to respond to concerns raised by the Council on Environmental Quality ("CEQ") and the United States Environmental Protection Agency ("EPA") about the problem of relying on stale information for a current environmental decision.

> Federal and State agencies questioned how new scientific information could be folded into the GEIS findings because the GEIS would have been performed so far in advance of the actual renewal of an operating license. . . . A group of commenters, including CEQ and EPA noted that the rigidity of the proposed rule hampers the NRC's ability to respond to new information or to different environmental issues not listed in the proposed rule.

61 Fed. Reg. 28,467 at 28,470 (June 5, 1996) Statement of Consideration Environmental Review for Renewal of Nuclear Power Plant Operating Licenses ("SOC"). In response to these concerns the Commission expanded the regulation to include the requirement in 10 C.F.R. § 51.53(c)(3)(iv) to discuss new and significant information. *Id*. Although the focus, but not the words of the regulation, was on the generic findings getting stale over time, the same concern

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[10] This is not Exelon's only assertion of legal support for a proposition for which there is no support in the analyses and authorities cited by Exelon. Exelon asserts that "Category 1 issues are those resolved generically by the GEIS *or that otherwise need not be addressed as part of license renewal*, whereas Category 2 issues require plant-specific review". Exelon Answer at 14 (emphasis added). However, NRC regulations (Part 51, Subpart A, Appendix B at n. 2) provide specific criteria for an issue to be classified as Category 1, one of which is that it is capable of generic resolution, which clearly does not apply to the site-specific 1989 SAMDA.

applies to reliance in 2011 on an analysis conducted in 1989, particularly where the new and significant information involves such fundamental concerns as including an analysis of the economic cost and benefits of the mitigation measures and expanding the scope of mitigation measures to include recent information on both the need for, and ways to achieve, additional mitigation of environmental consequences of a severe accident.

While Exelon asserts it has not "adopted" the 1989 SAMDA and does not rely upon it for its license renewal application, the discussion pp. 6-8 *supra* demonstrates that Exelon does, as it must, attempt to make a showing that alternatives to mitigate severe accident consequences have been considered. It seeks to do this by claiming that the 1989 SAMDA met its obligation. But if that is so, then it must consider new and significant information that can modify those conclusions and incorporate the new and significant information into its analysis. Exelon attempts to do that and NRDC properly challenges that effort by noting that all new information was not considered and that the methodology used to determine whether new information was significant, was flawed. No rule, regulation or precedent does, or could, preclude such a claim from consideration here.

b. There has been no adjudication of the sufficiency of the 1989 SAMDA to meet the requirements of 10 C.F.R. § 51.53(c)(3)(ii)(L)

Exelon also claims that the 1989 SAMDA is an unassailable "exit visa" not only from the obligation to produce a SAMA but from the obligation to update the analysis with new and significant information and the obligation to defend the accuracy and completeness of the SAMDA analysis in the context of the proposed license renewal application. Exelon Answer at 26 ("Section 51.53(c)(3)(iv), however, is not a 'loophole' through which NRDC may litigate

matters that the NRC has resolved generically through rulemaking"). The single legal authority offered for this extraordinary argument is that the Commission, in adopting regulations in 1996 for license renewal, indicated in its Statement of Consideration and the NRC Staff indicated in the GEIS, that the SAMDA done for Limerick met the requirements of 10 C.F.R. § 51.53(c)(3)(ii)(L) and thus any issues related to that SAMDA have been adjudicated. Exelon Answer at 27-28. However, there has been no codification in Part 51 of the "finding" that the Limerick SAMDA is legally sufficient and no adjudication of that issue.

1) The legal sufficiency of the 1989 SAMDA to meet regulatory requirements adopted in 1996 was not adjudicated in 1989

In the first instance, when the 1989 SAMDA was issued, there was no adjudication of its adequacy, even for the purpose of supporting the major federal action of issuance of an initial operating license much less the for purpose of meeting a regulatory standard not adopted until 7 years later. The contention that raised the severe accident mitigation alternatives issue was raised in the context of issuance of an initial operation license and was settled, without a hearing or ruling by the Board, on the substantive adequacy of the SAMDA and, except for agreeing that the intervenor there, Limerick Ecology Action, would not challenge the SAMDA in the future, the settlement explicitly did not resolve the issue, stating instead that "[b]y executing this Agreement neither party acknowledges or admits the correctness of any other party's position on any matters related to this proceeding or any other proceeding regarding the Limerick Generating Station". *Philadelphia Electric Company* (Limerick Generating Station, Units 1 and 2) LBP-89-24, 30 N.R.C. 152 (1989) Attached Settlement Agreement dated August 25, 1989 at ¶ 23.

2) Adoption of 10 C.F.R. § 51.53(c)(3)(ii)(L) and issuance of the GEIS did not adjudicate the legal sufficiency of the 1989 SAMDA

In 1996, when NRC Staff issued the GEIS, it disclaimed any intent to have the GEIS in its entirety serve as an adjudication of any matters or to become a rule other than to identify issues that were capable of generic resolution, to provide NRC Staff's assessment of those generic impacts and to support regulations adopted by the Commission.

> The rule amendment and this document were initiated to enhance the efficiency of the license renewal process by documenting in this GElS and codifying in the Commission's regulations *the environmental impacts that are well understood*.
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> ***
>
> The information in the GElS is *available for use by the NRC and the licensee in performing the site-specific analysis of alternatives*.
>
> ***
>
> This final GElS assesses 92 environmental issues. Sixty-eight of these issues are found to be Category 1 and are identified in 10 CFR Part 51 as not requiring additional plant-specific analysis. *Guidance on the analyses required for each of the other 24 issues* is provided in 10 CFR Part 51. A summary of the findings for the 92 environmental issues is provided in Table 9.1 of this GElS. That table has been codified in Appendix B to Subpart A of 10 CFR Part 51 (Table B-1).

NUREG-1437, Generic Environmental Impact Statement for License Renewal of Nuclear Plants, ("GEIS") Vol. 1 at xxxiii, xxxiv and 1-6 (emphasis added).

When the Commission proposed the regulations for Environmental Review for Renewal of Nuclear Power Plant Operating Licenses (56 Fed.Reg. 47016 (September 17, 1991)) it gave no indication that it was considering adjudicating, or resolving by rule, the issue of the legal status of the 1989 SAMDA for purposes of a subsequent license renewal application by Limerick. In fact NRC initially proposed that as a generic matter severe accident mitigation alternatives would

not be considered for any license renewal proceeding. *Id*. NRC observed, based on the draft GEIS, that all plants had done sufficient analysis of severe accidents that it could conclude that their impacts were too small, when probabilities were considered, to warrant evaluating mitigation measures thus treating Limerick like all plants. *Id*. Proposed Action, Generic Environmental Impact Statement, Summary of Issues Analyzed in the GEIS at ¶ 9 and Proposed Table B. 1. By not notifying the public that it was considering requiring a SAMA analysis for all plants but exempting Limerick, based on the 1989 SAMDA, from conducting a SAMA analysis, NRC did not comply with the notice requirements for a valid adjudication of rights with regard to Limerick (5 U.S.C. § 554(b)):

> (b) Persons entitled to notice of an agency hearing shall be timely informed of–
>
> > (1) the time, place, and nature of the hearing;
> > (2) the legal authority and jurisdiction under which the hearing is to be held; and
> > (3) *the matters of fact and law asserted.*

Id. (emphasis added); *see also* 5 U.S.C. § 554(c)(2)("The agency shall give all interested parties opportunity for . . . hearing and decision on notice and in accordance with sections 556 and 557 of this title [5 USCS §§ 556 and 557]"); *PSC of Ky. v. FERC*, 397 F.3d 1004, 1012 (D.C.Cir. 2005)("The Due Process Clause and the APA require that an agency setting a matter for hearing provide parties 'with adequate notice of the issues that would be considered, and ultimately resolved, at that hearing.' This requirement ensures the parties' right to present rebuttal evidence on all matters decided at the hearing." (Citations omitted)).

Nor could the statement by the Commission in the SOC constitute a rule making by the Commission since that statement, purporting to determine the legal sufficiency of the Limerick

SAMDA for purposes of § 51.53(c)(3)(ii)(L), was not part of the notice issued by the Commission when it proposed the rules it eventually adopted and thus it would be in violation of 5 U.S.C. § 553(b) which requires that:

> (b) General notice of proposed rule making shall be published in the Federal Register, unless persons subject thereto are named and either personally served or otherwise have actual notice thereof in accordance with law. The notice shall include–
>
> > (1) a statement of the time, place, and nature of public rulemaking proceedings;
> > (2) reference to the legal authority under which the rule is proposed; and
> > (3) either the terms or substance of the proposed rule or a description of the subjects and issues involved.

Id.(emphasis added); *see also Telecommunications Research & Action Center v. FCC*, 800 F.2d 1181, 1186 (D.C. Cir. 1986)("Before an agency may adopt a substantive rule, it must publish a notice of the proposed rule and provide interested persons an opportunity to comment." (Citations omitted)).

It is ironic that Exelon and NRC Staff now argue that a statement made by the Commission in the SOC for the license renewal environmental regulations, constitutes a binding determination in this individual licensing proceeding on the issue of whether the SAMDA for Limerick was, or was not, legally sufficient to meet 10 C.F.R. § 51.53(c)(3)(ii)(L) or whether it needed to be updated with new and significant information. Reliance on a statement in the Commission's Statement of Consideration to bar an actual adjudication in the future is akin to the legal violation that resulted in the Commission being compelled to conduct site-specific SAMA reviews for operating license proceedings. *See Limerick Ecology Action v. NRC,* 869 F.2d 719, 741 (3rd Cir. 1989)(NRC must consider SAMDAs in individual operating license

proceedings, "[b]ecause the action not to consider SAMDAs was promulgated as a policy statement, rather than a rule, and because it applies to an issue that [the court] find[s] is unlikely to be treated as generic").

In addition, 10 C.F.R. § 51.53(c)(3)(ii)(L) only absolves an applicant, that meets the regulatory preconditions, of the need to prepare a SAMA analysis. It does not absolve that applicant of the obligation to update the analysis with new and significant information nor of the obligation to defend the analysis as sufficient to meet the requirements of the regulations. NRDC is not demanding that Exelon conduct a new SAMA analysis. Rather, NRDC is asking that Exelon defend the 1989 SAMDA analysis upon which it relies by updating the information with new and significant information, by upgrading the analysis to reflect current technical knowledge about severe accidents and how to evaluate their consequences and by demonstrating, if it can, that the site-specific 1989 SAMDA meets the exemption preconditions in § 51.53(c)(3)(ii)(L). Exelon's reluctance to do any of this suggests that it is fully aware that the 1989 SAMDA analysis meets neither the letter nor the spirit of NRC's regulations for environmental analyses.

c. Contention 1-E raises material disputes

Exelon claims that so long as it has an argument about why NRDC is wrong on the merits with regard to the identified failings of the Limerick ER, NRDC has failed to show there is a material dispute. Exelon Answer at 34-50. Of course, rather than demonstrate that no dispute exists, the arguments by Exelon's lawyers against the opinions of NRDC's experts actually confirm the material dispute. Every instance in which NRDC identified new and significant information that should be considered in the severe accident mitigation alternatives analysis represents a material dispute with Exelon's treatment of that information in the ER, including

several instances in which Exelon ignores the new information completely.

1) Exelon's analysis of severe accident mitigation alternatives is not reasonable

A central argument repeated by Exelon is that NRDC is demanding that it conduct a more detailed and accurate analysis of alternatives than is required by NEPA's rule of reason. However, whether what Exelon has done is sufficiently reasonable to meet its regulatory obligations is a matter that NRDC disputes. *See* more detailed discussion of this point *infra* in III.A.4.d. For example, Exelon's claim that doing more than its crude comparison of off-site economic costs risk to off-site exposure cost risk at a site that bears no reasonable resemblance to the Limerick site, other than that it is in Pennsylvania, or that using accurate population estimates would require an unreasonable level of detail well beyond the requirements of NEPA, a claim without any specific legal authority, is belied by the fact that NRC guidance requires precisely the kind of analysis that NRDC urges. *See* NEI 05-01(Rev. A) Severe Accident Mitigation Alternatives (SAMA) Guidance Document) at 13, 16-17[11], which guidance has been adopted by the NRC Staff (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)). If it is reasonable for NRC Staff, relying on guidance from the industry's own trade association - NEI - to demand something more sophisticated than Exelon's crude, inappropriate and inaccurate analyses, it is not unreasonable for NRDC to insist on a similar level of analysis here.

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[11] NRDC does not contend that the NEI guidance document, or any other guidance document, like NUREG-1437, the GEIS, is controlling. However, those guidance documents do provide support for certain propositions, some of which Exelon relies upon and some of which NRDC relies upon. The hearings and this Board's final decision will determine who is right.

2) Exelon's population figures are unreasonable when compared to current best population estimates for the license renewal period

NRDC's population arguments constitute new and significant information. In defending the inaccurate population estimates used in the 1989 SAMDA and the ER update of those numbers, Exelon argues that the total population for the 50-mile area is actually 2.5% less than those projected in the ER for 2030. Exelon Answer at 38. But that argument misses the central point of NRDC's challenge. Since post-accident consequences are dependent on the person-rems of exposure, and since a significant component of the human exposure, *i.e.* collective dose, is expected within 10 miles of the plant, the key figure is the population within that 10 mile zone. NRDC E Declaration at ¶¶ 22-30. As NRDC demonstrates, and Exelon does not rebut, the population in that most vulnerable zone is substantially underestimated in the 1989 SAMDA and the ER update, thus substantially understating the impact of a severe accident. *Id*. Exelon also claims that it is not required, nor does any guidance provide, that it should do more than present a simplistic population projection without regard for transient poplulations. Exelon Answer at 40-41. However, NEI 05-01(Rev. A) Severe Accident Mitigation Alternatives (SAMA) Guidance Document)("NEI Guidance") at 13, 16-17[12], guidance adopted by the NRC Staff (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)) includes the following:

> Transient population included in the site emergency plan should be

[12] NRDC does not contend that the NEI guidance document, or any other guidance document, like NUREG-1437, the GEIS, is controlling. However, those guidance documents do provide support for certain propositions, some of which Exelon relies upon and some of which NRDC relies upon. The hearings and this Board's final decision will determine who is right.

> added to the census data before extrapolation. Explain why the population distribution used in the analysis is appropriate and justify the method used for population extrapolation.

Id. at 13. Thus, Exelon does need to consider uncertainty in dose from population estimates. Furthermore, Exelon claimed that NRDC's criticism of their analysis of the relationship between population and dose is vague. However, it is sufficiently supported by the data included in the technical declaration. NRDC Expert Declaration at ¶¶ 22-30.

3) Exelon's core damage frequency values are unreasonable when compared to current real world core damage frequencies

In defending the use of the core damage frequency ("CDF") value in the ER, Exelon argues that its CDF reflects a site-specific analysis of CDF (Exelon Answer at 44) but ignores the NRDC Expert Declaration statement that because "the PRA is based on modeling assumptions that contain a large number approximations, large uncertainties and omissions, the absolute value of a CDF calculated using PRA is not a reliable predictor of the actual CDF value." NRDC Expert Declaration at ¶ 18. Exelon also argues that it believes the experience at other reactors is not helpful in evaluating CDF for Limerick (Exelon Answer at 45-46) but does not take issue with the NRDC Expert Declaration statement that:

> the most accurate values of CDF probably lie somewhere between the theoretical values calculated by the applicant and one or more of the U.S. or global values based on the historical record. However, the CDFs used in a Limerick SAMA analysis should be evidence based. The applicant's estimates of CDF are non-conservative and a Limerick SAMA analysis would benefit from a sensitivity analysis in which higher core damage frequencies are assumed. Given the historical operating record of similar reactors, we assert that it is simply not credible to assume the CDF for older BWR reactors in the United States, such as Limerick Units 1 and 2, to be as low as 1.8×10^{-5} per reactor year, i.e., about one core damage event per 55,000 reactor-years of

operation.

NRDC Expert Declaration at ¶ 21. Exelon then regresses into a fact specific argument with NRDC experts about how relevant CDF experience at other reactors is to the CDF calculation for Limerick. Exelon Answer at 45-47.[13] Obviously, this will be an interesting issue for resolution at the hearing but not one for resolution at the contention admissibility stage.[14]

4) Exelon's off-site economic consequences analysis unreasonably relies on an analysis conducted at a materially different facility

In defending its use of the TMI SAMA analysis as a proper surrogate for the non-existent off-site economic analysis of the 1989 SAMDA, Exelon asserts that the ratio between off-site

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[13] Exelon's citation (Exelon Answer at 45, n. 228) to the Commission decision in *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station) CLI-10-11, 71 N.R.C. 287, 316 (2010) for the proposition that input values for calculating CDF are to be limited to the PRA done for the specific plant and should ignore CDF experience at other plants because the Commission observed in *Pilgrim* that mitigation alternatives analysis are to be site specific, supports NRDC's argument that use of the TMI SAMA analysis for the off-site economic costs of a severe accident at Limerick is inappropriate. It says nothing about the origin of the input data for the CDF analysis. However Reg. Guide 1.200, Rev. 1 immediately prior to Exelon's citation makes clear that experience at other plants is to be included in a proper PRA analysis:

> Parameter estimation analysis quantifies the frequencies of the initiating events, as well as the equipment failure probabilities and equipment unavailabilities of the modeled systems. The estimation process includes a mechanism for addressing uncertainties and has the ability to combine different sources of data in a coherent manner, including the actual operating history and experience of the plant when it is of sufficient quality, *as well as applicable generic experience*.

Id. at 9 (emphasis added).

[14] The Commission has recognized that challenges to CDF and the PRA analyses are legitimate contentions, when they are raised, as they are here, in a timely manner and with adequate technical support. *Duke Energy Corporation*, (McGuire Nuclear Station, Units 1 & 2, Catawba Nuclear Station, Units 1 & 2) CLI-02-28, 56 N.R.C. 373 (2002).

exposure cost risk and off-site economic cost risk it has used in the ER, i.e. 70% based on the ratio in the TMI SAMA, is within the range of the ratios identified by NRDC in the its Expert Declaration, and thus is appropriate. Exelon Answer at 48-49. Exelon ignores the basic argument advanced in the NRDC Expert Declaration that this entire approach, comparing the ratios of these values at one site to what might have been the ratios at Limerick is inherently defective, in part because the ratios vary widely and do not show a consistent nexus between the two values and in part because the site chosen by Exelon, TMI, bears no reasonable resemblance to the Limerick site in terms of off-site characteristics including persons exposed, economic assets at risk or nature of the economic development within the 50 mile radius of the plant. NRDC Expert Declaration at ¶¶ 31-39.

5) Exelon's meteorological data is unreasonable when compared to more accurate and representative site-specific meteorology

In defending the outdated and unrepresentative meteorological data upon which the 1989 SAMDA relied, Exelon distorted NRDC's argument. NRDC's central argument was that there is variability of weather conditions from year to year at a specific reactor site and that the single year selected in the 1989 SAMDA fails to take account of that variability. NRDC Expert Declaration at ¶¶ 46-47.

Exelon also asserts that it does not have to use current data to create its meteorological analysis and then, quoting from NEI 05-01 (Rev.A) at 15 notes that it only has to ""[e]xplain why the data set and data period are representative and typical". Exelon Answer at 54. NRDC has challenged the assertion that the meteorology used in the 1989 SAMDA is either representative or typical and provided substantial evidence and expert opinion why it is not. NRDC Expert

Declaration at ¶¶ 45-47.

In arguing that claims about the effects of global climate change and its impact on weather conditions in the future are too speculative Exelon ignores two important factors. First, climate change is no longer considered to be a speculative view point (NRDC Expert Declaration at ¶ 47 and Ecological Impacts of Climate Change, Committee on Ecological Impacts of Climate Change, National Academy of Sciences, National Academy of Engineering, Institute of Medicine and National Research Council (2009) at 4 ("[t]he world's climate is changing, and it will continue to change throughout the 21st century and beyond. Rising temperatures, new precipitation patterns, and other changes are already affecting many aspects of human society and the natural world")). Thus these considerations are now occurring and indeed are a reasonable foreseeable impact.

Second, Exelon has chosen to file its license renewal application 13 and 18 years before license renewal would commence. Necessarily all of its analyses of environmental impacts that may occur during license renewal have an element of speculation in them. If that is a basis for rejection of NRDC challenges, it is also a basis for rejection of all the portions of the ER that attempt to characterize the environment upon which Limerick's impacts will occur and to reject the proposal because it seeks approval for a period for which reliable environmental analyses are not possible. A more rational approach, and the one urged by NRDC, is to include in the analyses the reasonably likely environmental conditions that will exist during the period of proposed license renewal in order to evaluate environmental impacts. With regard to meteorological conditions, the 1989 SAMDA is woefully out of date because it fails to consider reasonably likely global climate changes that will be occurring during the time of proposed

license renewal, a deficiency that is a portion of the dispute raised by NRDC regarding the need for consideration of new and significant information in the severe accident mitigation alternatives analysis.

6) Exelon's selection of accident scenarios in its severe accident mitigation alternatives analysis and its choice of mitigation alternatives is unreasonable when compared to current information, including the Fukushima accident and SAMA analyses of similar Mark II BWRs

A recurring theme in Exelon's answer is that the findings of the 1989 SAMDA analysis are set in stone and not subject to review at this time.[15] They use this argument to support the view that the accidents at Fukushima and mitigation alternatives explored in recent SAMAs for Mark II BWR plants, are irrelevant to the 1989 SAMDA, citing to statements by the Commission that the Fukushima information is not, as of now, "new and significant" within the meaning of NRC's regulatory requirement to prepare supplemental environmental impact statements for plants that have completed their environmental analyses. Exelon Answer at 43-44. But the Commission's recent decision on this subject supports NRDC's position here. In *Union Elec. Co.* (Callaway Plant, Unit 2), CLI-11-05, 74 NRC __, slip op. at 31 the Commission concluded that "[t]o merit this additional review [a supplemental EIS], information must be both 'new' and

[15] Exelon and NRC Staff both argue that challenges to the 1989 SAMDA are untimely because the time to challenge that document was when it was issued. These arguments misperceive NRDC's contention. The 1989 SAMDA was issued to support issuance of the initial operating license. It was not, and could not have, been issued to support *relicensing* since NEPA aspects of that process did not come into existence until 1996. NRDC's challenge is directly derived from Exelon's decision to make the 1989 SAMDA relevant to its relicensing application and statements made by Exelon in the ER which rely upon the 1989 SAMDA. Those challenges could not be made until Exelon chose to rely upon the 1989 SAMDA to support its relicensing and until Exelon presented a narrow and indefensible analysis of new and significant information.

'significant,' and it must bear on the proposed action or its impacts. As we have explained, '[t]he new information must present 'a seriously different picture of the environmental impact of the proposed project from what was previously envisioned.'" (Citation omitted). In the individual proceedings involved there ongoing licensing reviews were being undertaken which would have included SAMA analyses that were using current techniques and current information. In this case, unlike the plants involved in the *Callaway* decision, Exelon is relying on information that is over 20 years old and the new information, including the addition of the economic impacts of severe accidents and a much wider range of mitigation alternatives, will paint "a seriously different picture of the environmental impact of the proposed action from what was previously envisioned" in the 1989 SAMDA. NRDC Expert Declaration at ¶¶ 48-49. Thus, the proper comparison for evaluating whether the new information is "significant" is not between current SAMA analyses and Fukushima, as the Commission did in *Callaway*, but between the 1989 SAMDA and Fukushima, as well as all the other relevant intervening events. NRDC has alleged and provided substantial supporting evidence that when this comparison is made, it is apparent that further severe accident mitigation alternative analyses must be examined.

The issue is not merely an abstract legal argument, as Exelon and NRC Staff would have it, but rather a real world consideration of alternatives to mitigate severe accidents at the Limerick facility where the population at risk is forecast to exceed 10 million and the current economic assets at risk are in the hundreds of billions of dollars. NRDC Expert Declaration at ¶¶ 24 and 35. It is indefensible and unconscionable that Exelon and NRC Staff would argue that a serious consideration of reasonably available mitigation measures, evaluated in light of accurate information on meteorology, population, accident scenarios and core damage frequency, should

be rejected because 22 years ago an analysis was done that did not consider that information. Neither logic nor Commission regulations sanction such a result.

3. Contention 2-E Is Admissible

Contention 2-E is based on application of the Commission's substantive regulations regarding the adequacy of alternatives analyses to Exelon's consideration of severe accident mitigation alternatives in its ER. NRDC contends that due to numerous identified deficiencies in the 1989 SAMDA, Exelon does not meet the alternatives analysis standards established by the Commission. *See* 10 C.F.R. §§ 51.45, 51.53(c)(2) and 51.53(c)(3)(iii). Exelon does not defend its analysis on the merits by attempting to show that it has in fact done an adequate analysis of alternatives to meet the regulatory requirements. Most of Exelon's challenge to Contention 2-E rests on its claim that it is not required to have an analysis of severe mitigation alternatives for license renewal because its prior analysis - 1989 SAMDA - fulfills the exemption standard in 10 C.F.R. § 51.53(c)(3)(ii)(L) and the Commission has determined by regulation that it meets that standard. NRDC has already addressed those claims in its response to Exelon and NRC Staff answers to Contention 1-E, *supra*, and incorporates that response here. The remainder of the Exelon challenges rest on a misunderstanding of the Contention and a misrepresentation of the relevant legal standards established in Part 51.

a. Exelon offers no substantive evidence of compliance with NRC Regulations regarding consideration of alternatives to the proposed license renewal

Contention 2-E is focused on the generic NEPA obligation, incorporated into Part 51, that relevant alternatives to the proposed action be adequately explored to permit NRC to take a "hard look" at the proposed action and alternatives to it. *Robertson v. Methow Valley Citizens Council*,

490 U.S. 332, 350 (U.S. 1989). At no time does Exelon offer a substantive defense of the 1989 SAMDA analysis as sufficient to meet the fundamental Part 51 obligation:

> The discussion of alternatives shall be sufficiently complete to aid the Commission in developing and exploring, pursuant to section 102(2)(E) of NEPA, "appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources."

10 C.F.R. § 51.45(b)(3). Rather it asserts that the 1989 SAMDA analysis is automatically sufficient because of SOC and GEIS statements and because it qualifies for the exemption created by 10 C.F.R. § 51.53(c)(3)(ii)(L). As noted above, the SOC and GEIS statements are not adjudications and do not provide controlling precedent on the issue for this adjudicatory proceeding. Whether the 1989 SAMDA analysis meets the regulatory exemption standard on the merits is an open issue, raised by NRDC Contention 3-E.

Contention 2-E addresses two separate possible positions by Exelon: 1) the 1989 SAMDA is relied upon by Exelon to meet its alternatives analysis obligations or 2) Exelon continues to assert it is not relying on the 1989 SAMDA analysis to meet its alternatives analysis obligation. In either case the absence of a full consideration of severe accident mitigation alternatives, based on current and accurate information, violates the requirements of Part 51 relating to alternatives.

b. Exelon fails to demonstrate that it complies with 10 C.F.R. §§ 51.45, 51.53(c)(2) and 51.53(c)(3)(iii)

1) The substantive standards for what constitutes a legally sufficient severe accident mitigation alternatives analysis are contained in 10 C.F.R. §§ 51.45, 51.53(c)(2) and 51.53(c)(3)(iii)

Exelon appears to argue that just because the 1989 analysis is called a SAMDA, Exelon is

exempt from all the substantive standards in Part 51 regarding alternative analyses, regardless of how inaccurately and incompletely the 1989 SAMDA analysis considered alternatives to mitigate severe accident consequences and regardless of its failure to consider such alternatives independently in its ER. 10 C.F.R. §§ 51.45, 51.53(c)(2) and 51.53(c)(3)(iii). Exelon does not and cannot offer any legal support for that proposition. All 10 C.F.R. § 51.53(c)(3)(ii)(L) does is create the requirement for a SAMA analysis and provide exemption from that requirement if certain conditions are met. It does not define the characteristics that an analysis must meet to qualify as a sufficient analysis of alternatives to exempt the applicant from a SAMA analysis. The substantive standards for what must be included to have a sufficient analysis of alternatives are contained in other provisions of Part 51 and in the relevant cases, discussed *infra*. Exelon offers no substantive argument that it complies with the requirements for alternative analyses.

2) Application of 10 C.F.R. §§ 51.45, 51.53(c)(2) and 51.53(c)(3)(iii) to Exelon's 2011 Application is not retroactive

Exelon also asserts that standards and information that are clearly relevant to an accurate and complete exploration of alternatives to mitigate severe accident consequences should not be applied retroactively to the 1989 SAMDA. While that might be correct, if the issue were whether the 1989 SAMDA analysis was sufficient to support the *initial* operating license issuance in 1989, Exelon's view is clearly incorrect when applied to Exelon's attempt to use the 1989 SAMDA analysis to support its request for issuance of a renewed operating license in 2011. For this license renewal proceeding, NRC is obligated to assure that:

> the Commission has taken all practicable measures within its jurisdiction to avoid or minimize environmental harm from the alternative selected, and if not, to explain why those measures were not adopted.

10 C.F.R. § 51.103(a)(4). When NRC determines whether it meets this self-imposed and NEPA required standard it must provide a rational basis for its decision. *ShieldAlloy Metallurgical Corp. v. Nuclear Regulatory Commission*, 624 F.3d 489, 492-93 (D.C. Cir. 2010).

Contention 2-E asserts that NRC, relying on the 1989 SAMDA to fulfill its alternatives analysis for this 2011 license renewal request, will be unable to provide a rational basis for its reliance because of the substantial failure of the 1989 SAMDA to fully evaluate and weigh mitigation alternatives. Among the most significant defects in the 1989 SAMDA, particularly as a document to support a 2011 ER, is that it does not consider the off-site economic consequences of a severe accident[16], consequences that could substantially increase the cost of an accident, which costs could be substantially reduced by implementation of reasonably priced mitigation alternatives, that it ignores new and more accurate information regarding population, meteorology, evacuation and CDF, and that the scope of potential mitigation measures considered and accidents analyzed are artificially narrow and ignores numerous viable mitigation

[16] In 1980 the Commission issued a policy on severe accidents and their consideration in environmental reviews and specified that an environmental analysis of severe accident alternative mitigation alternatives should evaluate off-site consequences. 45 Fed.Reg. 40101 (June 13, 1980)("In this regard, attention shall be given both to the probability of occurrence of such releases and to the environmental consequences of such releases" and "potential radiological exposures to individuals, to population groups, and, where applicable, to biota. Health and safety risks that may be associated with exposures to people shall be discussed in a manner that fairly reflects the current state of knowledge regarding such risks. Socioeconomic impacts that might be associated with emergency measures during or following an accident should also be discussed." *Id.* at 40101 and 40103). But, as the Commission held in *Philadelphia Electric Company* (Limerick Generating Station, Units 1 and 2) CLI-86-05, CLI-86-06, 23 N.R.C. 125 (1986) *reversed on this issue in Limerick Ecology Action v. N.R.C.* in reliance on "Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants," 50 Fed. Reg. 32138 (August 8, 1985), "the need for design alternatives to further mitigate severe accidents is not to be addressed in case-specific reviews and hearings". However, nothing changed the Commission's stated intent that if such reviews were conducted, off-site consequences were to be considered.

alternatives for this type of reactor. NRC will not be able to defend a final decision on the Limerick relicensing application that uncritically accepts as sufficient in 2011 a 1989 alternatives analysis that ignores these, and other critical components, the adequacy of which for license renewal purposes was never adjudicated.

3) The 1989 SAMDA is substantively deficient in significant ways

i) The 1989 SAMDA has no analysis of off-site economic consequences

Arguably the most glaring defect in the 1989 SAMDA analysis is its failure to consider the economic consequences of a severe accident in order to provide a basis to determine the relative benefits and costs of mitigation measures. As noted in NRDC's Expert Declaration at ¶¶ 31-39, the off-site economic consequences of a severe accident at Limerick can measure in the hundreds of billions of dollars. Exelon concedes that the 1989 SAMDA failed to consider off-site economic consequences (ER at 5-5) but seeks to belittle the significance of that failure by drawing an inapt comparison of the off-site economic costs at Limerick with those at TMI. *Id*. At best, Exelon and NRDC experts disagree on the impact of this critical omission from the 1989 SAMDA. However, what cannot be ignored is the fact that the 1989 SAMDA is missing an analysis component that is essential in determining whether mitigation measures are cost beneficial. If a substantial component of the cost of an accident is ignored, then the true cost of not implementing an alternative cannot be determined.

The NEI Guidance for SAMA analyses instructs an applicant to complete the SAMA analysis "to the point where economic viability of the proposed modification can be adequately gauged". NEI 05-01(Rev. A) at 28. NRC Staff guidance documents reveal that the purpose of

reaching the point where a SAMA's economic viability can be "adequately gauged" is to then allow NRC Staff to determine whether implementation of any SAMAs is "warranted". *See* NRC Reg. Guide 4.2, Supplement 1 (September 2000) at 4.2-S-50; NRC Standard Review Plan for Environmental Reviews for Nuclear Power Plants - Supplement 1: Operating License Renewal (Oct. 1999) ("Standard Review Plan") at 5.1.1-8 to 5.1.1-9; and NRC Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission NUREG/BR-0058, Revision 4 (September 2004) at 4. The ASLB recently confirmed that a key function of the analysis of severe accident mitigation alternatives is to provide sufficient data for NRC to determine whether implementation of a cost beneficial severe accident mitigation measure is warranted. *Entergy Nuclear Operations, Inc*., LBP-11-17, Slip op. at 15-17.

The 1989 SAMDA does not provide the economic analyses needed to determine whether any particular mitigation measure is warranted. In fact, the 1989 SAMDA document does not even include a rigorous analysis of the few factors it did consider. For example the 1989 SAMDA gives credence to an unverified study done by the applicant of CDF that showed a lower CDF than used in the SAMDA. Staff relied on this unverified study to justify rejection of several potential cost effective mitigation measures. 1989 SAMDA at vi ("while the screening cost/benefit analysis performed above indicates that several candidate SAMDAs might be cost effective based on a criterion of $1000 per person-rem averted, a more recent utility PRA presents lower risk estimates which indicate that SAMDAs are not justified. While the staff has not verified the utility estimates, the staff is convinced that risk is now lower for Limerick than the estimates used in our cost/benefit study"). At a minimum, the adequacy of the 1989 SAMDA to meet the alternatives analysis requirements for Exelon's 2011 license renewal application

should be judged by the standards intended to be used in doing severe accident mitigation alternative analyses. Contention 2-E challenges the ER because the accident analysis upon which it relies fails to include essential components of a legally sufficient alternatives analysis.

Exelon's rebuttal to the merits of the declarations of NRDC's expert, a rebuttal unsupported by any expert declaration, does no more than demonstrate the extent of the factual disagreement for which the hearing phase, not the contention admissibility phase, is the proper forum for resolution. "Determining whether the contention is adequately supported by a concise allegation of the facts or expert opinion is not a hearing on the merits. The petitioner does not have to prove its contention at the admissibility stage. The contention admissibility threshold is less than is required at the summary disposition stage." *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3) LBP-08-13, 68 NRC 43, 63 (2008)(footnotes omitted).

ii) The 1989 SAMDA relies on flawed evacuation analysis

Exelon rejects the criticism of the 1989 SAMDA because of its flawed evacuation assumptions based on a repetition of the assertion that no challenge is permitted to the 1989 SAMDA as part of the 2011 license renewal proceeding. Exelon Answer at 55-56. Significantly, Exelon never claims that NRDC is wrong on the merits. See the discussion at pp. 11-21 *supra* rebutting Exelon's claim that the 1989 SAMDA is immune from challenge.

iii) The 1989 SAMDA is flawed in numerous other respects

Exelon rejects the criticism of the 1989 SAMDA based on the serious flaws in the meteorological analysis, its population projections, its CDF value, its range of potential accidents and its range of potential mitigation measures by repeating the same arguments about the immunity of the 1989 SAMDA from criticism and by the same attacks challenging the merits of

those bases. Those Exelon arguments are addressed *supra* in the discussion of Contention 1-E and are incorporated here by reference.

4. Contention 3-E Is Admissible

NRDC's Contention 3-E rests not on an attempt to reclassify an issue which is Category 1 into a Category 2 issue nor does it demand that Exelon do "*another* SAMA analysis" (Exelon Answer at 17 (emphasis in original). Rather NRDC alleges that there has never been an analysis of severe accident mitigation alternatives for Limerick that meets the requirements of 10 C.F.R. § 51.53(c)(3)(ii)(L) and that the 1989 SAMDA analysis upon which Exelon relies does not meet the regulatory standard to exempt the issue of severe accident mitigation alternatives from consideration in this license renewal proceeding. The applicable standard for application of the exemption language in 10 C.F.R. § 51.53(c)(3)(ii)(L) is contained in 10 C.F.R. § 51.53(c)(3)(iii) which provides:

> The report must contain a consideration of alternatives for reducing adverse impacts, as required by §51.45(c), for all Category 2 license renewal issues in appendix B to subpart A of this part.

Id. Since severe accident mitigation alternatives are Category 2 issues, Exelon must demonstrate that it has included, by reference or otherwise, an adequate analysis of severe accident mitigation alternatives. Exelon has failed to make that demonstration.

a. Whether an issue qualifies for exemption from being addressed in the ER is a legitimate contention in a license renewal proceeding

Exelon claims that if an issue is precluded by Part 51 from the ER because it is classified as a Category 1 generic issue *or for some other reason*, a challenge to the claim that it qualifies for exclusion is beyond the reach of the license renewal hearing. Exelon Answer at 28-34.

Nothing in the cases and regulatory history supports Exelon's expansive view.

Exelon provides a good example of an issue that is excluded from consideration under Appendix B, Subpart of Part 51 and is thus a Category 1 issue, but that is nonetheless open to a challenge to an applicant's assertion that it qualifies for the exclusion. Exelon cites to 10 C.F.R. § 51.53(c)(3)(ii)(D) that provides "[i]f the applicant's plant is located at an inland site and utilizes cooling ponds, an assessment of the impact of the proposed action on groundwater quality must be provided" as an example of an exclusion that would apply to an ER for plants that do not utilize cooling ponds at an inland site because for such plants the groundwater quality issue is Category 1. Exelon Answer at 28. There is no case law or regulatory history that precludes a contention, if properly supported, that challenges an applicant's assertion that it did not have cooling ponds at an inland site but was, instead, using a salt marsh for its cooling. NRDC Contention 3-E is just such a contention that challenges Exelon's assertion that it qualifies for the exclusion from a SAMA analysis under 10 C.F.R. § 51.53(c)(3)(ii)(L).[17]

b. Challenging the adequacy of the 1989 SAMDA to meet the requirements of 10 C.F.R. § 51.53(c)(3)(ii)(L) is timely

Although Exelon and NRC Staff would have it that NRDC seeks to litigate the validity of the 1989 SAMDA, an issue that they assert had to be raised in 1989, NRDC has no such intent. The questions raised by Contention 3-E is not whether the 1989 SAMDA is a legally sufficient

[17] The reason plants that did not have cooling ponds at an inland site are exempt from evaluating the groundwater quality issue is that the GEIS has done a generic analysis of all other cooling mechanisms. The alleged basis for the claim that the 1989 SAMDA analysis allows Exelon to be excused from doing a SAMA analysis cannot be that the 1989 SAMDA was a generic analysis. Rather, it was specifically intended to be a site-specific analysis that has not converted the issue of severe accident mitigation alternatives into a generic issue. Thus, there is no generic evaluation that provides the basis for converting the severe accident mitigation alternatives issue into a Category 1 issue.

analysis to support the *initial operating license* for Limerick but rather whether it is a legally sufficient analysis to support a *new 20 year operating license* for Limerick. The test to be applied is not the rules applicable to SAMDAs in 1989 - actually there were no NRC Regulations defining the scope or nature of the SAMDA review - but the rules applicable to relicensing of Limerick in 2011. It is those rules, which came into existence in 1996, that are the focus of NRDC's Contentions.

c. The 1989 SAMDA does not constitute an analysis that qualifies as one that has "previously considered severe accident mitigation alternatives for the applicant's plant in an environmental impact statement or related supplement" within the meaning of § 51.53(c)(3)(ii)(L)

Although the regulation does not specify what is required for NRC Staff to have "previously considered severe accident mitigation alternatives for the applicant's plant in an environmental impact statement or related supplement" (§ 51.53(c)(3)(ii)(L)) it does not mean that any analysis labeled as a consideration of severe accident mitigation alternatives automatically qualifies. NRDC has pointed to industry guidance (NEI 05-01 (Rev. A)), adopted by NRC Staff, as evidence of the depth and breadth of the analysis required to have a legally sufficient analysis of severe accident mitigation alternatives. All Exelon has to say in response is that NEI 05-01 (Rev. A) does not apply to an analysis done in 1989. But, as noted, pp. 6-8, *supra*, Exelon has made the 1989 SAMDA an issue for this 2011 relicensing proceeding and thus it is in light of current standards that the 1989 analysis must be examined. In addition, as demonstrated in the discussion of Contention 2-E, the substantive standards against which any analysis of alternatives is to be judged are contained in other provisions of Part 51 and case law under NEPA. Unless Exelon could prevail on the argument that the 1989 SAMDA is immune

from any examination - an argument that the ER rejects by examining the 1989 SAMDA in light of what Exelon identifies as new information (ER at 5-4 to 5-9) - it must be evaluated against some standards. Exelon does not offer any such standards.

NRDC does not claim that the analysis of severe accident mitigation alternatives required for Limerick must use the methodologies routinely used today for SAMA analyses. What NRDC does claim is that the principles that govern the adequacy of such an analysis, principles derived from NRC regulations and NEPA case law on the thoroughness of alternatives analyses and from guidance documents like NEI 05-01 (Rev. A) should be applied to test the adequacy of Exelon's proffered 1989 SAMDA analysis. It is evident that the 1989 SAMDA fails to meet many of those basic principles including failing to quantify all types of major off-site economic costs, failure to compare cost and benefits of all reasonable mitigation alternatives, failure to use reasonably accurate, and readily available, information for population, meteorology, evacuation time, CDF and a range of accident scenarios.

d. The 1989 SAMDA is not a reasonable analysis of severe accident mitigation alternatives

Exelon's principle defense to charges that its 1989 SAMDA is insufficient is the assertion that it only need conduct a "reasonable" analysis of alternatives, that it need not consider "worst case" scenarios and that in general a NEPA analysis need not have the level of accuracy and completeness demanded by NRDC contentions.[18] Exelon Answer at 40. NRDC made no such demands in its contention. The relief from perfection that Exelon relies on is not a license for

[18] Since NRC Staff uses the applicant's analysis of severe accident mitigation alternatives for the DSEIS and FSEIS rather than generate its own independent analysis (NUREG-1555, Supp. 1 (October 1999) at 5.1.1-1 *et seq*), the discussion here focuses on the NEPA standards even though, technically, Exelon is not subject to NEPA.

using inaccurate, unreliable and misleading analyses such as those Exelon offers in its discussion of severe accident mitigation alternatives in the ER or in the 1989 SAMDA or for failing to use readily available information to improve the quality and accuracy of the NEPA analysis.

Contrary to Exelon's argument there are standards that an alternatives analysis must meet that are practical and enforceable. NEPA requires a comparative analysis of the environmental consequences of the alternatives before the agency. *See* 42 U.S.C. § 4332(2)(c)(iii); 40 C.F.R. § 1502.14(d).[19] NEPA section 102(2)(E) further requires federal agencies to "study, develop, and describe appropriate alternatives to recommend courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." NEPA requires sufficient discussion of relevant issues and opposing viewpoints to enable the decision maker to take a hard look at environmental factors and to make reasoned decisions; the impact statement must be sufficient to enable those who did not have part in its compilation to understand and consider meaningfully factors involved.[20] NEPA also helps NRC make a sound, evidence-based decision. "While NEPA does not require agencies to select particular options, it is intended to 'foster both informed decision-making and informed public participation, and thus to ensure that the agency does not act upon incomplete information, only to regret its decision after it is too late

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[19] NRC has not adopted all of the CEQ regulations although it does give them substantial deference. *Dominion Nuclear N. Anna, LLC*, CLI-07-27, 66 N.R.C. 215, 222 n. 21 ("Although the CEQ's guidance does not bind us, we give such guidance substantial deference." (Citations omitted)); *see also Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 334, 355-56, (CEQ regulations are entitled to "substantial deference").

[20] *Limerick Ecology Action, Inc. v. U.S. Nuclear Regulatory Comm'n*, 869 F.2d 719 (3rd Cir. 1989) (noting that statements by an agency of the reasons for its determinations in the EIS are crucial to effective judicial review).

to correct.'".[21] The adequacy of an environmental impact statement ("EIS") under NEPA is evaluated according to a rule of reason, given the scope and purpose of the proposed action.[22]

NEPA's "alternatives provision" requires federal agencies to give a "hard look," *i.e.*, a "full and meaningful consideration to all reasonable alternatives,"[23] including the option of abandoning the project altogether.[24] Thus, an environmental impact statement must do more than merely list alternative courses of action to the one recommended by the agency; alternative courses of action must be affirmatively studied and the study of alternatives must be exhibited in the statement for public review and consideration.[25] "General statements about 'possible' effects and 'some risk' do not constitute a 'hard look' absent a justification regarding why more definitive information could not be provided."[26]

NEPA requires that the EIS "[r]igorously explore and objectively evaluate all reasonable alternatives."[27] An ER may not simply rely on incorrect assumptions or unexamined data.[28] "Accurate scientific analysis, expert agency comments, and public scrutiny are essential to

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[21] *Duke Energy Corp*. (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2) CLI-02-17, 56 N.R.C. 1, 10 (2002) (citation and footnote omitted).

[22] 42 U.S.C.A. § 4321.

[23] *See also* 40 C.F.R. § 1502.1; *Pa'ina Hawaii, LLC*, CLI-10-18, __ N.R.C.__ (July 8, 2010).

[24] *Alaska Wilderness,* 67 F.3d at 729 ("Consideration of alternatives must include whether a project should be totally abandoned.")

[25] *Rankin v. Coleman*, 394 F.Supp. 647 (D.C.N.C.1975), *modified on other grounds* 401 F. Supp. 664 (1975).

[26] *Neighbors of Cuddy Mountain v. United States Forest Service,* 137 F.3d 1372, 1380 (9th Cir.1998)(citation omitted).

[27] *See also Pa'ina Hawaii*, CLI-10-18 at p 8.

[28] 40 C.F.R. § 1500.1(b)

implementing NEPA."[29] Accordingly, NEPA requires that an EIS must contain "high quality" information and "accurate scientific analysis,"[30] and furthermore obligates Staff to independently ensure "the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." 40 C.F.R. § 1502.24. Furthermore, NEPA obliges a federal agency to consider "the relevant factors" that bear on its licensing decision, including information about changes in policy or economic conditions that may impact the alternatives to the proposed action, regardless of whether they are within the agency's control.[31] In assessing how economic conditions are portrayed, a key consideration of several courts has been whether the economic assumptions of the FEIS "were so distorted as to impair fair consideration of the project's adverse environmental effects."[32]

Furthermore, in furtherance of NEPA's function as a vehicle for public discussion on federal actions with local environmental impacts, NEPA imposes continuing obligations on an agency after it completes its initial environmental analysis to revisit its alternatives analysis, whenever there are changed circumstances, including changed economic conditions, that affect the factors relevant to the development and evaluation of alternatives.[33] Once evidence casting serious doubt upon the reasonableness of the agency's conclusions is presented to the agency, the

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[29] *Native Ecosystems Council v. U.S. Forest Svc.,* 418 F.3d 953, 964 -65 (9th Cir. 2005).

[30] 40 C.F.R. § 1500.1(b); *Conservation Northwest v. Rey*, 674 F. Supp. 2d 1232, 1249 (W.D. Wash. 2009).

[31] *Conservation Northwest*, 674 F. Supp. 2d at 1251.

[32] *Hughes River Watershed Conservancy v. Glickman,* 81 F.3d 437, 446 (4th Cir 1996).

[33] *Oregon Natural Resources Council Action v. U.S. Forest Service,* 445 F.Supp.2d 1211, 1224 (D. Or. 2006) (finding the agency did not satisfy its obligation to consider a true no-action alternative and remanding for a fresh consideration of alternatives because the Forest Service used inaccurate data for market demand in developing its original NEPA analysis).

agency has the burden of demonstrating why this evidence does not create a controversy.[34] An agency that receives new and significant information casting doubt upon a previous environmental analysis must furthermore reevaluate the prior analysis and provide a reasoned evaluation of new or contradictory information.[35]

"[W]hen an agency's initial analysis of alternatives involves a major deficiency [such as an inadequate analysis of mitigation alternatives as is here the case] . . . the agency's decision was necessarily undertaken without a proper consideration of relevant alternatives."[36] The discussion of alternatives allows policymakers and the public to compare the environmental consequences of implementing the proposed action with the environmental consequences of alternatives to the project.

The ultimate goal of the NEPA analysis is to facilitate reasoned decision-making. A key step in the reasoned decision-making process is a thorough and objective analysis that gathers the relevant facts and provides a rational consideration of them. Ultimately, the decision-maker must be able to use the NEPA analysis in providing a rational basis for its final decision. In a recent decision an ASLB emphasized the need for a "rational basis" for NRC's relicensing decision. "NRC would be acting arbitrarily and capriciously if it did not look at relevant data and sufficiently explain a rational nexus between the facts found in its review and the choice it makes as a result of that review." *Entergy Nuclear Operations, Inc*. (Indian Point Units 2 and 3),

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[34] 42 U.S.C.A. § 4321; *Natural Resources Defense Council, Inc. v. U.S. Forest Service*, 634 F.Supp.2d 1045 (E.D. Cal. 2007).

[35] *Oregon Natural Resources Council Action,* 445 F.Supp.2d 1211 at 1224.

[36] *See* 40 C.F.R. § 1502.14(d); *see also Custer County Action Assoc. v. Garvey,* 256 F.3d 1024, 1040 (10th Cir. 2001) ("informed and meaningful consideration of a no-action alternative, is central to the NEPA statutory scheme.") *accord Biological Diversity,* 623 F.3d at 642.

LBP-11-17, __ N.R.C. __ (July 14, 2011) Slip op. at 11-12 *citing Shieldalloy Metallugical Corp*., 624 F.3d at 492-93; *see also Kleppe v. Sierra Club*, 427 U.S. 390, 410 n.21 (1976) ("The only role for a court is to insure that the agency has taken a 'hard look' at environmental consequences."); *Nuclear Fuel Servs., Inc*. (Erwin, Tennessee), LBP-05-08, 61 NRC 202, 207 (2005) (citations omitted)("NEPA . . . imposes a procedural requirement on an agency's decision-making process by mandating that an agency consider the environmental impacts of a proposed action and inform the public that it has taken those impacts into account in making its decision. In other words, an agency must take a 'hard look' at the environmental consequences of a proposed action before taking that action.").

In this case NRDC has identified major problems with the severe accident mitigation alternatives analysis upon which Exelon relies including:

1. It did not consider the off-site economic impacts of a severe accident and thus did not properly evaluate the costs and benefits of mitigation alternatives;

2. It relied on substantially deficient population analyses;

3. It used an incorrect core damage frequency;

4. It ignored a substantially wider range of mitigation alternatives now routinely considered for reactors of the Limerick design;

5. It relies on inaccurate meteorological data thus miscalculating the dispersion of radionuclides following a severe accident;

6. It relies on inaccurate estimates of evacuation time thus understating the extent of public exposure to radionuclides;

7. It relies on outdated analyses of accident scenarios in light of the Fukushima accident.

NEPA's obligation requiring a "hard look" at alternatives also requires that the agency use high quality, accurate and up to date information in its analysis. Even Exelon recognizes that it must present new information and evaluate its significance and that it cannot just rely on the 1989 SAMDA analysis.

A genuine dispute exists over whether Exelon has demonstrated that the 1989 SAMDA meets the standards to allow Exelon to avoid having to prepare a SAMA analysis. Obviously, the place for resolution of these disputes is in hearings, not at the contention admissibility stage. "A petitioner does not have to provide a complete or final list of its experts or evidence or prove the merits of its contention at the admissibility stage." *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), LBP-06-23, 64 NRC 257, 356 (2006).

B. CONTENTION 4-E IS ADMISSIBLE

Contention 4-E challenges the adequacy of Exelon's analysis of the No Action Alternative and Exelon's failure to comprehend the NRC's requirements for how to address the No Action Alternative. NRC has described the analysis of alternatives as "the heart of the environmental impact statement." 10 C.F.R. Part 51, Appendix A, ¶ 5. Exelon treated the No Action Alternative with disdain, conjuring up unrealistic scenarios to meet its obligation to evaluate the consequences of the no-action alternative. NRDC provided a full discussion of the missing components of Exelon's analysis. Exelon's attack on Contention 4-E reflects a profound misunderstanding of both the No Action Alternative and NRDC's Contention.

The preceding discussion at pp. 41-45, *supra*, provides a full discussion of the legal obligations relevant to the consideration of alternatives and applies with equal force to the ER analysis of the No Action Alternative. NRC Regulations impose a substantial burden on an

applicant to conduct a thorough analysis of all alternatives and to balance the environmental impacts of alternatives against the environmental impacts of the proposed action. 10 C.F.R. § 51.45(c)("The environmental report shall include an analysis that considers and balances the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects. . . . Environmental reports prepared at the license renewal stage pursuant to §51.53(c) need not discuss the economic or technical benefits and costs of either the proposed action or alternatives except insofar as such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation").

Although the ER fails to provide a legally or factually sufficient analysis of the No Action Alternative, it does recognize the costs and benefits of the No Action Alternative are an essential component in conducting the necessary balance between the proposed action and the No Action Alternative. ER at 7-3 to 7-4. In *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3) LBP-08-13, 68 NRC 43, 92-93 (2008) the Board recognized the important difference between the range of factors to be considered in analyzing specific alternatives to the proposed action that are intended to serve the same purpose as the proposed action, and the consideration of the No Action Alternative where the focus is on the consequences of the No Action Alternative as compared to the proposed action and not a consideration of two potential actions intended to fulfill the same purpose. The No Action Alternative imposes a far different obligation on an applicant, one that Exelon has failed to meet.

Exelon repeatedly refers to various energy options as "alternatives" to relicensing and

notes, in the case of demand side management ("DSM") that it is only an energy generator and does not have any programs by which it could adopt DSM. However, the No Action Alternative has an already defined alternative - i.e. no action. The ER is required to evaluate the consequences of choosing no action - i.e. to evaluate what would likely occur in 2024 and 2030 when the Limerick facilities are shutdown. Contention 4-E challenges Exelon's failure to even consider that question. Rather, the ER focuses on various energy alternatives to replace the generating capacity of Limerick, assuming that its generating capacity will have to met by new generation, and then explores the alleged adverse environmental impacts that each of those generation alternatives will create. However, Exelon does not provide an analysis of whether any of those options are the likely consequence of the No Action Alternative being chosen and, in some cases, makes a compelling case for why such a generation option would be unlikely to be adopted. *See e.g.* ER at 7-31 to 7-34, discussing its solar alternative. What Exelon should have done, but has not done, is to evaluate the likely electricity situation in its service area were NRC to determine, say by the end of 2012, that Limerick should not be relicensed. With 12 years to plan for the shutdown of Unit 1 and 17 years to plan for the shutdown of Unit 2, what would likely occur?

1. Exelon's Answer Addresses the Wrong Issue in Analyzing the No Action Alternative

In his declaration, Christopher Paine, a recognized expert on nuclear energy matters who directs the Nuclear Program of a large U.S. non-governmental organization, provides a succinct summary of the flaw in Exelon's analysis:

> the likely evolution of electricity system resources in the areas of PJM Interconnection ("PJM") served by LGS is an empirical and analytical question that necessarily involves the consideration of

> multiple socio-economic factors and technological trends – not merely those deemed appropriate to pursuit of the applicant's specific business interest.

Paine Declaration at 3. Exelon counters by referencing its brief discussion of the past success of DSM in a portion of the Limerick service area and its speculation regarding the future of DSM over the next 13-18 years without Limerick license renewal. ER at 7-16 to 7-17. It concludes with this revealing admission:

> although DSM is an important tool for meeting projected electricity demand and the impacts from the DSM alternative are generally small, *DSM does not fulfill the stated purpose and need for license renewal* of nuclear power plants, which is to "provide power generation capability" (NRC, 1996a).

ER at 7-17 (emphasis added). As Mr. Paine points out in his Declaration, it is precisely this distorted perception of the No Action Alternative that forms the basis of Contention 4-E:

> But, almost by definition, analysis of the No-Action alternative does not involve consideration of alternatives that would "equivalently satisfy the purpose and need for the proposed action," and therefore the required NEPA consideration of "No Action" cannot reasonably be equated with "replacing the generating capacity of LGS," or limited to an analysis of this particular problem.

Paine Declaration at 3. The No Action Alternative is not about adopting or implementing an alternative to meet the goals of the proposed action. Rather, it is an examination of the question whether the environment and the community impacted and potentially impacted by Limerick will be better off without Limerick. Exelon fails to address that question, particularly the fact that if NRC rejected the license renewal in 2012, Exelon's service area planners would have 12-17 years to make and implement plans for what to do when Limerick was no longer operating.

In response to a clear, straightforward declaration by Mr. Paine, in support of NRDC's

contention that the Exelon's ER fails to adequately consider the No Action Alternative, Exelon and NRC Staff have together filed responses, totaling 28 pages on this contention underlining the magnitude of the material dispute between NRDC and Exelon and the need for a hearing to resolve these disagreements. However, in the 28 pages of briefing Exelon and NRC Staff fail to refute any part of the essential argument advanced by NRDC, which is simply and clearly stated as a contention of omission with respect to the No Action Alternative. Thus, NRDC need not, for the purposes of admissibility, seek to discredit or punch holes in the ER's analysis of electric generation alternatives that the Exelon identifies as the options that fulfill the "stated purpose and need of the proposed action" (ER at 7-16) since that is not a purpose against which the No Action Alternative is to be judged. 10 C.F.R. § 2.309(f)(1)(vi)("if the petitioner believes that the application fails to contain information on a relevant matter as required by law, the identification of each failure and the supporting reasons for the petitioner's belief") is sufficient for an admissible contention.

In their respective responses, NRC Staff and Exelon have not sought to demonstrate that the ER includes the type of no action analysis identified by Mr. Paine. Instead, they claim that such an analysis is not specifically *required* by NRC's regulations implementing NEPA, and that the ER's skimpy, pro-forma analysis of no action incorporates by reference the analysis performed to identify reasonable alternatives for fulfilling the purpose and need for the proposed action. In so doing, both these responses implicitly equate the environmental consequences of the "Proposed Action" with those of "No Action," a logical *cul-de-sac* from which they never emerge.

Mr. Paine's declaration specifically identifies the type of information and analysis that

NRDC contends is missing from the ER's severely truncated discussion of the No Action Alternative, and he points to the specific passages in the ER that he contends represent the source of this omission: the erroneous application of criteria laid down in the GEIS for a separate purpose—consideration of "single discrete electric generation sources" as reasonable alternatives to the "defined generating requirement" currently being met by Limerick Generating Station (LGS). Paine Declaration at 2-3.

The Commission makes a distinction, as do all Federal agencies subject to NEPA, between the analysis of reasonable alternatives that satisfy the purpose and need for a proposed action – in this case meeting the future base load generating requirement currently being met by LGS via license extension or a reasonable alternative – and the alternative of no action, which by definition would not satisfy the purpose and need for nuclear or equivalent base load capacity, but might offer other advantages, such as the preservation of important environmental equities and/or the avoidance of significant environmental risks, which could be uncovered through a NEPA analysis.

> "The Nuclear Regulatory Commission's (NRC's) environmental review regulations implementing the National Environmental Policy Act (NEPA) (10 CFR Part 51) require that the NRC consider all reasonable alternatives to a proposed action before acting on a proposal, including consideration of the no-action alternative. The intent of such a consideration is to enable the agency to consider the relative environmental consequences of an action given the environmental consequences of other activities that also meet the purpose of the action, *as well as the environmental consequences of taking no action at all*." GEIS at 8-1 (emphasis added).

Thus, as is clear from the preceding quotation NRC regards the No Action Alternative as distinct

from, and therefore not interchangeable with, consideration of the proposed action and reasonable alternatives that "also meet the purpose of the action."

Mr. Paine contends that the ER "unreasonably misapplies," to its analysis of the No Action Alternative, findings of the GEIS that limit consideration of reasonable alternatives to those that meet a "defined generating requirement" – in this case the base load capacity of LGS – with "single discrete electric generation sources." Finding no other stricture in the GEIS or NRC regulations that similarly constrains mandatory NEPA consideration of the environmental consequences of no action, - and neither Exelon nor the NRC staff are able to point to one - Mr. Paine specifically contends that, "as a consequence of this misapplication, the ER arbitrarily limits and unfairly conflates consideration of the No Action Alternative with the same set of alternatives that it deems reasonable for analysis as 'single discrete generation sources.'" Paine Declaration at 2-3.

Specifically citing the relevant passage of the Exelon's ER (at 7-3) that NRDC contends misapplies the findings of the GEIS, Mr. Paine concludes that, "almost by definition, analysis of the No-Action Alternative" cannot be equated with "satisfy[ing] the purpose and need for the proposed action, and therefore the required NEPA consideration of 'No Action' cannot reasonably be equated with 'replacing the generating capacity of LGS,' or limited to an analysis of this particular problem." Paine Declaration at 3. Instead, absent LGS license extension, the "likely evolution of electricity system resources [in the PJM Interconnection]…is an empirical and analytical question…that necessarily involves making an informed projection of the likely portfolio of PJM electricity system resources available in the region served by LGS beginning 13 years and 18 years hence that could reasonably be expected to supply the energy services

currently supplied by LGS." Paine Declaration at 3-4. He then contends that the "reasonably foreseeable system resources" available under no action include, *in addition to* those reviewed by the Exelon as reasonable alternatives to extended operation of LGS, "all forms of Demand Side Management (DSM), waste heat co-generation, combined heat and power, and distributed renewable energy resources." He contends that the ER's analysis of the No Action Alternative "fails to consider the environmental impacts of this reasonably foreseeable portfolio of PJM system resources," and thereby "fails to make the required comparison between the environmental impacts of No Action and the continued operation of LGS for an additional 20 years." Paine Declaration at 4.

The GEIS clearly suggests and sanctions this approach to analysis of the No Action Alternative. Section 8.1 of the GEIS includes a brief, but highly instructive discussion of "conservation and power import alternatives:"

> Although these alternatives do not represent discrete power generation sources they represent options that states and utilities may use to reduce their need for power generation capability. *In addition, energy conservation and power imports are possible consequences of the no-action alternative*. GEIS at 8-2 (emphasis added).

The GEIS outlines the necessary scope of environmental analysis for the no-action alternative as follows:

> [T]he no-action alternative is denial of a renewed license. Denial of a renewed license as a power generating capability may lead to *a variety of potential outcomes*. In *some* cases denial may lead to the selection of *other electric generating sources* to meet energy demands *as determined by appropriate state and utility officials*. In *other* cases, denial may lead to *conservation measures and/or decisions to import power*. In addition, denial may result in a *combination of these different outcomes*. Therefore, *the*

> *environmental impacts of such resulting alternatives would be included as the environmental impacts of the no-action alternative*." GEIS at 8-2 (emphasis added).

The GEIS clearly construes the requirements for analysis of the No-Action Alternative in a manner that supports NRDC's contention.

2. Exelon's Mentioning of Various Issues in its Discussion of the No Action Alternative and its Inaccurate or Incomplete Analysis of Those Issues Does Not Constitute an Adequate Analysis

Exelon and Staff assert that NRDC has ignored the analyses contained in the ER that have been incorporated by reference into the No Action Alternative analysis. Far from ignoring it, the Paine Declaration has eviscerated it.

NRDC has never asserted that the ER did not consider *some* of these "other electric generating sources"—which are incorporated by reference in the six paragraphs (slightly more than a page) that comprise the ER's entire discussion of the No Action Alternative. ER at Sec. 7.1. Four of these six paragraphs, however, are devoted to a discussion of the treatment of decommissioning impacts, which discussion is entirely given over to cross-referencing other generic NEPA analyses, and concludes, "decommissioning activities and their impacts are not discriminators between the proposed action and the no-action alternative." ER at 7-3. This effectively reduces the ER's discussion of "discriminators between the proposed action and the no-action alternative" to two short paragraphs. These, however, are devoted to explaining Exelon's erroneous equation of the No Action Alternative with "replacing the generating capacity of LGS," followed by *one sentence* that outlines three possibilities for how this "replacement" could be accomplished, namely, by: "(1) building new base-load capacity using energy from coal, gas, nuclear, wind, solar, other sources, or some combination of these; (2)

purchasing power from the wholesale market; or (3) reducing power requirements through demand side reduction." ER at 7-3.[37] Items 1, 2, and 3 are presented and analyzed as mutually exclusive options, whereas in reality, in the event of the denial of LGS license renewal (the GEIS definition of "no action") the response of the electricity market represented by the PJM Interconnection would, or reasonably could, involve *various combinations* of these resources, as described in the GEIS.

It is readily apparent that the ER's consideration of these options not only omits analysis of the "reasonably foreseeable portfolio of PJM system resources" described by Mr. Paine in his declaration, but also fails to consider a "combination of these different outcomes" as called for in the GEIS. GEIS at 8-2. This is easily demonstrated by examining the cross references included in the ER's exceptionally truncated consideration of the No Action Alternative, which reference ER Section 7.2.1, and Section 7. 2.2.

3. NRC and Exelon Answers Ignore the ER's Failure to Consider Reasonable Consequences in the Event License Renewal Is Denied Which Do Not Require Centralized Generation

NRDC has no objection to the judicious use of cross-referencing to eliminate duplicative presentation of data or descriptive matter already included elsewhere, but do object to the use of cross-referencing that results, as it has in this case, in shortchanging an important part of the

[37] Exelon and NRC Staff insist that "need for power" is not a legitimate issue in license renewal and cite to 10 C.F.R. § 51.53(c)(2). However, a large portion of the analysis of the No Action Alternative involves Exelon's handwringing about how the power supplied by Limerick to meet a current power need, will be supplied in the future. If Exelon chooses to rely on this "need for power" there is no lawful basis to preclude NRDC from challenging it. At this point such a challenge is not necessary since Exelon has not provided an analysis of the No Action Alternative that addresses the likely consequences of license renewal denial and thus has not relied upon any alleged need for power justification for rejecting the No Action Alternative.

NEPA analysis. Unfortunately, the cross-referenced material does not serve to satisfy consideration of the No Action Alternative, because "for the purposes of this report, alternative generating technologies were evaluated to identify candidate technologies that would be capable of replacing the LGS nominal total net base-load capacity of 2,340 MWe at the time the LGS Unit 1 license expires in 2024." ER at 7-5.

While employing this GEIS-sanctioned screen to identify supposedly "reasonable" generating alternatives to LGS is problematic in its own right - and leads to several "hypothetical" and highly implausible NEPA alternatives for LGS baseload replacement - using this screen to delineate the impacts of the No Action Alternative results in the arbitrary and capricious exclusion of a wide portfolio of *decentralized and distributed* generation and DSM resources, as outlined by Mr. Paine in his declaration. Unlike the renewable energy alternatives considered in the ER, these resources are not "hypothetical" analytical constructs, and actually exist today as part of the electricity resources available in the PJM Interconnection's wholesale power market. They are reasonably assessed as capable of playing a larger role in the future. Moreover, in the case of no action, *various combinations* of these resources, with or without power imports, plausibly *could* evolve by 2024 to effectively "replace" the *energy services*—not necessarily the "net base-load capacity"—now provided by LGS, but the ER omits analysis of this scenario, in clear contravention of the GEIS, which states, "energy conservation *and* power imports *are possible consequences of the no-action alternative*." GEIS at 8-2 (emphasis added). The ER's analysis of reasonable alternatives rejects DSM, as it is apparently entitled to do under prior ASLB Board decisions, as an unreasonable alternative to LGS license extension. Exelon is

not entitled to import this rejection into the analysis of the No Action Alternative, which is governed by other GEIS determinations.

The DSM energy savings scenario is no less reasonable than the massive but wildly unrealistic centralized renewable energy schemes confected by Exelon for the sole purpose of performing pro-forma NEPA analyses. In fact, the GEIS recognizes decentralized energy schemes but Exelon ignores them in its analysis of the No Action Alternative:

> Every technology discussed in this section could generate power in much smaller facilities than 1000 MW(e) in dispersed locations throughout a utility's service area. *Typically, conservation or demand-side alternatives and renewable technologies lend themselves best to relatively small facilities*, whereas conventional nonrenewable technologies are suited more for large central generating stations. Numerous exceptions to these generalizations exist or are feasible. *Thus multiple alternatives could be selected to replace a single nuclear plant.*" GEIS at 8-16 (emphasis added).

The GEIS goes on to postulate that "a utility and state public utility commission could agree" that a "combination" of advanced fossil generation (coal and combined cycle gas), conservation, purchased power, wind power, and municipal solid waste combustion "would be the preferred set of alternatives to replace a single nuclear plant." GEIS at 8-16. But as Mr. Paine contends in his declaration, such objectively reasonable combinations of demand side alternatives and dispersed renewable energy technologies with conventional nonrenewable technologies are neither considered in the discussion of the No Action Alternative, nor included in the cross-referenced but skewed discussion of reasonable alternatives for replacing the baseload generating capacity of LGS. Paine Declaration at 3-4.

4. The Combinations of Electricity Resources Cited by NRC Staff and Exelon Answers Are Neither Feasible Nor Likely Consequences of License Renewal Denial

The ER discussion includes consideration of only two hypothetical combinations of electricity resources that are deemed "reasonable" by the Exelon: in the first, "LGS base-load capacity of 2,340 MWe would be replaced by one 2,308 MWe wind farm (with a140 MWe gas-fired combined-cycle backup unit) and three 1,000 MWe PV solar facilities (each with a 100 MWe gas-fired combined-cycle backup unit)." ER at 7.2.1.6; in the second, 4400 MWe of new on-shore and offshore wind capacity would be combined with 2340 MWe of compress air energy storage "to provide a nearly constant output of 2,340 MWe from the combined wind and CAES facilities." ER at 7.2.1.6. Neither of these analyzed combinations incorporate the reduction in new generating capacity requirements afforded by DSM, or the distributed implementation of renewable and other energy technologies cited by Mr. Paine in his declaration, or the "energy conservation and/or power imports" cited by the GEIS as germane to consideration of the No Action Alternative. Nor does Exelon offer an analysis to demonstrate that its chosen combination of generation sources is a likely consequence of license renewal denial. So this cross- referenced analysis cannot serve as a proxy for the missing analysis identified in the Paine Declaration.

Moreover, several of the cross-referenced "reasonable alternatives," cited by both Exelon and NRC Staff as satisfying the requirement for analysis of the No Action Alternative, are in fact patently *unreasonable*, and plainly violate NRC Staff determinations in the GEIS that "a reasonable set of alternatives should be limited to … electric generation sources that are *technically feasible and commercially viable*", and that "…the consideration of alternative energy sources in individual license renewal reviews will consider *those alternatives that are*

reasonable for the region, including power purchases from outside the applicant's service area...." GEIS (NUREG-1437), as cited in ER at 7-2 (emphasis added).

Exelon's ER alternatives analysis repeatedly violates these criteria. To take but one example, Exelon states that, "for the purposes of this environmental report, it is assumed that a solar plant using PV generation with no firming capacity could be a reasonable alternative" for replacing LGS base-load generating capacity. ER at 7-13. However, a massive solar plant of the type described, with inherently intermittent supply and without associated energy storage or other "firming capacity," could not substitute on the grid for the base load capacity currently provided by LGS. This so-called "reasonable alternative" is utterly implausible and exposes the lack of serious consideration that Exelon gives to its alternatives analysis.

The environmental impacts of the sham solar alternative are then described as follows:

> Replacement of the LGS approximate annual average net base-load generating capacity of 2,340 MWe, assuming the current-day [PJM] capacity credit for solar generating capacity would require dedication of about 40,000 hectares (98,900 acres) of land for PV and about 62,200 hectares (154,000 acres) of land for CSP. In comparison, the LGS plant site occupies approximately 261 hectares (645 acres), and no new land development would occur as a result of license renewal.
>
> No existing power plant sites in the ROI are large enough to accommodate either type solar plant of the generating capacity needed to replace the LGS base-load generation capacity. Accordingly, any solar plant constructed to replace LGS would have to be located on a greenfield site. Assuming that sufficient land could be acquired for a solar generation facility, development of the greenfield site would cause much larger land use impacts in comparison to renewal of the existing LGS operating licenses. Overall, land use impacts from both CSP and PV solar energy development is characterized LARGE.
>
> Much of the land area occupied by either a CSP or PV generation facility would be cleared andmaintained as an

> unvegetated or sparsely vegetated surface throughout the life of the facility. This would create an extensive loss of habitat for terrestrial, avian and plant communities."

This highly implausible rendition of the PV solar power alternative is not remotely "reasonable for the region" nor would it be "commercially viable," now or in the future because the land requirements and cost alone, in the densely populated Mid-Atlantic region served by LGS, rule it out. The GEIS itself notes that solar and other renewable energy alternatives "lend themselves best to relatively small facilities" (GEIS at 8-16) but Exelon eschews such reasonable alternatives in favor of those whose adverse impacts are easily identified.

As for the postulated Concentrating Solar Power (CSP) deployment, it is not merely unreasonable for the region and commercially non-viable, but *technically infeasible* as well – yet another violation of the GEIS criteria. Exelon offers no basis to believe that any PJM member utility or independent merchant power generator has proposed or would propose deployment of the massive CSP plant described in the ER, given the comparatively low levels of direct normal solar radiation available in the ROI served by PJM. ER at 7-13. In short, Exelon and NRC Staff assertions that the missing analysis of reasonable consequences of the No Action Alternative can be found in the Alternatives portion of the ER is demonstrably wrong.

5. The NRC Staff and Exelon Defense of the ER's Vision for the Future Development of Energy Supplies and DSM in the Exelon Service Area Is Unrealistic and Unsupported

The NRC Staff and Exelon answers assert that the ER supplies, by reference, a legally sufficient proxy analysis of the environmental impacts of the No Action Alternative. However, as alleged in the Paine declaration, the ER fails to demonstrate how any of these alternatives

fairly represent the way renewable energy, DSM, and other distributed generation assets are deployed and integrated today on the PJM Interconnection, nor do they plausibly represent the way in which these resources will be deployed and integrated in the future if relicensing is denied. Therefore they cannot possibly serve as a suitable proxy for how the LGS load would be served in the event of the denial of a renewed operating license for LGS, and their environmental impacts do not fairly represent the impacts that would flow from that decision.

In the introduction to its alternatives analysis, Exelon states,"[i]t must be emphasized, however, that all scenarios are hypothetical." ER at p. 7-10. Rather than resting on "hypothetical scenarios," analysis of the No Action Alternative, to the extent feasible, must reflect the actual environmental impacts of existing, planned, proposed and "reasonably foreseeable" PJM electricity resources that would, or reasonably could, be made available by 2024 in the event the LGS operating license is not renewed. As Exelon itself admits, it has no "current plans" to build any of the hypothetical, impractical, and uneconomic "base-load" solar, wind or hybrid solar-wind-gas power plant alternatives described in the ER, and neither does it provide any basis to believe any other member company of the PJM Interconnection would do so. ER at p. 7-10.

As noted above, the ER posits the need for gratuitously massive solar and wind power plants (*e.g*. 4400 MW) to replace the baseload generating capacity represented by LGS. When misapplied to the No Action Alternative, this arbitrary supposition also has the unfortunate effect of obscuring and distorting the view of related, environmentally protective energy storage technologies.

> Demonstration projects have been deployed for varying other applications, but, there are no current applications or demonstration studies of battery storage systems that approach the

> reserve capacity required for balancing the output from *a wind or solar generation power plant of the size necessary to replace the LGS* approximate annual average net base-load generating capacity of 2,340 MWe (NREL, 2010a). Because this method for balancing intermittent output from wind and solar generation facilities has not been demonstrated, *Exelon Generation does not consider it to be a reasonable firming capacity method and, thus, impacts of combining it with wind or solar generation are not evaluated further*. ER at p. 7-7, emphasis added.

However, as the ER itself describes, several types of battery storage systems *are* available or under development that can support less massive renewable energy deployments. ER at p. 7-7. These are being designed to support "dispersed" and modular applications of solar and wind technologies, as discussed in the GEIS. GEIS at 8-16. Exelon provides no analysis of the availability or likelihood that such systems can or will be deployed within the area served by PJM, and therefore comprise a reasonably foreseeable component of the PJM electricity resources that would be available in 2024, under the No Action Alternative, to assume a portion of the system load now served by LGS.

The no action analysis should fully examine, as initially outlined in the Paine Declaration, the likely consequences of the No Action Alternative and explore and project the growth and future balance of PJM system electricity resources, including DSM and various forms of distributed generation, that are likely to exist if relicensing is denied: (a) to comply with existing PJM-area state renewable energy mandates, including but not limited to those state mandates described in Section 7.2.1 of the ER; (b) in response to varying plausible assumptions regarding the evolution of natural gas prices and other relevant factors, such as technological change and power imports from outside the region , and (c) in response to provision or removal of federal and state incentives, such as investment and production tax credits for certain clean energy

technologies.

Such an analysis would allow the Commission to fairly balance the likely environmental consequences of the No Action Alternative against relicensing to determine which is preferable, thereby providing a *bona fide* basis for the Commission to determine that it "has taken all practicable measures within its jurisdiction to avoid or minimize environmental harm from the alternative selected, and if not, to explain why those measures were not adopted". 10 C.F.R. § 51.103(a)(4). The ER fails to provide a basis for NRC to determine whether it has taken "all practicable measures within its jurisdiction [including license renewal denial] to avoid or minimize environmental harm".

6. The NRC Staff Answer Seriously Distorts the Paine Declaration

In a number of instances, the NRC Staff Answer contains misleading and inaccurate characterizations of the statements made by Mr. Paine in his Declaration: characterizations that in fact form the basis for the NRC Staff Answer and that could, if not corrected, carry over in the NRC Staff Draft Supplemental Environmental Impact Statement ("DSEIS"). Nine of these mischaracterizations are addressed below, justaposing the NRC Staff assertion and the relevant portions of Mr. Paines Declaration or the Intervention Petition.

a. NRC Answer erroneously claims that NRDC seeks analysis of an excessive number of No Action Alternative consequences

NRC Staff Answer at 41 states "[m]oreover, Mr. Paine claims without factual support that the Applicant must analyze 'all forms of Demand Side Management (DSM), waste heat cogeneration, combined heat and power, and distributed renewable energy sources in addition to the alternatives put forth in the ER.'"

Mr. Paine makes no such excessive claim. What he did say was that NEPA analysis of the No Action Alternative "necessarily involves making an informed projection of the likely portfolio of PJM electricity system resources available in the region served by LGS beginning 13 and 18 years hence that could reasonably be expected to supply the energy services currently supplied by LGS." Mr. Paine then states that "these reasonably foreseeable system resources include all forms of DSM, waste heat co-generation, combined heat and power, and distributed renewable energy resources, in addition to the 'single, discrete electric generation sources' reviewed by the Applicant as reasonable alternatives to extended operation of Limerick's base load capacity." Paine Declaration at 4. In other words, Mr. Paine is not finding fault with the ER's no action analysis for failing to discuss each and every one of these potential resources individually. Nor does he seek to requiring the applicant to discuss "every conceivable permutation" of a No Action Alternative in its ER. Rather Mr. Paine has listed the PJM resources that NRDC contends must be considered in a proper empirical analysis of the reasonable range of impacts from the portfolio of PJM system resources that would serve LGS customers in the event no action is the chosen alternative.

b. The NRC Answer wrongly asserts that NRDC requires Exelon to look at every conceivable alternative.

On page 43 of the NRC Staff Answer it asserts that NRDC violates the principle that "there is no requirement for an applicant to look at every conceivable alternative to its proposed action," but only "reasonable alternatives (i.e. those that are feasible and nonspeculative)." In support of its straw-man position that "there are limits to consideration of the no-action alternative"-NRDC does not disagree with this general proposition and has never maintained that

Exelon's or NRC's obligation in this regard is "unlimited"-NRC Staff cites the 1996 GEIS determination that, "While many methods are available for generating electricity, and a huge number of combinations or mixes can be assimilated to meet a defined generating requirement, such expansive consideration would be too unwieldy to perform given the purposes of this analysis."

However, as noted previously above, neither Mr. Paine's declaration nor the contention it supports seek an analysis of "every conceivable alternative to its proposed action." On the contrary, NRDC has already noted its view that several of the "conceivable alternatives" examined by the Applicant are, in the Applicants own words, so "hypothetical" as to be utterly implausible, and therefore not "feasible" and indeed, "speculative". The cases cited do not involve comparable facts or contentions to those in the Paine Declaration. For example, *Louisiana Energy Services, LP*, CLI-98-3, 47 NRC at 97 describes a situation in which an applicant planning to build an enrichment plant cross-references an earlier FEIS chapter on environmental consequences of the Proposed Action, and then declares the impact of no action to be "that all the impacts described there [in the cross-referenced material] would not occur if the license were denied." The factual situation is actually reversed in the instant case. Exelon itself has declared, "The No-Action alternative is defined as ….replacing the generating capacity of LGS [and decommissioning the LGS facility]," thereby triggering, not the analogized absence of impacts, but a different set of impacts under the no-action alternative. ER at 7-3.

Contention 4-E does not demand analysis of "a huge number of combinations or mixes" of "methods…for generating electricity," but rather seeks an analysis of the range of likely environmental impacts for a reasonably foreseeable range of electricity resources in PJM's

electricity portfolio at two distinct periods of time, following LGS Unit 1 license expiration in 2024 and LGS Unit 2 license expiration in 2029. Paine Declaration at 3-4. Both target dates for the requested analysis are well within the time horizon of the proposed action, which runs to 2049, and are therefore "reasonable" in NEPA terms.

c. The NRC Answer arbitrarily limits a reasonable set of alternatives.

The NRC Staff response cites the GEIS statement that "a reasonable set of alternatives should be limited to single discrete electric generation sources and only electric generation sources that are technically feasible and commercially viable" and asserts that NRDC is violating that guidance. However, as already noted, by postulating the deployment of massive 98,900 - 154,000 acre solar plants on land cleared for this purpose within the ROI for Limerick, it is the ER's that violates the "technically feasible" and "commercially viable" criteria for selection of reasonable alternatives set forth in the GEIS, a failing not noted by NRC Staff. In addition, the analysis requested by NRDC of reasonably foreseeable PJM system resources under the No Action Alternative actually does conform to these criteria because electricity resources, whether they be DSM, distributed generation, or conventional central-station generating assets, can be included in the PJM portfolio only if they are "technically feasible" and "commercially viable." But the NRC Staff response goes on to err in yet another way. The quoted sentence, from the Introductory section of the GEIS discussion on "Alternatives to License Renewal," makes clear that this GEIS determination applies to the consideration of reasonable alternatives "to meet a defined generating requirement," - i.e. as defined by the base load capacity of LGS-and not to the analysis of the No Action Alternative, which by definition does not have a "defined generating requirement" associated with it. In the immediately preceding paragraph, which defines the No

Action Alternative as "the denial of a renewed license," the GEIS states:

> In general, if a renewed license were denied, a plant would be decommissioned and other electric generating sources would be pursued if the power were still needed. It is important to note that NRC's consideration of the No Action Alternative does not involve the determination of whether any power is needed or should be generated. The decision to generate power and the determination of how much power is needed are at the discretion of state and utility officials.

GEIS at 8.1.[38] As noted above, the ER contravenes this GEIS determination by "defining" the No Action Alternative as also providing "a large amount of base load power" to "replac[e] the generating capacity of LGS", another failing of the ER noted by NRDC and not identified by NRC Staff.

Finally, the GEIS section specifically dedicated to consideration of the No Action Alternative does not contain or repeat the NRC Staff cited guidance limiting NRC's consideration of this alternative to "single discrete electric generation sources." Instead, it refers to the latter alternatives as "possible actions resulting from the denial of a renewed license" that "represent[s] additional impacts of the no-action alternative." GEIS at 8.2. But, as previously noted, power plant alternatives are to be considered "possible" actions only if, per the GEIS, they are also "technically feasible," "commercially viable", and "reasonable for the region," which, as we have already noted, several of them are not.

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[38] At 16 years, the GEIS analysis is showing its age, as the "discretion of state and utility officials" has been replaced by varying degrees in some areas of the country, including the mid-Atlantic ROI by "Independent System Operators" who continually assess future electricity needs and manage competitive wholesale markets for delivering the electricity resources to meet those needs. All of which is to say, in the ROI for this facility, the analog of what was once the "state and utility official" view of future power needs is now a continually evolving set of forecasts and responsive electricity resource portfolios assembled by PJM using a competitive wholesale market mechanism and not directly regulated by state and utility officials.

d. The NRC Staff answer wrongly asserts that NRDC fails to cite a legal basis to support its claim that Exelon must conduct NRDC's desired analysis of the No Action Alternative

NRC Staff asserts that "NRDC does not demonstrate that the Applicant has failed to meet any statutory or regulatory requirement nor does NRDC provide sufficient supporting reasons to substantiate its claims" and that "Neither the regulations cited by NRDC nor NEPA case law establish a requirement for a license renewal applicant to expand its analysis of the No Action Alternative to project the future system resources portfolio of a regional transmission organization such as PJM or to include every conceivable permutation of potential power sources or energy efficiency." NRC Staff Answer at 45.

NRDC has already dealt extensively with the "every conceivable permutation" charge. As for whether regulations and NEPA case "establish a requirement for a license renewal applicant... to project future system resources…" as part of the analysis of no action, it is the NRC Staff's own GEIS that indicates that the No Action Alternative requires consideration of "the environmental consequences of taking no action at all." GEIS at 8-1. It is difficult to see how that would be accomplished without some projection of future system resources. For example, if DSM were going to keep the demand relatively flat for the next 20 years, the need for additional generating capacity in that period would be much less and the impacts from such generation sources would be much reduced. Clearly, what the energy future is likely to look like is a central question for consideration on the merits. NRDC has alleged, with support in the Paine Declaration, and in response to counter claims raised by Exelon and NRC Staff that NEPA requires an analysis to properly ascertain the reasonable range of future environmental impacts stemming from no action. NRDC has also gone beyond this threshold standard and amply

demonstrated in Paine Declaration and in reply to inaccurate allegations by Exelon and NRC Staff that the ER fails at numerous points to comply with the determinations of the 1996 GEIS, and more broadly, "misapplies" these determinations to the detriment of adequate consideration of the No Action Alternative, precisely as alleged in the Paine Declaration.

e. The NRC Staff in fact qualifies its consideration of the No Action Alternative in a manner that is consistent with NRDC's requested analysis while Exelon ignores findings of the GEIS

NRC Staff response states, "It is not unreasonable to assume for the purpose of considering the no-action alternative that power would need to be replaced in some fashion." NRC Staff Answer at 47. We agree - the added qualifier "in some fashion" leaves open the very possibilities raised by Mr. Paine in his declaration, but this qualifier is not present in the Applicant's definition of no action, which as we have noted above, defines the No Action Alternative as providing "a large amount of base load power" to "replac[e] the generating capacity of LGS." DSM measures, for example, are dismissed by the Applicant as a reasonable consequence of no action, either alone or in combination with distributed renewable generation or other electricity resources, such as natural gas-fired generation or Canadian hydropower imports, to "replacing the generating capacity of LGS." According to the ER, "Exelon Generation does not consider DSM to be a viable supply of replacement base-load electricity. Hence, DSM does not represent a reasonable alternative to renewal of the LGS operating licenses." ER at 7-17. But this finding contravenes the findings of the GEIS, which "assumes that conservation technologies produce enough energy savings to permit the closing of a nuclear plant" (GEIS at 8.3.14), yet another instance in which NRC Staff distorts the Paine Declaration and Contention 4-E to make its case against NRDC intervention, while ignoring blatant

violations of NRC guidance, violations that NRDC identified in its Intervention Petition.

f. The NRC Staff's list of deficiencies is ill-founded and goes to the merits of NRDC's contention

NRC Staff provides a list of alleged deficiencies in the Contention 4-E and the supporting Paine Declaration. NRC Staff Answer at 50-51.

As the preceding discussion demonstrates these charges are ill-founded. First, NRC Staff, and Exelon, would have NRDC prove its case as a precondition to admission of the Contention, a clear violation of the controlling Commission precedents cited above. Second, NRDC identified the portions of the ER that failed to provide the necessary analyses, identified what those analyses should include, offered an Expert Declaration to support that statement and cited to portions of the GEIS that Exelon failed to follow. The discussion above in response to numerous inaccuracies by Exelon and NRC Staff fully rebuts NRC Staff charges of inadequate support for Contention 4-E. In addition the NRC Staff Answer implicitly concedes the existence of a material dispute on these pages by noting that "other than to allege without support that the no-action alternative must include the 'expected growth in demand side management and renewable energy sources,'" and "other than to argue in a conclusory fashion that the Applicant must model a likely evolution of electricity resources [without LGS license renewal] , NRDC does not identify any dispute with the ER's analysis of such resources". But, contrary to NRC Staff's assertion, NRDC provided references to the GEIS that indicated that the very analysis not conducted by Exelon is required as part of the No Action Alternative.

g. The NRC Staff wrongly charges that NRDC is seeking to compel applicant to implement demand side management

NRC Staff charges that nothing in the Paine Declaration "establishes that the Applicant

could implement demand side management in PJM". NRC Staff Answer at 52.

Mr. Paine's declaration never makes this specific claim, limiting itself to making the reasonable allegation, based on the information from the company's website, that Exelon Generation Company's characterization of its own capacities "is not a fair characterization of the business and abilities of the parent company, Exelon." Moreover, his entire declaration speaks to the *analysis* of the combined impact of DSM measures within a broad portfolio of other electricity system resources, and not to who has or doesn't have the corporate capacities to "implement" DSM.

h. The NRC Answer claims that NRDC fails to identify a dispute with the Exelon's existing analysis of DSM

The NRC Staff Answer states: "The Applicant analyzes DSM and its potential as an energy alternative and concludes that DSM is not a viable option for supplying the base load electricity currently supplied by LGS. NRDC does not identify any dispute with the Applicant's existing analysis of DSM…" NRC Staff Answer at 52.

But the Paine Declaration does identify the flaw in looking at DSM as an alternative to "replace" the generating capacity of Limerick rather than as a reasonably foreseeable consequence of the No Action Alternative, and for the need to consider DSM in a portfolio context rather than in isolation. Paine Declaration at 2, citing to the GEIS. The GEIS assumes conservation technologies produce enough energy savings to permit the closing of a nuclear plant. GEIS at 8.3.14.

i. The NRC Staff erroneously claims that Contention 4-E does not raise a material dispute because the application contains the missing information

The NRC Staff Answer states: "Contention 4-E does not raise a material dispute with the

application because the application actually contains the information Contention 4-E asserts is missing." NRC Staff Answer at 54.

NRC Staff, like Exelon, assumes that because the ER mentions some of the issues raised by NRDC, there is no material dispute. But this ignores both the wording of the Contention and the evidence offered by NRDC in support of it. The Contention alleges that the "Environmental Report (§ 7.2) Fails to *Adequately* Consider the No Action Alternative" (emphasis added) and the bases and Paine Declaration spell out the inadequacies including: conflating the consideration of no action with alternatives for baseload capacity; the use of totally unrealistic "consequence" scenarios; the failure to actually conduct an analysis of the likely consequences of no action when the decision will occur 12 to 17 years before Limerick would be shut down; and the failure to balance the environmental consequences of no action against the consequences of the proposed action, to mention only a few.

IV. CONCLUSION

For the reasons stated above and as presented in NRDC's Petition to Intervene, the Petition to Intervene should be granted and the four Contentions and their bases should be admitted.

Respectfully Submitted

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CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing Natural Resources Defense Council ("NRDC") Combined Reply to Exelon and NRC Staff Answers to Petition to Intervene in the captioned proceeding were served via the Electronic Information Exchange (EIE) on the 6th day of January 2012, which to the best of my knowledge resulted in transmittal of same to those on the EIE Service List for the captioned proceeding.

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