

**NATURAL RESOURCES DEFENSE COUNCIL’S BRIEF IN SUPPORT OF WAIVER  
OF 10 C.F.R. § 51.53(c)(3)(ii)(L) AS APPLIED TO APPLICATION  
FOR RENEWAL OF LICENSES FOR LIMERICK UNITS 1 AND 2**

**EXHIBIT B**

**PDF Page number**

1. NATURAL RESOURCES DEFENSE COUNCIL’S PETITION, BY  
WAY OF MOTION, FOR WAIVER OF 10 C.F.R. § 51.53(c)(3)(ii)(L)  
AS APPLIED TO APPLICATION FOR RENEWAL OF LICENSES  
FOR LIMERICK UNITS 1 AND 2 (Nov. 21, 2012)..... 2
2. DECLARATION OF CHRISTOPHER J. WEAVER, Ph.D., ON  
BEHALF OF THE NATURAL RESOURCES DEFENSE COUNCIL IN  
SUPPORT OF MOTION FOR WAIVER (Nov. 21, 2012).....31
3. DECLARATION OF GEOFFREY H. FETTUS, COUNSEL FOR THE  
NATURAL RESOURCES DEFENSE COUNCIL (NRDC),  
REGARDING WAIVER OF 10 C.F.R. § 51.53(c)(3)(ii)(L) AS  
APPLIED TO APPLICATION FOR RENEWAL OF LICENSES FOR  
LIMERICK UNITS 1 AND 2 (Nov. 21, 2012).....58

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**BEFORE THE ATOMIC SAFETY AND LICENSING BOARD**

<b>In the Matter of:</b>	)	
	)	
<b>EXELON GENERATION COMPANY, LLC</b>	)	<b>Docket No. 50-352-LR</b>
	)	<b>Docket No. 50-353-LR</b>
<b>(Limerick Generating Station, Units 1 and 2)</b>	)	
		<b>November 21, 2012</b>
<b>(License Renewal Application)</b>		

**NATURAL RESOURCES DEFENSE COUNCIL’S PETITION, BY WAY OF MOTION,  
FOR WAIVER OF 10 C.F.R. § 51.53(c)(3)(ii)(L) AS APPLIED TO APPLICATION FOR  
RENEWAL OF LICENSES FOR LIMERICK UNITS 1 AND 2**

In accordance with the Commission’s October 23, 2012 Memorandum and Order (CLI - 12-19) (hereafter “Comm. Op.”), *see* 2012 WL 5266118, and 10 C.F.R. § 2.335(b)-(d), the Natural Resources Defense Council (“NRDC”) respectfully submits this petition for waiver of 10 C.F.R. § 51.53(c)(3)(ii)(L). This waiver request is supported by the attached Declaration of Christopher Weaver, Ph.D, on behalf of NRDC (“NRDC Decl.”) and NRDC’s Counsel, Geoffrey H. Fettus (“Counsel Decl.”).<sup>1</sup>

**I. INTRODUCTION**

On October 23, 2012, the Commission reversed the Atomic Safety and Licensing Board’s (“ASLB”) April 4, 2012 Memorandum and Order (ASLBP No. 12-916-04-LR-BD01) (hereafter “ASLB Op.”), which had admitted two bases for one of NRDC’s November 22, 2011 Contentions concerning Exelon Generating Company LLC’s (“Exelon”) license renewal

---

<sup>1</sup> For convenience we are also attaching NRDC’s Petition to Intervene and Contentions, along with the supporting technical declaration filed with that Petition (“NRDC Cont.”).

application for the Limerick Generating Station, Units 1 and 2 (“Limerick”). The ASLB had ruled that, in light of the plain language of 10 C.F.R. § 51.53(c)(3)(iv) – which provides that the environmental review of a nuclear plant license renewal application must consider “any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware” – two basis for NRDC’s Contention 1E regarding significant new information related to Exelon’s consideration of Severe Accident Mitigation Alternatives<sup>2</sup> for Limerick should be admitted. ASLB Op. at 18-21. Reversing this determination, the Commission ruled that this provision is subservient to 10 C.F.R. § 51.53(c)(3)(ii)(L), which, in the Commissions’ view, exempts Exelon from any SAMDA analysis requirements in connection with the relicensing, including the need to defend its Environmental Report (“ER”) analysis of new and significant information that might bear on the adequacy of the 1989 SAMDA that was included in a Supplement to the Environmental Impact Statement for the Limerick Operating License. Comm. Op. at 11-15.

However, the Commission invited NRDC to submit a petition for waiver of 10 C.F.R. § 51.53(c)(3)(ii)(L), pursuant to 10 C.F.R. § 2.335(b). Comm. Op. at 13 (emphasis added). Accordingly, while continuing to maintain that no waiver of 10 C.F.R. § 51.53(c)(3)(ii)(L) is necessary, NRDC hereby seeks such a waiver, respectfully requesting that the Commission grant this request to waive the application of the regulation to permit two of NRDC’s Contentions to be admitted on several bases.

---

<sup>2</sup> Severe Accident Mitigation Alternatives, or “SAMAs” are also referred to as Severe Accident Mitigation Design Alternatives, or “SAMDAs,” and will be so referred to here.

In particular, as detailed below, NRDC seeks a waiver regarding the two bases of Contention 1E admitted by the ASLB: (a) Exelon has omitted from its ER a required analysis of new and significant information regarding potential new severe accident mitigation alternatives previously considered for other BWR Mark II Containment reactors (Contention 1E-1); and (b) Exelon's reliance on data from Three Mile Island ("TMI") in its analysis of the significance of new information regarding economic cost risk constitutes an inadequate analysis of new and significant information (Contention 1E-2).

NRDC also seeks a waiver regarding Contention 3E, as to the requirement that Exelon utilize modern techniques for assessing whether the newly considered severe accident mitigation alternatives are cost-beneficial. *See* NRDC Cont. at 22 (¶¶ 1 and 3).<sup>3</sup>

## **II. STATUTORY AND REGULATORY FRAMEWORK**

### **A. The National Environmental Policy Act**

Our Nation's "basic national charter for protection of the environment," 40 C.F.R. § 1500.1(a), NEPA's purpose is to "help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment." *Id.* at § 1500.1(c). NEPA's "twin aims" are to force every agency "to

---

<sup>3</sup> The ASLB had denied the admissibility of Contention 3E *in toto* on the ground that the Contention is impermissible in light of 10 C.F.R. § 51.53(c)(3)(ii)(L), ASLB Op. at 31-34, but the Commission invited NRDC to seek a waiver of that regulation as to this contention. The aspect of Contention 3E that is not already addressed by Contention 1E, as admitted by the ASLB, concerns the discrete issue of Exelon's failure to use a probabilistic safety assessment severe accident consequences code system comparable to the MELCOR Accident Consequence Codes Systems 2 ("MACCS2") in its analysis, as detailed in the first and third bases of this Contention. NRDC Cont. at 22, ¶¶ 1, 3. The portion of 3E that survives the ASLB's rulings and is eligible for waiver is the contention that any new analysis of additional mitigation alternatives and any new consideration of off-site economic impacts must use an advanced probabilistic safety assessment of severe accident consequences like MACCS2. The portion of 3E that was related to flaws in the 1989 SAMDA is not the subject of this waiver request.

consider every significant aspect of the environmental impact of a proposed action,” and to “inform the public that it has indeed considered environmental concerns in its decisionmaking process.” *Baltimore Gas & Elec. Co. v. NRDC*, 462 U.S. 87, 97 (1983). Under NEPA, federal agencies are required to prepare an Environmental Impact Statement (EIS) for all “major Federal actions significantly affecting the quality of the human environment . . . .” 42 U.S.C. § 4332(C). Among other issues, an EIS must analyze the “environmental impact of the proposed action” and reasonable alternatives. *Id.* at § 4332(C)(I).

The completion of an EIS for a proposed action does not end an agency’s responsibility to weigh the environmental impacts of a proposed action. *Marsh v. Ore. Natural Res. Council*, 490 U.S. 360, 371-72 (1989). As the Supreme Court recognized in *Marsh*, it would be incongruous with NEPA’s “action-forcing” purpose to allow an agency to put on “blinders to adverse environmental effects,” just because the EIS has been completed. *Id.* Accordingly, an agency must supplement its EIS if there is new information showing that the remaining federal action will affect the quality of the human environment “in a significant manner or to a significant extent not already considered.” *Id.* at 374; *see also Warm Springs Dam Task Force v. Gribble*, 621 F.2d 1017, 1024 (9<sup>th</sup> Cir. 1980) (“When new information comes to light the agency must consider it, evaluate it, and make a reasoned determination whether it is of such significance as to require implementation of formal NEPA filing procedures”); *Friends of the Clearwater v. Dombeck*, 222 F.3d 552, 558 (9<sup>th</sup> Cir. 2000) (finding “no evidence in the record” that Forest Service had considered new information bearing on sufficiency of programmatic EIS to support individual timber sale).

Consistent with these duties, the Council on Environmental Quality's ("CEQ") implementing NEPA regulations require that even after a NEPA process is completed, where an agency learns of "significant new circumstances," or new "information relevant to environmental concerns and bearing on the proposed action or its impacts," 40 C.F.R. § 1502.9(c), it must supplement its NEPA review. This is a continuing obligation, and a NEPA process may require *more than one supplement* if new information comes to light even after an initial supplement is prepared. *E.g., Marsh*, 490 U.S. at 368 ("if all of the information contained in the [two documents] was both new and accurate, the Corps would have been required to prepare a *second supplemental EIS*") (emphasis added); *Deukmejian v. NRC*, 751 F.2d 1287, 1298 (D.C. Cir. 1984) (explaining that "The [NRC's] obligations under NEPA [include] a continuing duty to supplement EISs which have already become final whenever the discovery of significant new information renders the original EIS inadequate").

#### **B. The Commission's NEPA Framework For Relicensing Nuclear Power Plants**

The scope of the NEPA review for the relicensing of nuclear power plants by the NRC is set out in 10 C.F.R. Part 51 and the NRC's "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" ("GEIS") (NUREG-1437) (May 1996). NRC's NEPA regulations require an EIS for any major licensing action significantly affecting the quality of the human environment. 10 C.F.R. §§ 51.71, 51.91. Before the EIS is prepared, however, NRC's regulations require that the license applicant must prepare what amounts to a first draft of the EIS, *i.e.*, the environmental report ("ER"), 10 C.F.R. § 51.53(c)(1), *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041, 1049 (1983), which generally must address all the same impacts, alternatives, and other environmental issues that will be addressed

later in the NRC's EIS. *Compare* 10 C.F.R. § 51.53(c)(2) *with* 10 C.F.R. § 51.71.

As provided in the NRC regulations, some environmental issues that might otherwise be germane in a license renewal proceeding have been resolved generically for all plants in the GEIS. These "Category 1" issues are "beyond the scope of a license renewal hearing." *Fla. Power and Light Co.*, 54 NRC at 3, 15 (2001); *see* 10 C.F.R. § 51.53(c)(3)(i).

For other issues, referred to as Category 2 issues, an ER "must contain environmental analyses of the[ir] environmental impacts." 10 C.F.R. Pt. 51.53(c)(3)(ii). This includes the consideration of "alternatives to mitigate severe accidents," including the "consequences of atmospheric releases, fallout onto open bodies of water, releases to ground water, and societal and economic impacts from severe accidents." *Id.* at Table B-1, Postulated Accidents; *see also*, *e.g. Limerick Ecology Action, Inc. v. NRC ("LEA")*, 869 F.2d 719, 741 (3d Cir. 1989) (holding that SAMDAs "must be given careful consideration" in the NEPA process).

Central to the current dispute, the obligation for an Applicant and NRC Staff to consider severe accident mitigation alternatives contains a carve-out for plants seeking a renewed license if severe accident mitigation alternatives have been previously considered for that plant. Thus, 10 C.F.R. § 51.53(c)(3)(ii)(L) provides that these alternatives need only be considered "[i]f the staff has not previously considered severe accident mitigation alternatives for the applicant's plant in an [EIS] or related supplement." There are only three plants that arguably fall into this exception – Limerick, Comanche Peak, and Watts Barr.

Nonetheless, consistent with the CEQ regulations, the Commission's own NEPA regulations also provide that supplements to either a Draft EIS, or a Final EIS, will be prepared where there are, *inter alia*, "new and significant circumstances or information relevant to

environmental concerns and bearing on the proposed action or its impacts.” 10 C.F.R. §§ 51.72(a); 51.92(a). In the relicensing context, this obligation is codified at 10 C.F.R. § 51.53(c)(iv), which provides that the EIS for a license renewal “must contain any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware.” *See also, e.g., Union Elec. Co. et al.*, CLI-11-05, 2011 WL 4027741, 12 (Sept. 9, 2011) (further NEPA review required where new information presents “a seriously different picture of the environmental impact of the proposed project from what was previously envisioned”).

Previously the ASLB found, correctly in our view, that a Commission rule narrowly exempting the three particular plants from repeating a SAMA analysis that had only been performed at the initial licensing stage could not reasonably be construed as nullifying a fundamental NEPA obligation, binding on all license renewal applicants, to consider “new and significant information” on severe accident mitigation that may have come to light in the intervening decades since their initial licensing. However, in its recent decision, the Commission concluded that, in a license renewal proceeding, consideration of new and significant information related to a previously conducted analysis of severe accident mitigation alternatives would be in conflict with the exception written into § 51.23(c)(3)(ii)(L) and thus such new and significant information could not be considered absent a waiver being granted pursuant to 10 C.F.R. § 2.335.

### **C. The Commission’s Regulatory Framework For Challenging License Renewal Applications**

In order to challenge a relicensing application, a party generally must file Contentions setting forth, *inter alia*, the specific issues to be raised, a brief explanation of the bases for those



issues, and sufficient evidence supporting those bases to demonstrate that the issue is material to the matters to be decided in a relicensing proceeding and is within the scope of the proceeding. 10 C.F.R. § 2.309(f). Among the issues that may *not* be raised in such a proceeding is a challenge to any “rule or regulation of the Commission, or any provision thereof.” 10 C.F.R. § 2.335(a).

If a party seeks to challenge a rule or regulation, then it must file a separate “waiver petition” requesting that the rule or regulations be “waived or an exception made for the particular proceeding,” based upon “special circumstances with respect to the subject matter of the particular proceeding.” 10 C.F.R. § 2.335(b). The petition must demonstrate that those special circumstances “are such that the application of the rule or regulation (or a provision of it)” in the particular instance “would not serve the purposes for which the rule or regulation was adopted.” *Id.*<sup>4</sup>

### **III. PROCEDURAL BACKGROUND**

#### **A. The Commission’s Prior Consideration of SAMAs for Limerick**

In 1980, in the wake of the TMI accident, the NRC issued a policy requiring the consideration of “severe accidents in future NEPA reviews.” *LEA*, 869 F.2d at 726. Five years later, the agency issued a Final Policy that “excluded consideration of severe accident mitigation design alternatives from individual licensing proceedings.” *Id.* at 727.

---

<sup>4</sup> In promulgating the Category 1 and 2 regulations, the Commission noted that if presented with “new, site-specific information which demonstrates that the analysis of an impact codified in the rule is incorrect with respect to the particular plant, the NRC staff will seek Commission approval to waive the application of the rule with respect to that analysis in that specific renewal proceeding.” 61 Fed. Reg. 28,467, 28,470 (1996). Moreover, as the Commission noted in reversing the ASLB’s admission of NRDC’s contentions here, NRC Staff has an obligation to consider “*new information that could render invalid the original site-specific analysis . . .*” Comm. Op. at 13, n.54 (emphasis added).

In the meantime, in 1981 LEA and others intervened in the licensing proceeding for Limerick. LEA raised several issues, including whether the NRC had adequately considered severe accident mitigation alternatives at the facility. In the Final Environmental Statement (“FES”) the staff rejected these arguments, and, as to severe accident mitigation alternatives in particular, “concluded that there are *no special or unique circumstances* about the Limerick site and environs that would warrant consideration of” such alternatives. 869 F.2d at 732 (quoting FES at 5-126 (emphasis added)). On appeal, the Board also relied on the conclusion that there were “*no special or unique circumstances* about the Limerick site” that warranted further review. *Id.* (emphasis added).

LEA filed a Petition for Review in the Third Circuit. LEA, 869 F.2d 719. The Court of Appeals first concluded that the Policy Statement did not preclude consideration of the issue, *id.* at 733-736, and then also rejected the argument that no special or unique circumstances at Limerick warranted consideration of severe accident mitigation alternatives there. *Id.* at 738-39. In particular, the Court found that: (a) “the Commission itself has noted [that] the impact of SAMDAs on the environment will differ with the particular plant’s design, construction and location”; and (b) “the risk will vary with the potential consequences,” which “will vary *tremendously* across all plants.” *Id.* (emphasis added).

The NRC subsequently issued a 1989 document entitled a “Supplement” to the FES for Limerick to address severe accident mitigation alternative issues, but the Supplement “discovered no substantial changes in the proposed action as previously evaluated . . . that are relevant to environmental concerns nor significant new circumstances or information relevant to environmental concerns.” NUREG-0974 at iii. Thus, the Commission found “no new

information that would call into question the FES conclusion” that there is no basis to further consider” severe accident mitigation alternatives at Limerick. *Id.* at 1.

## **B. The Present Proceeding**

In response to a notice of opportunity for hearing, 76 Fed. Reg. 52,992 (2011), on November 22, 2011 NRDC submitted a petition to intervene and notice of intent to participate in the Limerick relicensing proceeding, submitting four contentions. *See* Att. A (“NRDC Cont.”). Contention 1E contends that Exelon’s analysis, in its ER for the relicensing, of new and significant information related to the 1989 SAMDA was inadequate because it failed to properly analyze the significance of new information that Exelon conceded existed and because it failed to acknowledge other new information that was also significant. *Id.* at 16-19. As detailed in NRDC’s expert declarations, other Boiling Water Reactor (“BWR”) plants have identified numerous severe accident mitigation alternatives that are cost-beneficial or potentially cost-beneficial such as, for example, portable generators for emergency power supply; providing alternative sources of water to address emergencies; and improvements to the connections between electric power systems to allow more flexible supply of critical power needs during an emergency. NRDC Decl. ¶¶ 12-14. Indeed, as the ASLB recognized, “NRDC has shown there are numerous new SAMA candidates which should be evaluated for their significance.” ASLB Op. at 21.

In Contention 1E, NRDC also argued that Exelon has improperly relied on data from an analysis done at TMI concerning the economic impacts of a severe accident. NRDC Cont. at 18. NRDC explained that use of that analysis was not appropriate since TMI is a markedly different and less economically developed site than Limerick, which includes densely populated areas

including Philadelphia, PA. *Id.* NRDC also explained that the comparison is inappropriate because TMI is a Pressurized Water Reactor (“PWR”), with correspondingly different accident scenario source terms than the BWR at Limerick. *Id.*; *see also* NRDC Decl. ¶¶ 17-24.

In addition, in Contention 3E NRDC argued, *inter alia*, that the ER is inadequate in relying on the methodology used in the 1989 SAMDA analysis, both for that analysis and for consideration of any newly identified mitigation alternatives, in light of techniques that have been developed since that SAMDA was conducted to assess whether alternatives are cost-beneficial. NRDC Cont. at 21-23. In particular, Contention 3E asserted, *inter alia*, that the 1989 SAMDA was legally deficient because it failed to use a probabilistic safety assessment severe accident consequences code system comparable to the MELCOR Accident Consequence Codes Systems (“MACCS”) 2. *Id.* Contention 3E was based, in part, on the continuing obligation imposed by NEPA on federal agencies, to update and correct previous information when the agency becomes aware of new information that demonstrates the inadequacy of a prior analysis. *See, e.g., Deukmejian v. NRC*, 751 F.2d at 1298. Thus, this aspect of Contention 3E sought, *inter alia*, to require Exelon and NRC Staff to use the more accurate and reliable methods available today for assessing the consequences of a severe accident, including economic consequences, and assessing the costs and benefits of the additional mitigation alternatives that are appropriate for BWRs – which has never been done for Limerick.<sup>5</sup>

---

<sup>5</sup> NRDC only seeks waiver of 10 C.F.R. § 51.53(c)(3)(ii)(L) as it applies to two aspects of Contention 1E, *i.e.*, the failure to consider the wider range of mitigation alternatives now identified for BWRs, and the failure to conduct a reliable off-site economic consequences analysis, and one aspect of Contention 3E, *i.e.*, the need to use a modern methodology to assess the cost-benefit of new mitigation alternatives for Limerick, as it is this aspect of that Contention that qualifies for a waiver. As to other issues NRDC raised in its Contentions that were rejected by the ASLB and thus were not before the Commission, NRDC simply reserves the right to

The applicant and NRC staff opposed the motion to intervene, arguing, *inter alia*, that issues related to severe accident mitigation alternatives were precluded by 10 C.F.R. § 51.53(c)(3)(ii)(L).

On April 4, 2012 the Board rejected many of the applicant's and NRC's arguments and admitted a modified version of Contention 1E. ASLB Op. With respect to the threshold argument that any contention concerning SAMAs is precluded by 10 C.F.R. § 51.53(c)(3)(ii)(L), the Board concluded that the "regulation[ ] cannot trump statutory mandates," *id.* at 15, and that NEPA mandates an analysis based on "the best information available today." *Id.* The Board further recognized that Exelon had, in fact, "identified new information relating to severe accident mitigation," and had included such information in its ER. *Id.* at 30.

Thus, the Board concluded that in the relicensing proceeding Exelon must abide by the regulatory requirement to consider "any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware." 10 C.F.R. § 51.53(c)(3)(iv). On that basis the Board admitted a modified Contention 1E focused on the consideration of two of the bases presented by NRDC. *First*, it found that NRDC had raised an admissible contention regarding the extent to which Exelon should have addressed in its ER the "new severe accident mitigation alternatives previously considered for other BWR Mark II Containment reactors." ASLB Op. at 27. *Second*, the Board found admissible the issue of "whether Exelon's use of data from TMI in its analysis provides an adequate consideration of new and significant information regarding economic cost risk." *Id.* at 25, 27.

---

pursue those issues at the appropriate time.

The Commission reversed. Comm. Op. As an initial matter, the Commission recognized what it considered to be “ambiguity in our regulations.” *Id.* at 11. While the Commission characterized 10 C.F.R. § 51.53(c)(3)(ii)(L) as exempting Exelon from site-specific supplemental SAMDA analysis in the relicensing proceeding, it also recognized that the regulations mandate that “the license renewal application must contain any significant new information relevant to environmental impacts,” which “may be challenged in individual adjudications.” Comm. Op. at 11-12. The Commission also noted that “*Exelon has put forward in its license renewal application new information regarding its SAMDA analysis.*” *Id.* at 13 (emphasis added). Particularly in light of that fact, and NRDC’s claim that “the information provided by Exelon” is insufficient, the Commission ruled that “*NRDC may challenge the adequacy of the new information provided in the Limerick Environmental Report.*” *Id.* (emphasis added).

However, the Commission concluded that in light of 10 C.F.R. § 51.53(c)(3)(ii)(L), “the proper procedural avenue for NRDC to raise its concerns is to seek a waiver of the relevant provision in” that section. *Id.* The Board further invited NRDC to include other Contentions that had been rejected on the basis of 10 C.F.R. § 51.53(c)(3)(ii)(L). *Id.*

#### **IV. ARGUMENT**

##### **A. NRDC Is Entitled To Pursue Its Contention That Exelon Must Consider A Reasonable Range of Severe Accident Mitigation Alternatives As Mandated By NEPA.**

At the outset, NRDC notes its strenuous disagreement with the Commissions’ ruling that the only way NRDC can seek to bring Exelon into compliance with NEPA in connection with the Limerick relicensing is to apply for a waiver of 10 C.F.R. § 51.53(c)(3)(ii)(L). However, the bottom line is that, to be consistent with NEPA, the Commission must *either* conclude that a

waiver is not necessary, or waive 10 C.F.R. § 51.53(c)(3)(ii)(L), for to decide that NRDC may not pursue these issues under *either* approach would violate NEPA.<sup>6</sup>

Consistent with NEPA, NRC’s regulations provide that in conducting environmental review – be it in an initial EIS, a supplemental review, or a further supplemental stage – the Commission must consider “*any new and significant information* regarding the environmental impacts of license renewal of which the applicant is aware.” 10 C.F.R. § 51.53(c)(3)(iv) (emphasis added). This regulation fulfills the NEPA obligation to supplement a NEPA review in appropriate circumstances, even when a prior NEPA review has been completed. *E.g., Marsh v. Oregon Natural Res. Council*, 490 U.S. at 365.

This NEPA mandate – which simply may not be abrogated by a contrary NRC regulation – requires that if presented with appropriate new and significant information regarding alternatives, including, as here, alternatives to help mitigate environmental harms such as the serious environmental harms associated with a severe accident at Limerick, the Commission *must consider that information*. Thus, while in NRDC’s view the ASLB correctly concluded that because “[r]egulations cannot trump statutory mandates,” ASLB Op. at 15, NRDC’s contention based on such new information must be permitted into the proceeding, irrespective of 10 C.F.R. § 51.53(c)(3)(ii)(L), *at bare minimum a waiver of the regulation must be granted on that basis alone*.<sup>7</sup>

---

<sup>6</sup> NRDC reserves the right at the appropriate time to challenge the Commission’s decision that a waiver is required here.

<sup>7</sup> Indeed, the Commission’s October 23, 2012 ruling strongly suggests that the waiver should be granted. The Commission noted that “Exelon has put forward in its license renewal application new information regarding its SAMDA analysis.” Comm. Op. at 13. The Commission then recognized that “NRDC finds insufficient the information provided by Exelon,

Under these circumstances, the waiver petition should be granted. Indeed, were the Commission to deny the waiver petition, the result would be that, irrespective of the existence of new and significant information regarding mitigation alternatives for severe accidents, the NRC, and by extension Exelon, could not be required to come into compliance with NEPA.<sup>8</sup>

**B. NRDC Satisfies The Criteria For A Waiver Of 10 C.F.R. § 51.53(c)(3)(ii)(L) With Respect To Contention 1E As Admitted By The ASLB And Contention 3E.**

In *Dominion*, CLI-05-24, which involved a request for a waiver of the NRC's emergency planning regulations, the Commission articulated a four-part waiver test: (i) strict application of the rule sought to be waived "would not serve the purposes for which [it] was adopted"; (ii) the movant has alleged "special circumstances" that were "not considered, either explicitly or by necessary implication, in the rulemaking proceeding leading to the rule sought to be waived"; (iii) those circumstances are "unique" to the facility rather than "common to a large class of facilities"; and (iv) a waiver of the regulation is necessary to reach a significant issue. *Id.* at 560;

---

and therefore seeks to challenge the validity of the decades-old SAMDA analysis." *Id.* Recognizing that, "[t]o date, we have not been presented with precisely this scenario," the Commission stated that "*NRDC may challenge the adequacy of the new information provided in the Limerick Environmental Report.*" *Id.* (emphasis added). Then, in light of the Commissions' view that 10 C.F.R. § 51.53(c)(3)(ii)(L) would otherwise bar such a challenge, the Commission concluded that "the proper procedural vehicle for NRDC to raise its concerns is to seek a waiver" of that rule. *Id.*

<sup>8</sup> It is also critical to emphasize that at this stage NRDC need not demonstrate that it meets the significant new information standard, as the merits of NRDC's contentions are not at issue, but rather only whether the waiver criteria are satisfied.



*see also, e.g. In re Millstone Nuclear Power Station Units 1 and 2*, 62 N.R.C. 551, 559-60

(2005). NRDC's Contentions satisfy this test.<sup>9</sup>

**1. Application of 10 C.F.R. § 51.53(c)(3)(ii)(L) in the manner interpreted by the Commission would not serve the purposes for which the regulation was adopted.**

10 C.F.R. § 51.53(c)(3)(ii)(L) provides that, although severe accident mitigation is a Category 2 issue, and thus generally must be considered on a site-specific basis during relicensing, this requirement is only applicable “[i]f the staff has *not previously considered* severe accident mitigation alternatives for the applicant’s plant in an environmental impact statement or related supplement.” 10 C.F.R. § 51.53(c)(3)(ii)(L) (emphasis added). Put another way, the regulation provides that where SAMDA’s were “previously considered,” they need not be considered on a site-specific basis during relicensing. As interpreted by the Commission, 10 C.F.R. § 51.53(c)(3)(ii)(L) therefore exempts Limerick from the obligation to revisit SAMDAs in connection with relicensing, because a SAMDA analysis was conducted in a 1989 supplement to the original EIS.

Assuming for purposes of this waiver request that this interpretation of 10 C.F.R. § 51.53(c)(3)(ii)(L) is correct, NRDC respectfully submits that the application of the regulation here would not serve the purpose for which the regulation was adopted. As noted, the Commission developed its Category 1 and 2 regulations to distinguish between issues that “have been resolved generically for all plants,” *Turkey Point*, 54 NRC at 15 (Category 1), and those

---

<sup>9</sup> Since these precedents concerned safety issues, the fourth prong of the analysis was focused on whether a significant “safety problem” was at issue, but where, as here, the waiver request involves an environmental concern this last factor focuses on the significance of the potential environmental impacts involved. *See In re Pacific Gas & Elec.*, LPB-10-15, at 35-36, 38 (ASLB Aug. 4, 2010).

that may “requir[e] further analysis” in light of “significant new information.” 10 C.F.R. § 51, preamble to App. B to Subpart A (Category 2). The Commission intended that consideration of mitigation alternatives, as to which the regulations provide for consideration of “alternatives to mitigate severe accidents,” be considered a Category 2 issue, and thus be adequately considered in the ER for relicensing.

Indeed, the Proposed Rule had put this issue into Category 1, and it was in response to comments that the Commission made it a Category 2 issue, recognizing that *severe accident mitigation should generally be addressed on a site-specific basis*. 61 Fed. Reg. at 28,480. Thus, in the regulatory preamble the Commission stated that the *purpose* of the regulatory exception here was simply to limit the analysis during relicensing to exclude “consideration of *such alternatives* regarding plant operation” that were previously considered. *Id.* (emphasis added). Accordingly, despite its language, the *purpose* of 10 C.F.R. § 51.53(c)(3)(ii)(L) was simply to exempt companies such as Exelon from being forced to reconsider *specific alternatives previously considered*, from which it necessarily follows that any *new* alternatives that would mitigate severe accidents should be subject to the standard for “new and significant information.” 10 C.F.R. § 51.53(c)(3)(iv); *see* Counsel Decl. ¶¶ 1-3.

That this is the purpose of 10 C.F.R. § 51.53(c)(3)(ii)(L) is further confirmed by other portions of the regulatory preamble to these regulations. In multiple portions the Commission provided assurances that “any new and significant information presented during the review of individual license renewal application” *will be considered*. *E.g.* 61 Fed. Reg. at 28,468; *see also id.* at 28,472 (“For individual plant reviews, information codified in the rule, information

developed in the GEIS, and *any significant new information introduced during the plant-specific review . . . will be considered in reaching conclusions in the supplemental EIS*”(emphasis added); *id.* at 28,470.<sup>10</sup>

This view of the purpose of the regulation is further confirmed by the Court’s ruling in *NJ Dept of Env. Prot. v. NRC*, 561 F.3d 132, 135 (3d Cir. 2009), where the Court explained that the purpose of the Category 2 regulations, including this one, is to require “evaluations of site-specific Category 2 issues – including a consideration of ‘severe accident mitigation alternatives’ (SAMAs) for *those issues that have not previously been considered.*” *Id.* (emphasis added). Thus, since the purpose of the exemption for previously conducted SAMDAs, as explained both in the regulatory preamble and the case law, was to simply exempt “those *issues*” previously considered, rather than to wholly exempt from any future environmental impact statement consideration of severe accident mitigation alternatives that had not been previously considered,

---

<sup>10</sup> After the rule was published several other plants complained that the Commission had erred in making severe accident mitigation alternatives a Category 2 issue, on the grounds that soon all plants will have considered the issue in an Individual Plant Examination (“IPE”) or an Individual Plant Examination of External Events (“IPEE”). 61 Fed. Reg. 66,547, 66,540 (Dec. 18, 1996). The Commission rejected this argument, reiterating that these issues must be considered in site-specific NEPA reviews, as an IPE or IPEE cannot substitute for NEPA review. *Id.* Several years later, the Nuclear Energy Institute submitted a formal rulemaking petition seeking to make severe accident mitigation alternatives a Category 1 issue, and, again, the Commission expressly rejected that proposal. 66 Fed. Reg. 10,834 (Feb. 20, 2001).

Moreover, as noted, *see supra* at 8, n.4, the preamble also suggests that if a commenter puts forward “new, site specific information which demonstrates that the analysis of an impact codified in the rule is incorrect with respect to the particular plant, the NRC staff *will seek Commission approval to waive the application of the rule* with respect to that analysis in that specific renewal proceeding.” 61 Fed. Reg. at 28,470. Thus, since the ASLB has already concluded that NRDC meets this standard, NRC staff should be joining NRDC in presenting this waiver petition.

it would not serve the purpose of 10 C.F.R. § 51.53(c)(3)(ii)(L) to apply it in a way that would prevent NRC from considering newly identified mitigation alternatives, from evaluating those newly identified mitigation alternatives in light of their off-site economic consequences and from using the most advanced and established methodologies for evaluating the costs and benefits of those newly identified mitigation alternatives and that would prevent NRDC from challenging Exelon's ER for its failure to properly fulfill these obligations. NRDC Counsel Decl. ¶¶ 1-3.<sup>11</sup>

Finally, the regulatory preamble also recognizes that, in light of inevitable changes that occur over time, "10 years is a suitable period" to delimit the outer bounds of when the Commission will assume that changes in condition and technology do not warrant additional NEPA review. 61 Fed. Reg. at 28,471. The last consideration of mitigation alternatives for severe accidents at Limerick occurred in 1989 – more than twenty years ago. Accordingly, it would plainly be inconsistent with the purpose of these regulations to limit the scope of these severe accident mitigation alternatives, the offsite economic impacts of severe accidents, and the methodology for assessing the costs and benefits of such mitigation alternatives to alternatives to those that were considered so long ago.

Indeed, for the reasons explained above, *see supra* at 13-14, the Commission cannot reasonably conclude that purposes of 10 C.F.R. § 51.53(c)(3)(ii)(L) would be served by applying

---

<sup>11</sup> It bears noting in this regard that, consistent with NEPA, the NRC's regulations require that an ER consider "appropriate alternatives to recommended courses of action," including "alternatives available for reducing or avoiding adverse environmental effects." 10 C.F.R. § 51.45(b)(3) and (b)(5); *see also* 10 C.F.R. § 51.103 (requiring discussing of alternatives in the Record of Decision, including, *inter alia*, the "preferences among alternatives" and "whether the Commission has taken all practicable measures . . . to avoid or minimize environmental harm from the alternative selected"). This of course includes alternatives that mitigate against severe accidents. *E.g. LEA*, 869 F.2d at 741.

the regulation to exclude consideration of new and significant information, in light of the overarching NEPA mandate to consider such information even when prior NEPA review has been completed. *E.g., Marsh v. Oregon Natural Res. Council*, 490 U.S. at 365. Rather, to reach a result that does not defy NEPA the Commission *must* conclude that the purpose of the regulation would not be served by applying it to reject NRDC's Contentions based on such information.

Accordingly, it would be contrary to the purpose of 10 C.F.R. § 51.53(c)(3)(ii)(L) to deny the following NRDC Contentions (for portions of 1E, as modified by the ASLB, and portions of 3E):

- a. **Exelon has omitted from its ER a required analysis of new and significant information regarding potential new severe accident mitigation alternatives previously considered for other BWR Mark II Containment reactors (Contention 1E-1)**

NRDC's Contention 1E, and supporting declaration, contends that the ER is deficient because it ignores new severe accident mitigation alternatives previously considered for other BWR Mark II Containment reactors. NRDC Cont. at 16-19; *see also* ASLB Op. at 40; NRDC Decl. ¶¶ 5-13. For the foregoing reasons it would not serve the purposes of 10 C.F.R. § 51.53(c)(3)(ii)(L) for this regulation to bar consideration of this basis for Contention 1E here. *See also* NRDC Counsel Decl. ¶ 1.

- b. **Exelon's reliance on data from TMI in its analysis of the significance of new information regarding economic cost risk constitutes an inadequate analysis of new and significant information (1E-2).**

NRDC's Contention 1E, and supporting declaration, also contends that the ER is deficient in relying on data from TMI in order to consider the significance of the new information concerning economic cost risks. NRDC Cont. at 18 (¶ 5); *see also* ASLB Op. at 40;

NRDC Decl. ¶¶ 17-24. For the foregoing reasons, it would not serve the purposes of 10 C.F.R. § 51.53(c)(3)(ii)(L) for this regulation to bar consideration of this basis for Contention 1E here either. *See also* NRDC Counsel Decl. ¶ 2.

- c. **A legally sufficient analysis of newly identified severe accident mitigation alternatives for Limerick must utilize modern techniques for assessing whether those alternatives are cost-beneficial, and Exelon’s ER erroneously concluded that new mitigation alternatives can be evaluated without use of those modern techniques (3E)**

As noted, the Commission invited NRDC to seek a waiver of 10 C.F.R.

§ 51.53(c)(3)(ii)(L) not only as to the two modified bases for Contention 1E that were admitted by the ASLB, but also as to Contention 3E. NRDC seeks a waiver as to one basis for Contention 3E not covered by Contention 1E – the adequacy of the ER vis-à-vis techniques used to assess whether SAMDA’s are cost-beneficial. NRDC Cont. at 22 (¶¶ 1, 3). In particular, this basis for Contention 3E contends that the 1989 SAMDA failed to use a probabilistic safety assessment severe accident consequences code system comparable to the MELCOR Accident Consequence Codes Systems (“MACCS”) 2. *Id.* This basis for Contention 3E seeks to require Exelon and NRC Staff to use the more accurate and reliable methods available *today* for assessing the consequences of a severe accident, including economic consequences, and assessing the costs and benefits of the additional mitigation alternatives that are appropriate for BWRs. *Id.* For the foregoing reasons, it would also not serve the purposes of 10 C.F.R. § 51.53(c)(3)(ii)(L) for this regulation to bar consideration of this basis for Contention 3E. *See also* NRDC Counsel Decl. ¶ 3.

\* \* \*

In sum, having interpreted 10 C.F.R. § 51.53(c)(3)(ii)(L) to preclude admission of NRDC's contentions, the Commission must waive the regulation to insure that the purpose of the regulations – which are designed to implement NEPA – are fulfilled. Otherwise, in contradiction of NEPA dictates, assertions by Exelon in its ER concerning the economic impacts of severe accidents and the scope of mitigation alternatives will be unchallengeable, and, as a result, Limerick will be allowed to be relicensed even though, unlike every other BWR in the country, it did not have to consider either the economic impacts of a severe accident, the full range of potential mitigation alternatives or the use of much more updated and robust accident consequences analysis. The notion that NRC would in that event make a decision with regard to major federal action without considering the significance of new information that might well modify the proposal to substantially reduce its environmental impacts is so antithetical to NEPA's fundamental mandates that the regulation must be waived to fulfill the fundamental purposes of the Commission's NEPA implementing regulations.

**2. There are special circumstances unique to Limerick that warrant the waiver and were not considered in the rulemaking leading to 10 C.F.R. § 51.53(c)(3)(ii)(L).**

NRDC also plainly meets the “special circumstances” test here with respect to all three Contentions. As a threshold matter, this issue was arguably resolved in the *LEA* case, where the 3d Circuit considered the argument that the Commission need not consider mitigation for severe accidents at Limerick *specifically* because there were no special circumstances warranting such an individual review. As noted, the Commission had concluded that “there [we]re *no special or unique circumstances*” warranting consideration of these alternatives at Limerick, and the Board similarly concluded that there were “*no special or unique circumstances* about the Limerick site”

that warranted further review. 859 F.2d at 732 (emphasis added). The Third Circuit *rejected this conclusion*, finding that addressing severe accident mitigation at Limerick *is unique*, because, *inter alia*, these issues “vary tremendously across all plants,” and at Limerick in particular in light of its “particular plant’s design, construction and location.” *Id.* at 738; *see also id.* at 738 (population “affects the magnitude and location of potential consequences from radiation releases,” which “*is particularly true for plants such as Limerick which were built near densely populated areas*”) (emphasis added).

In any event, it is evident that NRDC’s Contentions raise issues that are both unique to Limerick and were not considered in the 10 C.F.R. § 51.53(c)(3)(ii)(L) rulemaking. NRDC’s fundamental concern, reflected in its Contentions, is that there are a number of potentially cost-beneficial measures to address severe accidents at Limerick that, to date, Exelon has refused to consider; that the evaluation of the costs and benefits of these mitigation alternatives must include offsite economic consequences that reflect the Limerick site; and that the methodology used to assess the cost and benefits of these additional mitigation alternatives must be the most advanced techniques available for such analyses. Thus, NRDC’s Contentions are that the ER is deficient because, to date, Exelon has refused to consider the costs and benefits of these measures at Limerick; has relied on inappropriate economic data from TMI to substitute for a site-specific analysis of off-site economic consequences; and has refused to utilize appropriate methodologies to evaluate these severe accident mitigation alternatives.

*Every other BWR nuclear power plant in the country that has undergone relicensing has conducted an analysis of severe accident mitigation alternatives that is more inclusive of potential alternatives, includes the offsite economic consequences of a severe accident and*



*utilizes the advanced computer methodology of MACCS2 to determine costs and benefits.*

NRDC Decl. ¶¶ 5-13. Thus, the Contentions apply only to Limerick, and, more importantly, absent the waiver sought here, the Limerick plant will be the *only* BWR nuclear power plant that will be relicensed without the operator or the NRC giving NEPA consideration to the most recent mitigation alternatives, assessment methodologies, and economic considerations regarding severe accident mitigation alternatives. Rather, while all other plants conduct such analyses, and provide them to the public for public comment, the millions of people living near Limerick during the license extension period will be forced to rely on an analysis conducted up to forty years ago, in 1989. NRDC Counsel Decl. ¶ 4.

Absent a waiver, by the time Limerick Unit 2 completes its license renewal period, in 2049, its required NEPA analysis of severe accident mitigation alternatives will conceivably have gone for sixty years without facing a requirement for updating in the light of new and significant information, and without affording the public its due process right under NEPA to challenge the licensee's use of such information and/or failure to apprehend its importance to identification of cost-effective measures for mitigating the environmental consequences of a severe accident. Such anomalous, highly prejudicial, and NEPA-noncompliant outcomes are a possible and readily foreseeable result of failing to waive application of Subpart L to the relicensing of Limerick, and thus also comprise the "special circumstances" satisfying this prong of the waiver analysis.

These issues certainly were not considered in the 10 C.F.R. § 51.53(c)(3)(ii)(L) rulemaking. To the contrary, as discussed above, the Commission was focused first and foremost on insuring that these kind of alternatives *are* considered in relicensing proceedings

(which is why they became Category 2 issues), and, secondarily, sought to avoid duplicative NEPA processes by exempting specific mitigation alternatives that had previously been considered from being subject to reconsideration. *See supra* at 17-19. Nothing in the regulatory preamble suggests that the Commission contemplated that the regulation would forever preclude Exelon from being required to consider new mitigation alternatives during relicensing.<sup>12</sup>

Exelon's own contradictory approach to this issue is also a special circumstance plainly not contemplated when this regulation was adopted. NRDC Counsel Decl. ¶ 4. It is critical to recognize in this regard that the ER *does discuss alternatives to mitigate for severe accidents*. *See* ER at 5-1 to 5-9. In conducting this analysis, Exelon recognized that it has an obligation to "identify any new and significant information of which" it is aware. *Id.* at 5-2. According to Exelon, it was because it did *not identify* any information that met the standard that no specific design alternatives were identified or discussed. *Id.* at 5-9.

However, NRDC's Contentions focus both on the flaws in the way the ER analyzed the significance of the new information, and the failure to consider all the relevant new information related to severe accident mitigation alternatives. Had Exelon claimed that the "new and significant information" standard in 10 C.F.R. § 51.53(c)(3)(iv) does not apply *at all* in light of 10 C.F.R. § 51.53(c)(3)(ii)(L), then it would not have conducted this review, and its position regarding the need to consider NRDC's information would at least be consistent with its approach to preparing the ER. *See also* NRDC Counsel Decl. ¶ 4.

---

<sup>12</sup> The fact that the issue is unique is also highlighted by the fact that although three plants are arguably covered by the exception – Limerick, Comanche Peak, and Watts Bar. 61 Fed. Reg. at 28,481 – only Limerick is a BWR, while the other two are Pressurized Water Reactors. Accordingly, the mitigation measures at issue only apply to Limerick.

In adopting 10 C.F.R. § 51.53(c)(3)(ii)(L) the Commission certainly did not contemplate that in a license renewal, an applicant could, on the one hand, recognize that 10 C.F.R. § 51.53(c)(3)(iv) *does apply*, and on the other hand claim that an intervenor has no right to challenge the adequacy of that analysis. Rather, such an approach is plainly contrary to both the regulations and NEPA mandates, particularly where, as here, the new and significant information is *uniquely relevant to this one plant*, since all other plants are looking at *the full range of relevant mitigation alternatives*, are conducting analyses of off-site economic consequences, and are using the most up-to-date the methodology for analyzing the costs and benefits of severe accident mitigation alternatives

Accordingly, NRDC meets this part of the test as well.

**3. Waiver of the regulation is necessary here to address a significant environmental concern.**

Finally, the issues NRDC seeks to raise also plainly address a significant environmental concern. *See In re Pacific Gas & Elec.*, LPB-10-15, at 35-36, 38 (ASLB Aug. 4, 2010) (finding that this factor “should be construed in this instance to permit a waiver if it is necessary to reach a significant environmental issue”). By definition, NRDC’s Contentions concern how to best mitigate for “severe” accidents. Courts, including *LEA*, have repeatedly *rejected* the notion that a small risk of a severe accident is an insignificant problem that need not be addressed in the NEPA process. *LEA*, 869 F.2d at 738 (“risk equals the likelihood of an occurrence times *the severity of the consequences*”) (emphasis added); *see also New York v. Nuclear Regulatory Comm’n*, 681 F.3d 471, 478-79 (D.C. Cir. 2012); *cf. Mountain States Legal Found. v. Glickman*, 92 F.3d 1228, 1235 (D.C. Cir. 1996) (“the more drastic the injury that government actions makes more likely, the lesser the increment in probability necessary to establish standing”).

As explained in NRDC's Declaration, during the life of a relicensed Limerick plant the surrounding population within 50 miles will grow to over 9 million people, including more than 400,000 people living within 10 miles of the site. NRDC Decl. ¶¶ 14-16. It is vital that appropriate mitigation alternatives be considered to ameliorate the risks to these residents.

The alternatives NRDC contends Exelon must consider are all designed to address these risks, which is why they have been considered for other BWR Mark II Containment plants. Severe accidents could result from external events such as tornadoes, floods, earthquakes, fires, or even sabotage, and could result in substantial damage to the reactor core. Where there are inadequate means to achieve backup power in the event of a power failure, for example, that power failure could lead to a severe accident, as at Fukushima. Or where inadequate training allows operation of a reactor while auxiliary feed pumps are closed for maintenance, an error in the primary pumps can lead to a severe accident, as occurred at TMI. The mitigation alternatives NRDC has identified from the SAMA analyses for other BWRs are designed either to reduce the likelihood of severe accidents or to mitigate the severity of their consequences should they nonetheless occur, NRDC Decl. ¶¶ 16, and thus because, absent the waiver, Exelon will not be required to consider these measures, the waiver is plainly necessary to address significant environmental issues regarding cost-beneficial mitigation alternatives. *See also* NRDC Counsel Decl. ¶ 5.

## V. CONCLUSION

For the foregoing reasons NRDC respectfully requests that the Commission grant this waiver petition, and admit Contention 1E-1 and 1E2, as admitted by the ASLB, as well as that aspect of Contention 3E that concerns appropriate techniques to analyze SAMDAs, by waiving application of 10 C.F.R. § 51.53(c)(3)(ii)(L).

Respectfully Submitted,

s/ (electronically signed)

Howard M. Crystal  
Meyer Glitzenstein & Crystal  
1601 Connecticut Ave., N.W., Suite 700  
Washington, D.C. 20009  
(202) 588-5206  
[hcrystal@meyerglitz.com](mailto:hcrystal@meyerglitz.com)

s/ (electronically signed)

Anthony Z. Roisman  
National Legal Scholars Law Firm, P.C.  
241 Poverty Lane, Unit 1  
Lebanon, NH 03766  
603-443-4162  
[aroisman@nationallegalscholars.com](mailto:aroisman@nationallegalscholars.com)

s/(electronically signed)

Geoffrey H. Fettus  
Natural Resources Defense Council  
1152 15<sup>th</sup> Street, NW, Suite 300  
Washington, D.C. 20005  
202-289-2371  
[gfettus@nrdc.org](mailto:gfettus@nrdc.org)

Filed this date of November 21, 2012

## **CERTIFICATE OF SERVICE**

I hereby certify that copies of the foregoing PETITION, BY WAY OF MOTION, FOR WAIVER OF 10 C.F.R. § 51.53(c)(3)(ii)(L) AS APPLIED TO APPLICATION FOR RENEWAL OF LICENSES FOR LIMERICK UNITS 1 AND 2 and supporting documents in the captioned proceeding were served via the Electronic Information Exchange (EIE) on the 21 day of November 2012, which to the best of my knowledge resulted in transmittal of same to those on the EIE Service List for the captioned proceeding.

Chief Judge Roy Hawkens  
Atomic Safety and Licensing Board  
Mail Stop: T-3F23  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001  
[Roy.Hawkens@nrc.gov](mailto:Roy.Hawkens@nrc.gov)

U.S. Nuclear Regulatory Commission  
Office of the Secretary of the Commission  
Mail Stop: O-16C1  
Washington, DC 20555-0001  
[hearingdocket@nrc.gov](mailto:hearingdocket@nrc.gov)

U.S. Nuclear Regulatory Commission  
Office of Commission Appellate Adjudication  
Mail Stop: O-16C1  
Washington, DC 20555-0001  
[ocaamail@nrc.gov](mailto:ocaamail@nrc.gov)

Exelon Generation Company, LLC  
4300 Warrenville Road  
Warrenville, IL 60555  
J. Bradley Fewell, Deputy General Counsel  
[Bradley.Fewell@exeloncorp.com](mailto:Bradley.Fewell@exeloncorp.com)

Morgan, Lewis & Bockius LLP  
1111 Pennsylvania Avenue, N.W.  
Washington, DC 20004  
Alex S. Polonsky, Esq.  
[apolonsky@morganlewis.com](mailto:apolonsky@morganlewis.com)  
Kathryn M. Sutton, Esq.  
[ksutton@morganlewis.com](mailto:ksutton@morganlewis.com)  
Brooke E. Leach  
[bleach@morganlewis.com](mailto:bleach@morganlewis.com)

Office of the General Counsel  
U.S. Nuclear Regulatory Commission  
Mail Stop O-15D21  
Washington, DC 20555-0001  
[ogcmailcenter@nrc.gov](mailto:ogcmailcenter@nrc.gov)  
Catherine Kanatas  
[catherine.kanatas@nrc.gov](mailto:catherine.kanatas@nrc.gov)  
Brian Newell  
[brian.newell@nrc.gov](mailto:brian.newell@nrc.gov)  
Maxwell Smith  
[maxwell.smith@nrc.gov](mailto:maxwell.smith@nrc.gov)  
Mary Spencer  
[mary.spencer@nrc.gov](mailto:mary.spencer@nrc.gov)  
Ed Williamson  
[edward.williamson@nrc.gov](mailto:edward.williamson@nrc.gov)

/Signed (electronically) by/  
Geoffrey H. Fettus

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)	)	

(License Renewal Application)

**DECLARATION OF CHRISTOPHER J. WEAVER, Ph.D., ON BEHALF  
OF THE NATURAL RESOURCES DEFENSE COUNCIL IN SUPPORT OF MOTION  
FOR WAIVER**

**INTRODUCTION**

I, Christopher J. Weaver (CJW), declare that the following statements are true and correct to the best of my knowledge.<sup>1</sup>

1. (CJW) My name is Christopher J. Weaver. I received my Ph.D. in Nuclear Engineering from the University of Texas at Austin in May 2011. I am a Project Scientist in the Nuclear Program and Science Center Fellow at NRDC at its Washington, D.C. office. My curriculum vitae is provided in Attachment A.
2. (TBC, MGM, CJW) On June 22, 2011, the Nuclear Regulatory Commission (NRC) received a License Renewal Application (Exelon, 2011a) for Limerick Generating Station

---

<sup>1</sup> This Declaration incorporates by reference and includes specific portions of the previous Declaration filed on November 19<sup>th</sup> 2011 by myself, Thomas B. Cochran, Ph.D. (TBC) and Matthew G. McKinzie, Ph.D. (MGM) Portions of the previous declaration that are included but were primarily supported by either Dr. Cochran or Dr. McKinzie, are identified at the outset of each paragraph by the initials of the Declarant(s) who are offering the information contained in that paragraph.

(LGS or “Limerick”) Unit 1 and Unit 2 from the licensee, Exelon Generation Company, LLC (“Exelon”). The operating license for Unit 1 currently expires on October 26, 2024, and the operating license for Unit 2 currently expires on June 22, 2029 (Exelon, 2011a). The two nuclear power plant units at Limerick are General Electric Type 4 Boiling Water Reactors (BWR) with Mark II containment structures (Exelon, 2011a). Exelon seeks to extend the operating license of Unit 1 until the year 2044, and Unit 2 until the year 2049 (Exelon, 2011a).

3. (TBC, MGM, CJW) Exelon has submitted an Environmental Report (Exelon, 2011b) in conjunction with its License Renewal Application that does not include a Severe Accident Mitigation Alternatives (SAMA) analysis for Limerick. Exelon, citing 10 CFR 51.53(c)(3)(ii)(L) (Exelon, 2011b), claims that it is not required to prepare a SAMA analysis for License Renewal because the NRC staff had previously considered a Severe Accident Mitigation Design Alternatives (SAMDA) analysis in a Supplement (NRC, 1989) to the Limerick Final Environmental Statement (NRC, 1984). The Limerick Final Environmental Statement (FES) is dated April, 1984, and the Supplement to the Limerick FES (FES Supplement) is dated August 1989. Exelon adopts the 1989 SAMDA analysis as its SAMA analysis. Nonetheless, in its Environmental Report Exelon does recognize that at least four items of new information bear directly on the validity of the previous SAMDA analysis and offers their view as to why this new information is not significant – i.e. why it does not warrant modifying the 1989 SAMDA analysis results (Exelon, 2011b).
4. (TBC, MGM, CJW) In the context of the environmental review for License Renewal conducted consistent with the National Environmental Policy Act (NEPA), the NRC



considers new information significant if it presents a seriously different picture of the environmental impact of the proposed project from what was previously envisioned. We have found that new information in several areas is plausibly significant, including, of relevance here: 1) additional SAMA candidates analyzed for BWRs; 2) use of an up-to-date methodology for determining the costs and benefits of these additional SAMA candidates; and 3) economic consequences from accident scenarios at Limerick. Taken individually and especially in combination, this new information would plausibly cause a materially different result in the SAMA analysis for Limerick and render the SAMDA analysis upon which Exelon relies incomplete. These areas of new information are uniquely relevant to the Limerick facility because they are specific to the site where the Limerick facility is located and are specific to the previous SAMDA analysis done for the Limerick facility.

**THE LIMERICK FES SUPPLEMENT AND LICENSE RENEWAL APPLICATION ENVIRONMENTAL REPORT DO NOT CONSIDER A REASONABLY SUFFICIENT SET OF SAMA CANDIDATES**

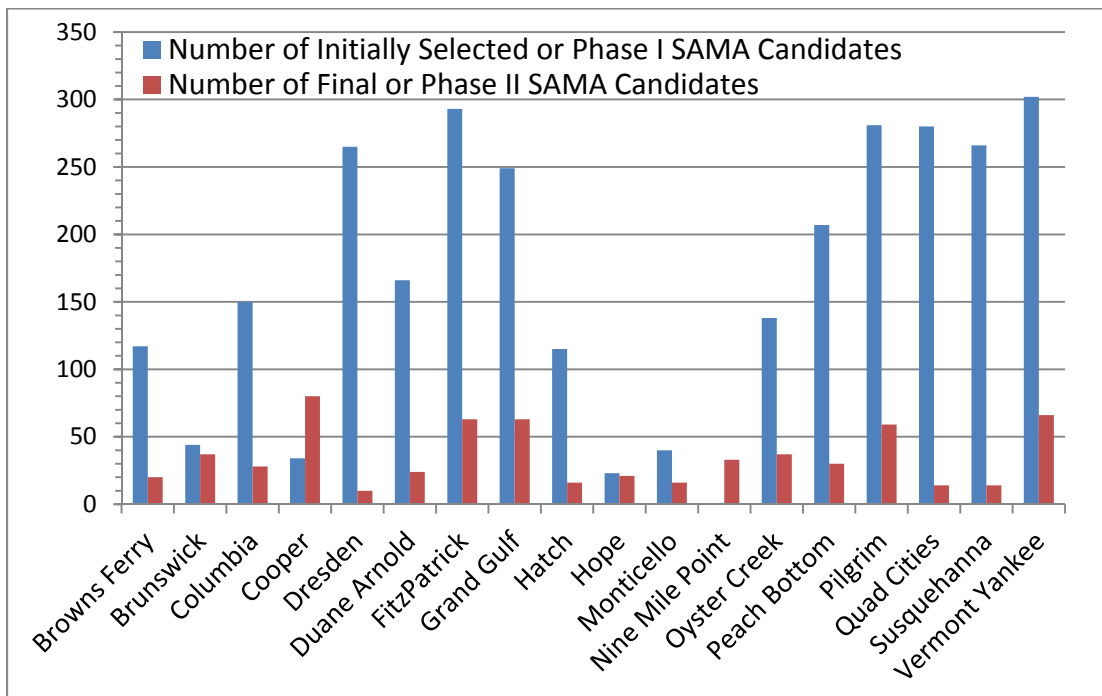
5. (MGM) In 1989, in *Limerick Ecology Action v. NRC*, the 3rd Circuit ruled that in the absence of an NRC finding that severe accidents are remote and speculative, the cost-benefits of severe accident mitigation design alternatives (SAMDA, currently termed SAMAs) should be considered as part of the NEPA analysis. As a direct consequence of this ruling, eight SAMDA candidates were initially considered in the Limerick FES Supplement, and seven final SAMDA candidates given a cost-benefit analysis with respect to person-rem averted (NRC, 1989). However two of these SAMDA candidates had already been implemented at Limerick at that time – the “Decay Heat Sized Vent Without Filter” and the “Low Pressure Reactor Makeup Capability” – and therefore in the FES Supplement the NRC noted that its staff “has not quantified the effectiveness of

these SAMDAs in reducing risk.” (NRC, 1989). Therefore the Limerick FES Supplement in effect considered only five SAMDA candidates.

6. (MGM) In the Limerick FES Supplement, the NRC staff determined that “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.” (NRC, 1989). In making this determination, the NRC staff in effect disregarded the SAMDA analysis in the FES Supplement due to forthcoming new and significant information: information which the NRC had not verified, and information for which the impacts on NRC’s calculations were not precisely determined.
7. (MGM) Subsequent to the 1989 Limerick FES Supplement, industry lessons learned and NRC studies have produced a large set of SAMA candidates that have been analyzed for License Renewal applications in accordance with NEPA. In contrast to the Limerick FES Supplement, the cohort of 27 U.S. BWR units at 18 sites undergoing license renewal reviews, or that have recently been granted license renewal, have on average considered 175 Phase I SAMA candidates and 35 Phase II SAMA candidates (Constellation Energy, 2004; Energy Northwest, 2010; Entergy 2006a; Entergy 2006b; Entergy 2006c; Entergy, 2011; Exelon, 2001; Exelon, 2003a; Exelon, 2003b; Exelon, 2005; Florida Power and Light, 2008; Nebraska Public Power District, 2008; Progress Energy, 2004; PSEG Nuclear, 2009; Southern Nuclear Operating Company, 2000; Susquehanna, 2006;

Tennessee Valley Authority. 2003; Xcel Energy Corporation, 2005). This data is displayed graphically in Figure 1 for these BWR SAMA analyses.

8. Figure 1: A chart of the numbers of Initially-Selected or Phase I, and Final or Phase II SAMA candidates analyzed with respect to License Renewal for U.S. BWRs .



9. (MGM) In my review of these 18 SAMA analyses conducted for BWR License Renewal Applications, the list of initial or Phase I SAMA candidates were developed by applicants both through examining industry documents and by considering plant-specific enhancements. These industry documents were a product of industry lessons learned covering the time period subsequent to the 1989 Limerick FES, and in addition include SAMA candidates from the Individual Plant Examination (IPE) and Individual Plant Examination of External Events (IPEEE) processes. These resources constitute new and significant information post-dating the Limerick FES Supplement. Limerick is unique in that it alone, among all the BWR's seeking or obtaining license renewal, has not conducted a systematic consideration of the cost and benefits of these additional mitigation alternatives,

using the most up-to-date methodology, as part of its license renewal application. Without such a systematic analysis it is not possible to determine which, if any, of these additional mitigation alternatives would be cost-beneficial alternatives to Exelon's now proposed license renewal for Limerick.

10. (MGM) The 18 SAMA analyses conducted for BWR License Renewal Applications which I reviewed include numerous examples of SAMA candidates for BWR technology that have been determined to be cost-beneficial or potentially cost-beneficial in Phase II of the SAMA candidate evaluations. Table 1 lists cost-beneficial or potentially cost-beneficial SAMA candidates from my review. Examples of or cost-beneficial SAMA candidates for Susquehanna, a GE Type 4 BWR with Mark II containment similar to Limerick Unit 1 and Unit 2, include: "Improve Cross-Tie Capability Between 4kV AC Emergency Buses (A-D, B-C)" and "Procure Spare 480V AC Portable Station Generator" (Susquehanna, 2006). These SAMA candidates were not considered in the Limerick FES Supplement (NRC, 1989). Of the SAMA analyses I surveyed for BWRs, on average four cost-beneficial or potentially cost-beneficial SAMAs were found for each site, with a maximum of 11 cost-beneficial or potentially cost-beneficial SAMAs. Browns Ferry, Nine Mile Point and Peach Bottom had no cost-beneficial or potentially cost-beneficial SAMA candidates identified. Whether any of these cost-beneficial mitigation alternatives would be cost-beneficial at Limerick has not been determined, or even considered, in Exelon's Environmental Report.

11. (MGM) Table 1: SAMA candidates that were found to be cost-beneficial or potentially cost-beneficial in BWR applications for license renewal. (Constellation Energy, 2004; Energy Northwest, 2010; Entergy 2006a; Entergy 2006b; Entergy 2006c; Entergy, 2011; Exelon, 2001; Exelon, 2003a; Exelon, 2003b; Exelon, 2005; Florida Power and Light,

2008; Nebraska Public Power District, 2008; Progress Energy, 2004; PSEG Nuclear, 2009; Southern Nuclear Operating Company, 2000; Susquehanna, 2006; Tennessee Valley Authority. 2003; Xcel Energy Corporation, 2005).

Nuclear Power Plant	Number of Cost-Beneficial or Potentially Cost-Beneficial SAMAs and List of Titles of SAMAs Found to be Cost-Beneficial or Potentially Cost-Beneficial	
Brunswick	7	Portable DC generator; Diverse EDG HVAC logic; Provide alternate feeds to panels supplied only by DC bus 2A-1; Provide an alternate means of supplying the instrument air header; Proceduralize battery charger high voltage shutdown circuit inhibit; Portable EDG fuel oil transfer pump; Use fire water as a backup for containment spray
Columbia	3	Reduce CCFs between EDG-3 and EDG1/2; Improve the fire resistance of cables to the containment vent valve; Improve the fire resistance of cables to transformer E-TR-S

Nuclear Power Plant	Number of Cost-Beneficial or Potentially Cost-Beneficial SAMAs and List of Titles of SAMAs Found to be Cost-Beneficial or Potentially Cost-Beneficial	
Cooper	11	Portable generator for DC power to supply the individual panels; Revise procedure to allow bypass of RCIC turbine exhaust pressure trip; Improve training on alternate injection via FPS; Revise procedures to allow manual alignment of the fire water system to RHR heat exchangers; Proceduralize the ability to crossconnect the circulating water pumps and the service water going to the TEC heat exchangers; Create ability for emergency connection of existing or new water sources to feedwater and condensate systems; Operator procedure revisions to provide additional space cooling to the EDG room via the use of portable equipment; Provide an alternate means of supplying the instrument air header; Proceduralize the use of a fire pumper truck to pressurize the fire water system; Generation Risk Assessment implementation into plant activities; Modify procedures to allow use of the RHRSW system without a SWBP
Duane Arnold	2	Provide an alternate source of water for the RHRSW/ESW pit; Increase the reliability of the low pressure ECCS RPV low pressure permissive circuitry. Install manual bypass of low pressure permissive
Grand Gulf	3	Procedural change to cross-tie open cycle cooling system to enhance containment spray system; Enhance procedures to refill CST from demineralized water or service water system; Increase operator training for alternating operation of the low pressure ECCS pumps (LPCI and LPCS) for loss of SSW scenarios.
Monticello	6	Enhanced DC Power Availability (provide cables from DG-13, the security diesel, or another source to directly power division II 250V battery chargers or other required loads); Enhance Alternate Injection Reliability (include the RHRSW and FSW valves in the maintenance testing program); Additional Diesel Fire Pump for FSW system (proceduralize the use of a fire truck to pressurize and provide flow to the fire main for RPV injection); Refill CST (develop emergency procedures and ensure viability of refilling the CSTs with FSW); Divert Water from Turbine Building 931-foot elevation; Manual RCIC Operation
Oyster Creek	7	Allow 4160 VAC bus IC and ID crosstie; Provide an alternate method for IC shell level determination; Portable DC battery charger to preserve IC and EMRV operability along with adequate instrumentation; Reduce fire impact in dominant fire areas; Operator Training; Protect Combustion Turbines; Upgrade Fire Pump House structural integrity
Pilgrim	5	Enhance procedures to make use of AC bus cross-ties; Enhance procedures to make use of DC bus cross-ties; Provide redundant DC power supplies to DTV valves; Proceduralize use of the diesel fire pump hydro turbine in the event of EDG A failure or unavailability; Proceduralize the operator action to feed B1 loads via B3 When A5 is unavailable posttrip Similarly, feed B2 loads via B4 when A6 is unavailable post trip
Susquehanna	2	Improve Cross-Tie Capability Between 4kV AC Emergency Buses (A-D, B-C); Procure Spare 480V AC Portable Station Generator
Vermont Yankee	3	Shield injection system electrical equipment from potential water spray; Improve operator action: Defeat low reactor pressure interlocks to open LPCI or core spray injection valves during transients with stuck open SRVs or LOCAs in which random failures prevent all low pressure injection valves from opening; Install a bypass switch to bypass the low reactor pressure interlocks of LPCI or core spray injection valve

12. (CJW) In addition to these currently-documented SAMAs, there are technological options that should plausibly be reviewed as SAMA candidates for Limerick due to the fact that they address issues related to prolonged station blackout (SBO) and improvement to safety-related systems. One possible SAMA candidate is to replace the emergency DC-powered valve actuators and speed controls for the steam-driven Safety-Related Turbines with a self-powered digital speed control and electrically-actuated valve-control system. This SAMA candidate would allow critical emergency core cooling pumps to run for days under SBO conditions. Another plausible SAMA candidate for Limerick relates to a concern raised in a recent Government Accountability Office report, that industry has limited ability to measure changes in safety-related pipe wall thickness caused by corrosion and located underground without costly excavation (GAO, 2011). To address this issue, nuclear plant operators could employ the use of non-destructive inspection techniques such as robotic crawlers that can navigate complex geometries to perform in-line pipe inspection. This SAMA candidate can potentially provide quantitative analysis without the need for expensive surface preparations.
13. (MGM) The Limerick Environmental Report for its License Renewal Application does not remedy the absence of SAMA candidates analyzed in the FES Supplement. Foremost this is because a new SAMA analysis for Limerick was not performed in support of license renewal using a set of SAMA candidates derived from new and significant information acquired by industry and by the NRC since 1989. The additional SAMA candidates, if properly evaluated, would be specific to the Limerick facility using a site-

specific methodology, such as one employing the use of MELCOR Accident Consequence Code Systems (MACCS2).

#### **THE LIMERICK FES SUPPLEMENT AND LICENSE RENEWAL APPLICATION ENVIRONMENTAL REPORT RELY ON INCORRECT DEMOGRAPHIC DATA**

14. (MGM) The cost- benefit ratios calculated in the 1989 SAMDA analysis rely on population data for the 50-mile zone around Limerick derived from 1980 census data (Exelon, 2011b). The 1984 FES stated that the area within 10 miles of Limerick experienced a decrease in population of 4.2% from 1970 to 1980, and the area with within 50 miles experienced a decrease in population of less than 0.2% between 1970 and 1980. Noting this trend, the NRC staff remarked that "...the area has not experienced—nor is it likely to experience—the growth anticipated." (NRC, 1984).
15. (MGM) By contrast, data from the 1990 Census, the 2000 Census, and the 2010 Census does show a substantial growth in population in the 10-mile and in the 50-mile zones around Limerick over the last thirty years. Census data for 1990, 2000 and 2010 were analyzed using ESRI ArcGIS 10 Geographic Information Systems (GIS) software, summing the total population in each census tract intersecting the 10-mile or 50-mile zones around Limerick (Census Bureau, 1990; Census Bureau, 2000; Census Bureau, 2011). The results of this GIS analysis can be seen in Table 2. By 1990, the Census population within the 10-mile zone already exceeded the year 2000 projection in the Limerick Final Environmental Statement by 40 percent. The 2010 Census population within the 10-mile zone is more than 200 percent of the 1980 value used in the Limerick SAMDA study. The 2010 Census population within the 50-mile zone around Limerick is 21 percent larger than the 1980 population used in the Limerick SAMDA analysis.



16. (MGM) Table 2: Census population data for 1990, 2000 and 2010 analyzed for the 10-mile and 50-mile zones around Limerick (Census Bureau, 1990; Census Bureau, 2000; Census Bureau, 2011) and projected to the years 2030 and 2049, and population data used in the 1984 Final Environmental Impact Statement (NRC, 1984).

	<b>10-Mile Zone around Limerick</b>	<b>50-Mile Zone around Limerick</b>
<b>1980 Population (1984 Limerick FES)</b>	156,354 People	6,863,983 People
<b>2000 Population (1984 Limerick FES)</b>	158,607 People	7,253,880 People
<b>1990 Population (U.S. Census)</b>	221,701 People	7,334,214 People
<b>2000 Population (U.S. Census)</b>	251,287 People	7,751,181 People
<b>2010 Population (U.S. Census)</b>	318,582 People	8,300,122 People
<b><i>Calculated Average Annual Population Growth Rate (1990-2010)</i></b>	<i>4,844 People per Year</i>	<i>48,295 People per Year</i>
<b>2030 Projected Population</b>	415,463 People	9,266,030 People
<b>2049 Projected Population</b>	507,500 People	10,183,643 People

## **THE LIMERICK FES SUPPLEMENT AND LICENSE RENEWAL APPLICATION ENVIRONMENTAL REPORT FAIL TO CONSIDER OFF-SITE ECONOMIC COST RISKS**

17. (MGM) Exelon confirms in the Limerick Environmental Report that the SAMDA analysis in the 1989 FES Supplement did not compute cost- benefit values for SAMDA candidates with respect to their reduction in land contamination subject to long-term interdiction, or the reduction in associated economic cost, from a severe accident (Exelon, 2011b). Economic cost risk calculations are now a codified component of SAMA cost- benefit assessments and have been performed as an integral part of other License Renewal Applications submitted to the NRC. New information pertaining to economic risk could plausibly cause materially different results in the assessment of impacts of an accident at Limerick, and materially different cost- benefit results in a new

SAMA analysis for Limerick. The proximity of Limerick to the city of Philadelphia, with substantial economic activities and assets, reinforces this conclusion.

18. (MGM) The Limerick Environmental Report for its License Renewal Application does not remedy the lack of economic risk assessment in the 1989 SAMDA study. Principally this is because a new SAMA analysis for Limerick was not performed in support of license renewal including economic cost risk. But in addition, the licensee commits errors in the 2011 Environmental Report in an effort to claim that economic risk is not significant new information.
19. (MGM) In its 2011 Environmental Report, the licensee claims that the economic cost of a severe accident at Limerick “can be estimated using information from other license renewal applications.” The example of Three Mile Island Nuclear (TMI) Station Unit 1 Environmental Report for License Renewal is cited, and the licensee argues that the Three Mile Island finding that economic cost risk is 70% larger than the off-site exposure cost risk is representative (Exelon, 2011b). This argument is incorrect: an examination of 18 SAMA analyses performed in support of License Renewal Applications for BWR shows that the ratio of economic cost risk to exposure cost risk exhibits a wide variation, as shown by example in Table 3. Claiming that economic cost risk simply scales with the exposure cost risk assumes that economic productivity and assets scale with population density, which may not be true when considering low-income communities, for example North Philadelphia. TMI is also an inappropriate example to use in estimating the economic risk for Limerick because TMI is a Pressurized Water Reactor (PWR) rather than a BWR, with correspondingly different accident scenario source terms, and

Harrisburg near TMI is smaller and less urban economic center than Philadelphia near Limerick.

20. (MGM) Table 3: A comparison of dose risk cost and economic risk cost for selected SAMA performed for BWR License Renewal Applications (Exelon, 2003a; Entergy, 2011; PSEG Nuclear, 2009; Constellation Energy, 2004; Exelon, 2005; Entergy, 2006b; Exelon, 2003b; AmerGen, 2008).

<b>Nuclear Plant</b>	<b>Weighted Population Dose Risk (person- rem/year)</b>	<b>Weighted Population Dose Risk Cost (\$/year)</b>	<b>Offsite Economic Risk Cost (\$/year)</b>	<b>Percentage Change in Off-Site Economic Cost over Off-Site Economic Exposure Cost</b>
Dresden	10.23	\$20,460.00	\$18,408.00	-10.0%
Grand Gulf	0.486	\$972.00	\$1,240.00	+27.6%
Hope Creek	22.9	\$45,800.00	\$155,000.00	+238.4%
Nine Mile Point Unit 1	22.5	\$45,000.00	\$86,000.00	+91.1%
Nine Mile Point Unit 2	50.9	\$101,800.00	\$125,000.00	+22.8%
Oyster Creek	36	\$72,000.00	\$118,000.00	+63.9%
Pilgrim	13.6	\$27,200.00	\$45,900.00	+68.8%
Quad Cities	1.67	\$3,340.00	\$2,806.87	-16.0%
Three Mile Island Unit 1	32.61	\$65,220.00	\$112,259.00	+72.1%

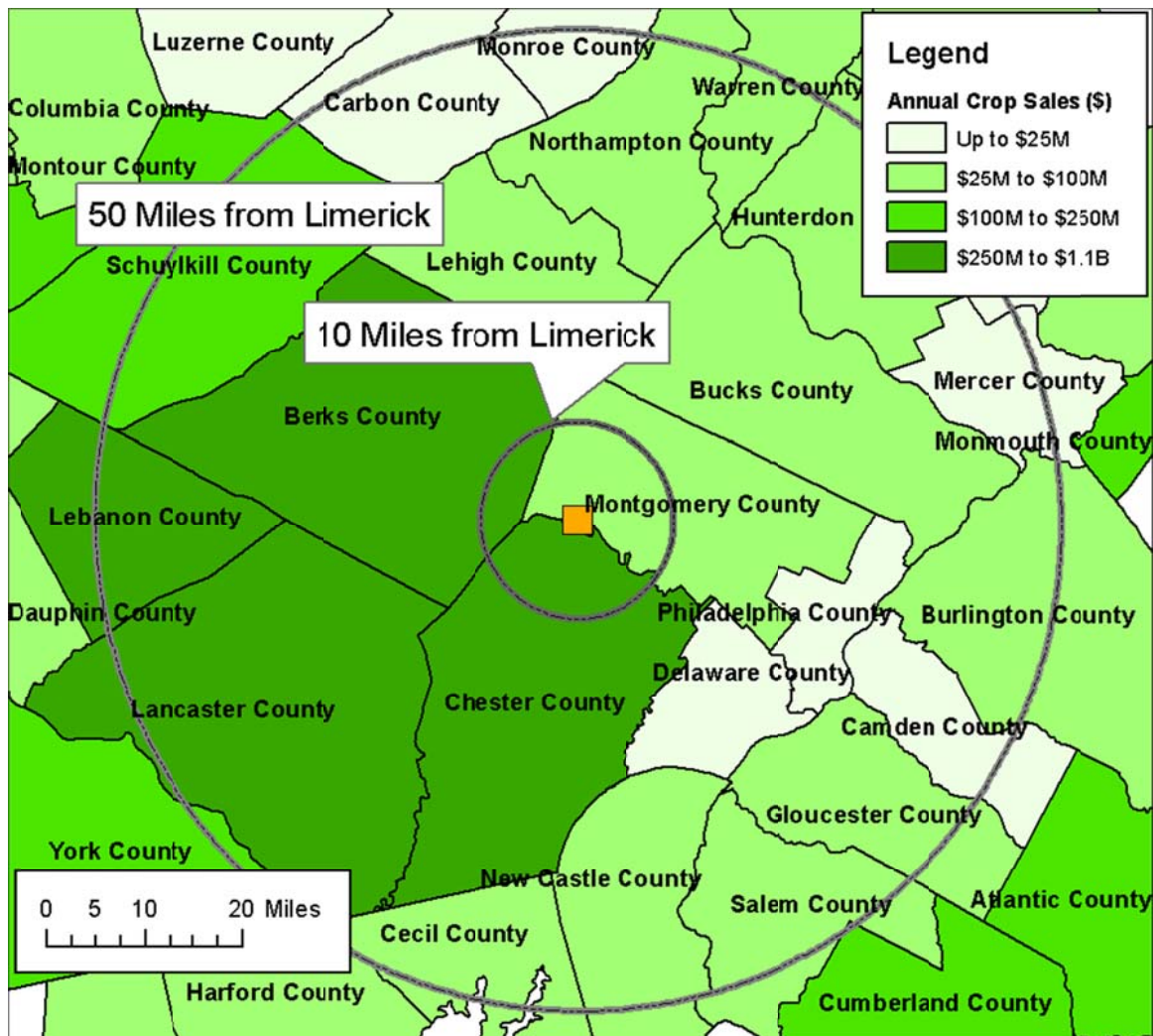
21. (MGM) Economic risk to the east of Limerick is dominated by the economic productivity of the city of Philadelphia and its surrounding region. The 2010 gross domestic product for all industries in the Philadelphia-Camden-Wilmington Metropolitan Statistical Area which lies within the Limerick 50-mile zone was computed to be \$347 billion, or more precisely \$346,932,000,000.00 (Bureau of Economic Analysis, 2011). Personal income summaries for the 23 counties in Delaware, Maryland, New Jersey and Pennsylvania which substantially overlap the 50-mile zone around Limerick is given in Table 4 (Bureau of Economic Analysis, 2011). The sum of 2009 personal income in the three Pennsylvania counties that overlap the 10-mile EPZ is approximately \$93 billion, and the

sum of 2009 personal income in all of the counties that substantially overlap the 50-mile zone around Limerick is approximately \$497 billion.

22. (MGM) Table 4: Personal income in dollars for the year 2009 summed for the indicated county (Bureau of Economic Analysis, 2011).

County Name, State	2009 Personal Income Summed by County
<b>Counties Overlapping the Limerick 10-mile EPZ</b>	
Berks County, PA	\$14,793,423,000.00
Chester County, PA	\$28,453,609,000.00
Montgomery County , PA	\$49,654,050,000.00
<b>Total in Counties Overlapping 10-mile EPZ</b>	<b>\$92,901,082,000.00</b>
<b>Counties Outside the Limerick 10-mile EPZ and Overlapping the 50-mile zone</b>	
Bucks County, PA	\$31,862,647,000.00
Carbon County, PA	\$2,007,062,000.00
Delaware County, PA	\$27,524,171,000.00
Lancaster County, PA	\$18,450,403,000.00
Lebanon County, PA	\$4,809,208,000.00
Lehigh County, PA	\$13,586,500,000.00
Monroe County, PA	\$5,298,681,000.00
Northampton County, PA	\$11,152,782,000.00
Philadelphia County, PA	\$54,125,507,000.00
Schuylkill County, PA	\$4,569,375,000.00
<b>Total Pennsylvania</b>	<b>\$359,188,500,000.00</b>
New Castle County, DE	\$23,500,800,000.00
<b>Total Delaware</b>	<b>\$23,500,800,000.00</b>
Cecil County, MD	\$3,715,479,000.00
<b>Total Maryland</b>	<b>\$3,715,479,000.00</b>
Burlington County, NJ	\$20,751,126,000.00
Camden County, NJ	\$21,379,186,000.00
Gloucester County, NJ	\$11,478,111,000.00
Hunterdon County, NJ	\$8,497,001,000.00
Mercer County, NJ	\$19,024,257,000.00
Salem County, NJ	\$2,541,629,000.00
Somerset County, NJ	\$22,679,780,000.00
Warren County, NJ	\$4,673,941,000.00
<b>Total New Jersey</b>	<b>\$111,025,031,000.00</b>
<b>Total</b>	<b>\$497,429,810,000.00</b>

23. (MGM) Agriculture is an important component to the economic risk to the west of Limerick has. As an example of data pertinent to determining economic risk that is absent from the Limerick FES Supplement but found universally in SAMA analyses conducted for other BWR License Renewal Applications, I have displayed U.S. Bureau of Agriculture statistics on crop sales by county within the 50-mile zone around Limerick in Figure 2 (USDA, 2011). As can be seen in this figure, Lancaster County to the southwest of Limerick had over \$1 billion in crop sales in 2007, Chester Counties had about one-half billion dollars in crop sales in 2007, and Berks County had about \$400 million in crops sales in 2007 (USDA, 2011).
24. (MGM) Figure 2: US Bureau of Agriculture data on annual crop sales in the area surrounding Limerick in 2007 (USDA, 2011).



**SUMMARY: NEW AND SIGNIFICANT INFORMATION COULD MATERIALLY ALTER THE ASSESSMENT OF IMPACTS OF A SEVERE ACCIDENT AND THE COST-BENEFIT RESULTS OF MITIGATION ALTERNATIVES AT LIMERICK, INCLUDING NEW SAMA CANDIDATES**

25. (TBC, MGM, CJW) A SAMA analysis entails five main steps: (1) the establishment of the baseline consequences of a severe accident, including off-site exposure costs and off-site economic costs; (2) the identification of SAMA candidates; (3) preliminary or Phase I screening of SAMA candidates; (4) final or Phase II Screening and cost-benefit evaluation of SAMA candidates; and (5) sensitivity analysis. We find that the Limerick

FES Supplement is inadequate regarding all five steps of the SAMA analysis process. Building on industry lessons learned and NRC studies, hundreds of SAMA candidates have been identified for BWRs since the Limerick FES Supplement was published in 1989, and numerous SAMA candidates for BWRs have been analyzed to be cost-beneficial or potentially cost-beneficial in reducing risk. The Limerick FES Supplement neglects to calculate economic costs entirely. A sensitivity analysis was not performed in the FES Supplement. These problems are not remedied in the 2011 Limerick Environmental Report. The Commission has already recognized in its regulations governing environmental analyses for license renewal that all SAMA analyses are inherently site specific Category 2 issues which cannot be addressed generically. 10 C.F.R. Part 51, Subpart A, Appendix B. Thus, the failures in the 1989 SAMDA analysis are also inherently site specific failures that can only be remedied by site-specific reanalysis.

26. (TBC, MGM, CJW) Our review of 18 SAMA analyses prepared by other BWR License Renewal applicants demonstrate that accurate site-specific data leads to results pertinent to individual cases. For example, the SAMA analysis for Hatch concluded that: “The area surrounding HNP is predominantly agricultural and forested land with sparse population. As a result, the baseline risk of the plant is low both for population doses and economic risk. This limits the potential averted risk from any severe accident modifications.” (Southern Nuclear Operating Company, 2000). Limerick represents an opposite extreme case from Hatch, as Limerick is located in an area of high population density and high economic productivity. We have found that new information in two areas – 1) additional SAMA candidates analyzed for BWRs; 2) economic consequences from accident scenarios at Limerick– are plausibly significant. Taken individually and in combination,

this new information would plausibly cause a materially different result in the SAMA analysis for Limerick.

Pursuant to 28 U.S.C. § 1746, I declare that the foregoing is true and correct to the best of my knowledge, information and belief, and that this declaration was executed in Washington, DC on November 21, 2012.

/s/ Dr. Christopher J. Weaver (electronic signature approved)



## References

AmerGen Energy Company, LLC (AmerGen). 2008. Applicant's Environmental Report – Operating License Renewal Stage: Three Mile Island Nuclear Station Unit 1, Appendix E – Severe Accident Mitigation Alternatives Analysis. U.S. NRC Docket No. 50-289.

Bureau of Economic Analysis. 2011. Regional gross domestic product and personal income data was downloaded from the U.S. Department of Commerce Bureau of Economic Analysis website (<http://www.bea.gov>).

U.S. Department of Agriculture (USDA). 2011. National Agricultural Statistics Service webpage (<http://quickstats.nass.usda.gov/>).

U.S. Census Bureau (Census Bureau). 1990. Population totals by census tract from the 1990 Census were downloaded from the Center for Disease Control and Prevention 1990 Census data website (<http://www2.cdc.gov/nceh/lead/census90/house11/download.htm>). GIS data for the 1990 Census Tract boundary polygons were obtained from the U.S. Census Bureau's Census 1990:Census Tract Cartographic Boundary Files website (<http://www.census.gov/geo/www/cob/tr1990.html>).

U.S. Census Bureau (Census Bureau). 2000. Population totals by census tract from the 2000 Census were downloaded from the Census Bureau's American Factfinder webpage (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>) for the states of Delaware, Maryland, New Jersey and Pennsylvania. GIS data for the 2000 Census Tract boundary polygons were obtained from the U.S. Census Bureau's Census 2000:Census Tract Cartographic Boundary Files website (<http://www.census.gov/geo/www/cob/tr2000.html>).

U.S. Census Bureau (Census Bureau). 2011. Population totals by census tract from the 2010 Census were downloaded from the Census Bureau's American Factfinder webpage (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>) for the states of Delaware, Maryland, New Jersey and Pennsylvania. GIS data for 2010 Census tract boundary polygons were obtained from the U.S. Census Bureau's 2010 Tiger/Line Shapefile webpage (<http://www.census.gov/geo/www/tiger/tgrshp2010/tgrshp2010.html>).

U.S. Census Monitoring Board: Presidential Members (Census Monitoring Board). 2001. Final Report to Congress, September 1.

Constellation Energy. 2004. Applicant's Environmental Report – Operating License Renewal Stage: Nine Mile Point Nuclear Station Units 1 & 2, Appendix F – Severe Accident Mitigation Alternatives (SAMAs), June.

Energy Northwest. 2010. Columbia Generating Station License Renewal Application, Environmental Report, Attachment E: Severe Accident Mitigation Alternatives Analysis, January.

Entergy Nuclear FitzPatrick, LLC, and Entergy Nuclear Operations, Inc. (Entergy). 2006a. James A. FitzPatrick Nuclear Power Plant --- License Renewal Application, Appendix E: Applicant's Environmental Report, Operating License Renewal Stage, Appendix G: Severe Accident Mitigation Alternatives, August.

Entergy Nuclear Generation Company (Entergy). 2006b. Applicant's Environmental Report – Operating License Renewal Stage: Pilgrim Nuclear Power Station, Attachment E – Severe Accident Mitigation Alternatives, January.

Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc. (Entergy). 2006c. Vermont Yankee Nuclear Power Station Applicant's Environmental Report Operating License Renewal Stage, Environmental Report, Attachment E: Severe Accident Mitigation Alternatives Analysis, January.

Entergy Nuclear Generation Company (Entergy). 2011. Applicant's Environmental Report – Operating License Renewal Stage: Grand Gulf Nuclear Station Unit 1, Attachment E – Severe Accident Mitigation Alternatives Analysis, November.

Exelon Generation Company, LLC (Exelon). 2001. License Renewal Application, Peach Bottom Atomic Power Station, Appendix E - Environmental Report, Appendix G: Severe Accident Mitigation Alternatives.

Exelon Generation Company, LLC (Exelon). 2003a. License Renewal Application, Dresden Nuclear Power Station and Quad Cities Nuclear Power Station, Appendix E - Dresden Nuclear Power Station Environmental Report, Appendix F: SAMA Analysis, January.

Exelon Generation Company, LLC (Exelon). 2003b. License Renewal Application, Dresden Nuclear Power Station and Quad Cities Nuclear Power Station, Appendix F – Quad Cities Nuclear Power Station Environmental Report, Appendix F: SAMA Analysis, January.

Exelon Generation Company, LLC (Exelon). 2005. License Renewal Application, Oyster Creek Generating Station, Environmental Report, Appendix F: Severe Accident Mitigation Alternatives.

Exelon Generation Company, LLC (Exelon). 2011a. License Renewal Application, Limerick Generating Station Units 1 and 2, Facility Operating License Nos. NPF-39 and NPF-85, June.

Exelon Generation Company, LLC (Exelon). 2011b. Applicant's Environmental Report Operating License Renewal Stage, Limerick Generating Station, Units 1 and 2, Docket Numbers 50-352 and 50-353, License Numbers NPF-39 and NPF-85, June.

FirstEnergy Nuclear Operating Company (2010). Applicant's Environmental Report – Operating License Renewal Stage: Davis-Besse Nuclear Power Station Unit 1, Attachment E – Severe Accident Mitigation Alternatives Analysis.

Florida Power and Light. 2001. Applicant's Environmental Report – Operating License Renewal Stage: St. Lucie Units 1 & 2, Appendix E – Severe Accident Mitigation Alternatives.

Florida Power and Light. 2008. Applicant's Environmental Report – Operating License Renewal Stage, Duane Arnold Energy Center, Appendix F: SAMA Analysis, September.

Government Accountability Office (GAO). 2011. Report to Congressional Requesters. Nuclear Regulatory Commission: Oversight of Underground Piping Systems Commensurate with Risk, but Proactive Measures Could Help Address Future Leaks. GAO-11-563, June.

R.E. Luna, H.R. Yoshimura, M.S. Soo Hoo. 2008. Survey of Costs Arising from Potential Radionuclide Scattering Events. WM2008 Conference, February 24-28, 2008, Phoenix, AZ, February.

Nebraska Public Power District. 2008. Cooper Nuclear Station, License Renewal Application, Appendix E: Applicant's Environmental Report, Attachment E: Severe Accident Mitigation Alternatives Analysis, September.

NextEra Energy Seabrook, LLC (2010). Applicant's Environmental Report – Operating License Renewal Stage: Seabrook Station, Attachment F – Severe Accident Mitigation Alternatives. U.S. NRC Docket No. 50-443.

Nuclear Energy Institute (NEI). 2005. NEI-05-01, Rev. A., Severe Accident Mitigation Alternatives (SAMA) Analysis: Guidance Document.

U.S. Nuclear Regulatory Commission (NRC). 1984. Final Environmental Statement Related to the Operation of Limerick Generating Station, Units 1 and 2. Philadelphia Electric Company. Docket Nos. 50-352 and 50-353. Office of Nuclear Reactor Regulation. NUREG-0974. Washington, DC. April.

U.S. Nuclear Regulatory Commission (NRC). 1989. Final Environmental Statement Related to the Operation of Limerick Generating Station, Units 1 and 2. Philadelphia Electric Company. Docket Nos. 50-352 and 50-353. Office of Nuclear Reactor Regulation. NUREG-0974 Supplement. August.

U.S. Nuclear Regulatory Commission (NRC). 2002. Memorandum To: William D. Travers, Executive Director for Operations, From: Ashok C. Thadani, Director, Office of Nuclear Regulatory Research, Subject: Closeout of Generic Safety Issue 172, Multiple System Responses Program, January 22.

U.S. Nuclear Regulatory Commission (NRC). 1990. NUREG-1150, Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants, December.

U.S. Nuclear Regulatory Commission (NRC). 2007. Final License Renewal Interim Staff Guidance LR-ISG-2006-03: Staff Guidance for Preparing Severe Accident Mitigation Alternatives Analyses, August.

U.S. Nuclear Regulatory Commission (NRC). 2011a. Recommendations for Enhancing Reactor Safety in the 21<sup>st</sup> Century: The Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident, July 12.

U.S. Nuclear Regulatory Commission (NRC). 2011b. Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 203 to Facility Operating License No. NPF-39, and Amendment No. 165 to Facility Operating License No. NPF-85, Exelon Generation Company, LLC, Limerick Generating Station, Units 1 And 2, Docket Nos. 50-352 And 50-353, July 29.

Pacific Gas and Electric Company. 2009. Applicant's Environmental Report – Operating License Renewal Stage: Diablo Canyon Power Plant Units 1 & 2, Attachment F – Severe Accident Mitigation Alternatives Analysis.

PPL Susquehanna LLC (Susquehanna). 2006. Susquehanna Steam Electric Station Units 1 & 2 License Renewal Application, Environmental Report, Attachment E: Severe Accident Mitigation Alternatives.

Progress Energy. 2004. Brunswick Steam Electric Plant License Renewal Application, Environmental Report, Appendix F Severe Accident Mitigation Alternatives, October.

Progress Energy. 2008. Applicant's Environmental Report – Operating License Renewal Stage: Crystal River Unit 3, Appendix E – Severe Accident Mitigation Alternatives. U.S. NRC Docket No. 50-302.

PSEG Nuclear. 2009. Applicant's Environmental Report – Operating License Renewal Stage, Hope Creek Generating Station, Appendix E, SAMA Analysis, August.

James Shortle, David Abler, Seth Blumsack, Robert Crane, Zachary Kaufman, Marc McDill, Raymond Najjar, Richard Ready, Thorsten Wagener, and Denice Wardrop, Penn State - Pennsylvania Department of Environmental Protection. 2009. Pennsylvania Climate Impact Assessment, Report to the Department of Environmental Protection, June 29.

Southern Nuclear Operating Company. 2000. Licensing Renewal for the Edwin I. Hatch Nuclear Power Plant Units 1 and 2, Appendix D-Attachment F, Severe Accident Mitigation Alternatives, March.

Tennessee Valley Authority. 2003. Applicant's Environmental Report Operating License Renewal Stage Browns Ferry Nuclear Power Plant Units 1, 2, and 3, Appendix E –

Environmental Report, Attachment E-4, Severe Accident Mitigation Alternatives (SAMA) at the Browns Ferry Nuclear Plant, December.

Xcel Energy Corporation. 2005. Monticello Nuclear Generating Plant, Application for Renewed Operating License, Appendix E – Environmental Report, Attachment F: Severe Accident Mitigation Alternatives, March.

## EDUCATION

### **Ph.D., Mechanical Engineering – Nuclear & Radiation Engineering Program, May 2011**

University of Texas at Austin

### **Master of Science, Mechanical Engineering – Nuclear & Radiation Engineering Program, May 2008**

University of Texas at Austin

### **Bachelor of Science, Physics, December 2005**

Louisiana State University (Baton Rouge, LA)

## PROFESSIONAL EXPERIENCE

- **Natural Resources Defense Council (NRDC), Washington, D.C. (July 2011 – Present)**
  - Project Scientist – Nuclear Program
  - Science Center Fellow
- **University of Texas at Austin, Austin, TX (Sept 2006 – May 2011)**
  - Graduate Research Assistant

## RESEARCH EXPERIENCE

- **Nuclear Engineering Teaching Laboratory (NETL), UT Austin (Sept 2006 – May 2011)**
  - Developed PYRAMDS (Python for Radioisotope Analysis and Multi-Detector Suppression) code for the analysis of List Mode gamma detector data with a focus on fission product detection limit improvements through the use of a multi-detector system (Dissertation Research).
  - Developed an aerosol sampler to improve detection in nuclear explosion monitoring through the use of cascade impactors. Including design, manufacture, and performance characterization of said aerosol sampler as deliverables (Thesis Research).
  - Provided operational support during field tests for Signature Science, LLC (Austin, TX) to develop atmospheric aerosol samplers. Personal focus on the applicability of radioactive sample collection and analysis.
  - Co-developed research project proposing a hypothetical advanced fuel cycle partnership in Southeast Asia for presentation at GLOBAL 2009 (Paris, France).

Focus on fuel cycle simulation and economic analysis during steady-state environment.

- Conducted initial dissertation research at Argonne National Laboratory in Chicago, IL as part of a 10-week fellowship practicum. ORIGIN modeling of various reactor operational schemes for forensic signatures.
- Conducted environmental sample analysis via neutron activation analysis (NAA) on local fishes. Focus on heavy metal uptake in the liver and flesh of samples.
- Summer Student Laboratory - Taught/conducted various lab classes about radiation statistics and radioanalytical processes (spectroscopy, activation analysis).
- TA for various classes - Presented lectures, administered tests, and grading.
- **ALLEGRO Gravitational Wave Group, LSU (Jan 2003 – Dec 2005)**
  - Assisted with redesign and maintenance of vacuum and cryogenics systems (liquid helium, nitrogen).
  - Designed/built noise- and vibration-proof vacuum pump enclosures to reduce interference with the acoustically and seismically sensitive experiment apparatus.
  - Redesigned and coded research group website front end.
- **Experimental Condensed Matter and Superconductivity Group, LSU (Jan 2002 – Jan 2003)**
  - Repaired cryostat units for quantum phase transition measurements of silicon-based magnetic semiconductors.
  - Performed research duties such as sample preparation, including smelting, annealing, EDM sample cutting, polishing, and liquid helium & nitrogen transfers.

## CONFERENCE PRESENTATIONS

- “A Regional Advanced Fuel Cycle Partnership in Southeast Asia” – Sept 6 – 11, 2009  
GLOBAL 2009 Paris, France.
- “Assessment of non-traditional isotopic ratios by mass spectrometry for analysis of nuclear activities” – April 4 – 11, 2009  
MARC VIII Kona, Hawaii
- “Evaluation of Heavy Metal Uptake in Micropterus Salmoides (Largemouth Bass) of Lake Austin, TX by Neutron Activation Analysis” – April 4 – 11, 2009  
MARC VIII Kona, Hawaii
- “Design of Aerosol Sampler to Remove Radon and Thoron Progeny April 4 – 11, 2009

Interference from Aerosol Samples for Nuclear Explosion Monitoring”  
– MARC VIII Kona, Hawaii

- “Testing of Aerosol Sampler to Remove Radon and Thoron Progeny Interference from Aerosol Samples for Nuclear Explosion Monitoring,” 29<sup>th</sup> Monitoring Research Review (MRR 2007) Sept 26 – 28, 2007

## PUBLICATIONS

- B. Buchholz, S. Biegalski, S. Whitney, S. Tumey, J. Weaver “Basis for developing samarium AMS for fuel cycle analysis,” *Nucl. Instr. Meth. Phys. B* (2010) 268 p. 773-775 April 2010
- J. Weaver, S. R. F. Biegalski, B. A. Buchholz “Assessment of non-traditional isotopic ratios by mass spectrometry for analysis of nuclear activities,” *J Radioanal Nucl Chem.* (2009) 282 p. 709-713. Dec 2009
- J. Weaver, S. R. F. Biegalski, A. Brand, E. J. Artnak “Design of aerosol sampler to remove radon and thoron progeny interference from aerosol samples for nuclear explosion monitoring,” *J Radioanal Nucl Chem.* (2009) 282 p. 687-692. Dec 2009
- J. Weaver, W. H. Wilson, S. R. F. Biegalski, D. J. O’Kelly “Evaluation of heavy metal uptake in micropterus salmoides (Largemouth Bass) of Lake Austin, TX by neutron activation analysis,” *J Radioanal Nucl Chem.* (2009) 282 p. 443-447. Nov 2009
- S. Biegalski, J. Weaver, S. Waye, O. Ezekoye, and P. Hopke “Testing of Aerosol Sampler to Remove Radon and Thoron Progeny Interference from Aerosol Samples for Nuclear Explosion Monitoring,” 29<sup>th</sup> Monitoring Research Review (MRR 2007) *Proceedings*, Denver, CO, p. 719-728. Sept 26 – 28, 2007
- M. McHugh, W. Johnson, W. Hamilton, J. Hanson, I. Heng, D. McNeese, P. Miller, D. Nettles, J. Weaver, P. Zhang “Calibration of the ALLEGRO resonant detector,” *Class. Quantum Grav.* (2005) 22 p. S965-S973 Aug 2005



## ACTIVITIES & HONORS

- Nuclear Forensics Graduate Fellowship Recipient – U.S. Dept of Homeland Security Domestic Nuclear Detection Office (DNDO) Sept 2008 - Dec 2010
- President, American Nuclear Society – UT Austin Chapter June 2008 – July 2009
- George A. Heuer, Jr. Ph.D. Endowed Graduate Fellowship Recipient – UT Austin Fall/Spring 2007
- Victor L. Hand Endowed Scholarship Recipient – UT Austin Fall/Spring 2006

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)	)	

(License Renewal Application)

**DECLARATION OF GEOFFREY H. FETTUS, COUNSEL FOR  
THE NATURAL RESOURCES DEFENSE COUNCIL (NRDC),  
REGARDING WAIVER OF 10 C.F.R. § 51.53(c)(3)(ii)(L) AS APPLIED TO  
APPLICATION FOR RENEWAL OF LICENSES FOR LIMERICK UNITS 1 AND 2**

I, Geoffrey H. Fettus, counsel for NRDC in this matter, declare that the following statements are true and correct to the best of my knowledge.

1. For NRDC's contention 1E-1 (that Exelon has omitted from its Environmental Report a required analysis of new and significant information regarding potential new severe accident mitigation alternatives previously considered for other Boiling Water Reactor (BWR) Mark II Containment), the strict application of 10 C.F.R. § 51.53(c)(3)(ii)(L) would not serve the purposes for which the regulation was enacted. The purpose of the regulation was to preclude the need for an applicant to reconsider a specific mitigation alternative that had been considered in a prior severe accident mitigation design alternatives ("SAMDA") analysis. Where, as here, there is new and significant information concerning additional severe accident mitigation alternatives not previously considered, it would be contrary to the purposes of the regulation to conclude that the

new information need not be considered simply because an analysis was conducted in 1989 that addressed other mitigation alternatives.

2. For NRDC's Contention 1E-2 (Exelon's reliance on data from Three Mile Island ("TMI") in its analysis of the significance of new information regarding off-site economic costs constitutes an inadequate analysis of new and significant information), the strict application of 10 C.F.R. § 51.53(c)(3)(ii)(L) also would not serve the purposes for which the regulation was enacted. Again, the Contention does not seek to require Exelon to reconsider a specific mitigation alternative that was considered in 1989. Rather, the Contention, building on Contention 1E-1, challenges the Environmental Report's reliance on economic data from TMI (a reactor in a vastly different geographic setting) as a substitute for doing a site-specific analysis of the offsite economic impacts of a severe accident at Limerick and of the use of the TMI data to evaluate any new mitigation alternatives. It would be contrary to the purposes of the regulation to preclude consideration of the appropriate and site-specific economic analysis for newly identified potential mitigation alternatives simply because a severe accident analysis was conducted in 1989 that did not include any analysis of offsite economic consequences and did not consider any of the newly identified severe accident mitigation alternatives for Boiling Water Reactors (BWR).
3. For NRDC's Contention 3E (a legally sufficient analysis of newly identified severe accident mitigation alternatives for Limerick must utilize modern techniques for assessing whether alternatives are cost-beneficial), the strict application of 10 C.F.R. § 51.53(c)(3)(ii)(L) would not serve the purposes for which the regulation was enacted. This Contention contends that the 1989 SAMDA was legally deficient because it failed to

use a probabilistic safety assessment severe accident consequences code system comparable to the MELCOR Accident Consequence Codes Systems (“MACCS”) 2.

Through this Contention NRDC seeks to require Exelon and NRC Staff to use the more accurate and reliable methods available today for assessing the consequences of a severe accident, including economic consequences, and assessing the costs and benefits of the additional mitigation alternatives that are appropriate for BWRs – which has never been done for Limerick. Since the Contention does not seek to require Exelon to reconsider specific mitigation alternatives considered in 1989, it would also be contrary to the purposes of the regulation to preclude consideration of this issue.

4. There are also circumstances not considered in enacting 10 C.F.R. § 51.53(c)(3)(ii)(L), unique to Limerick, that warrant a waiver for the three contentions. Every other BWR nuclear power plant in the country that has undergone relicensing has conducted a SAMA analysis that has looked at a wide range of potential mitigation alternatives, evaluated offsite economic consequences and used the most up-to-date methodology for assessing the costs and benefits of potential mitigation alternatives. Absent the waiver sought here, the Limerick plant will be the only BWR that will be relicensed without the operator or NRC considering the most recent techniques, technologies, and economic considerations regarding severe accident mitigation alternatives. This was not contemplated when 10 C.F.R. § 51.53(c)(3)(ii)(L) was enacted. In addition, Exelon essentially acknowledged that new and significant information, including particularly new mitigation alternatives and new economic impacts analyses, need to be considered for purposes of relicensing. Thus, what is unique here is that the issue is not whether this new and significant information should be considered but whether Exelon has considered it properly. Finally,

of the three plants arguably covered by 10 C.F.R. § 51.53(c)(3)(ii)(L), only Limerick is a BWR, which further makes this application unique.

5. Finally, waiver of the regulation to allow consideration of these three Contentions is necessary to address a significant environmental issue. NRDC's Contentions concern how to best mitigate for "severe" accidents. During the life of a relicensed Limerick plant the surrounding population within 50 miles will grow to over 9 million people, including more than 400,000 people living within 10 miles of the site. It is vital that appropriate mitigation alternatives be considered to ameliorate the risks to these residents. NRC regulations require that, as part of the NEPA process, NRC must "[s]tate whether 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). Moreover, the alternatives NRDC contends Exelon must consider are all designed to address these risks, which is why they have been considered for other BWR plants.

s/electronic signature  
Geoffrey H. Fettus

Signed this 21<sup>st</sup> day of November, 2012