UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
NUCLEAR INNOVATION NORTH	)	
AMERICA LLC	)	Docket Nos. 52-012 & 52-013
	)	
(South Texas Project, Units 3 & 4)	)	

NRC STAFF INITIAL STATEMENT OF POSITION

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May 9, 2011

TABLE OF CONTENTS

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Pursuant to 10 C.F.R. §§ 2.337(g)(2) and 2.1207(a)(1), and the Licensing Board's Memorandum and Order (Establishing Schedule for Evidentiary Hearing) (March 11, 2011), the U.S. Nuclear Regulatory Commission staff ("Staff") submits its initial written statement of position with written testimony, supporting affidavits, and supporting exhibits, regarding the Intervenors' admitted contentions.[1] For the reasons discussed below and in the testimony filed herewith, the contentions are without merit and the Board should find in favor of the Staff.

BACKGROUND

On September 20, 2007, the Applicant,[2] pursuant to the Atomic Energy Act of 1954, as amended (AEA) and the Commission's regulations, submitted an application for combined licenses (COLs) for two Advanced Boiling Water Reactors (ABWRs) to be located adjacent to the existing South Texas Project, Units 1 and 2 near Bay City, Texas (Application). The

[1] Intervenors include the Sustainable Energy and Economic Development Coalition, the South Texas Association for Responsible Energy, and Public Citizen.

[2] On January 21, 2011, STP Nuclear Operating Company informed the Board that effective January 24, 2011, Nuclear Innovation North America LLC (NINA) will be the lead applicant for South Texas Project, Units 3 and 4. *See* South Texas Project Nuclear Operating Co. (South Texas Project Units 3 & 4), (LBP Feb. 7, 2011) (unpublished order). Throughout the pleading, the Staff will refer to the relevant lead applicant as "Applicant," whether that is STP Nuclear Operating Company or NINA.

Application references the ABWR design certification rule, which was issued based upon the design certification application submitted by General Electric Nuclear Energy (GE). *See* STP COL Application, Part 1, General and Financial Information, at 1.0-1 (Rev. 5) (Jan. 31, 2011) (ML110340538) (incorporating Appendix A to 10 C.F.R. Part 52 by reference). The proposed units are known as STP Units 3 and 4 (STP).

On April 21, 2009, the Intervenors filed an intervention petition. Petition for Intervention and Request for Hearing (Apr. 21, 2009) (Intervention Petition). On August 27, 2009, and September 29, 2009, the Board ruled on the Intervenors' proposed contentions, admitting Contentions 8, 9, 14, 16, and 21. *South Texas Project Nuclear Operating Co.* (South Texas Project Units 3 & 4), LBP-09-21, 70 NRC 581 (2009); *South Texas Project Nuclear Operating Co.* (South Texas Project Units 3 & 4), LBP-09-25, 70 NRC 867 (2009). Contention 21 stated that, "[i]mpacts from severe radiological accident scenarios on the operation of other units at the STP site have not been considered in the Environmental Report." Intervention Petition at 46.

On November 11, 2009, the Applicant notified the Board and the parties of an amendment to the Environmental Report (ER) relating to Contention 21. Letter from Stephen J. Burdick to Members of the Licensing Board, Notification of Filing Related to Contention 21, (Nov. 11, 2009). Attached to this letter was an Applicant submission to the NRC dated November 10, 2009, which contained an attached supplement to the ER in the form of a new ER Section 7.5S. Section 7.5S is now incorporated into the STP ER. *See* ER § 7.5S (Rev. 5) (Jan. 31, 2011) (ML110340945). Subsequently, the Applicant filed a motion to dismiss Contention 21 as moot. Applicant's Motion to Dismiss Contention 21 As Moot (Nov. 30, 2009) (Motion to Dismiss). In their answer to the Motion to Dismiss, the Intervenors proposed that Contention 21 be amended. Intervenors' Response to Applicant's Motion to Dismiss Contention 21 as Moot (Dec. 14, 2009). Additionally, the Intervenors filed four new contentions regarding co-location issues. Intervenors' Contentions Regarding Applicant's Proposed Revision to Environmental Report Section 7.5S and Request for Hearing (Dec. 22, 2009) (Co-location

Contentions). In support of proposed Contentions CL-2 to CL-4, the Intervenors attached a report by their expert titled "Review of Replacement Power Costs For Unaffected Units At the STP Site" (2009 Johnson Report). The Applicant and Staff opposed the admission of all of the new contentions. Applicant's Answer Opposing New and Revised Contentions Regarding Environmental Report Section 7.5S (Jan. 22, 2010); NRC Staff's Answer to the Intervenors' Amended and New Accident Contentions (Jan. 22, 2010).

Subsequently, on March 26, 2010, the Environmental Protection Agency (EPA) issued a notice of availability for NUREG-1937, "Draft Environmental Impact Statement for Combined Licenses (COLs) for South Texas Project Electric Generating Station Units 3 and 4," (DEIS).[3] Environmental Impacts Statements; Notice of Availability, 75 Fed. Reg. 14,594, 14,595 (Mar. 26, 2010). In response, the Intervenors filed six new contentions based on the DEIS. Intervenors' Motion for Leave to File New Contentions Based on the Draft Environmental Impact Statement (May 19, 2010) (DEIS Contentions). The Applicant and Staff opposed the admission of all of the new DEIS contentions. Applicant's Answer Opposing New Contentions Based on the Draft Environmental Impact Statement (June 14, 2010); NRC Staff's Answer to the Intervenors' Motion to File New Contentions Based on the Draft Environmental Impact Statement (June 14, 2010). The Intervenors filed a response addressing both the Applicant's and Staff's Answers. Intervenors' Consolidated Response to the Applicant's and Staff's Answers in Opposition to the Intervenors' Proposed Contentions Based on the Draft Environmental Impact Statement (June 21, 2010).

On July 2, 2010, the Board dismissed all of the formerly admitted contentions (Contentions 8, 9, 14, 16, and 21) as moot and denied all of the pending contentions on the ER

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[3] The DEIS is contained in two volumes. Volume 1 (ML100700327) provides coverage through Chapter 7. Volume 2 (ML100700333) provides coverage from Chapter 8 through Appendix J.

except for Co-location Contentions CL-2 to CL-4. *South Texas Project Nuclear Operating Co.* (South Texas Project Units 3 & 4), LBP-10-14, 72 NRC __ (July 2, 2010) (slip op.). The Board admitted, in part, Intervenors' Co-location Contentions CL-2, CL-3, and CL-4 and combined them into a single admitted Contention CL-2. *Id*. at __ (slip op. at 2). Contention CL-2 is stated as follows:

> The Applicant's calculation in ER Section 7.5S of replacement power costs in the event of a forced shutdown of multiple STP Units is erroneous because it underestimates replacement power costs and fails to consider disruptive impacts, including ERCOT market price spikes.

Id. at __ (slip op. at 30). Contention CL-2 challenges the Applicant's SAMDA analysis. *South Texas Project*, LBP-11-07, 73 NRC at __ (slip op. at 3).

On July 22, 2010, the Staff filed a motion for summary disposition of Contention CL-2. NRC Staff Motion for Summary Disposition (July 22, 2010). The Applicant supported the Staff Motion, but the Intervenors opposed it. STP Nuclear Operating Company's Answer Supporting the NRC Staff Motion for Summary Disposition of Contention CL-2 (July 29, 2010); Intervenors' Response to Staff Motion for Summary Disposition (Aug. 11, 2010).

On September 14, 2010, the Applicant filed a "Motion For Summary Disposition of Contention CL-2," urging the Board to grant summary disposition in its favor on grounds different from the Staff Motion. STP Nuclear Operating Company's Motion for Summary Disposition of Contention CL-2 (Sept. 14, 2010) (Applicant Summary Disposition Motion). Attached to the Applicant's motion was a "Statement of Material Facts on Which No Genuine Issue Exists in Support of STP Nuclear Operating Company's Motion for Summary Disposition of Contention CL-2" (Applicant Statement of Material Facts) and a "Joint Affidavit of Jeffrey L. Zimmerly and Adrian Pieniazek" (Applicant Affidavit). The Staff filed an answer supporting the Applicant's Summary Disposition Motion. NRC Staff Answer to Applicant's Motion for Summary Disposition of Contention CL-2 (Oct. 7, 2010). The Intervenors filed a response opposing the Applicant's Summary Disposition Motion. Intervenors' Response to Applicant's Motion for

Summary Disposition of Contention CL-2 (Oct. 8, 2010). Attached to the Intervenors' response was the "Intervenors' Response to Applicant's Statement of Facts Pursuant to 10 C.F.R. 2.710," and an "Affidavit in Response to Motion for Summary Disposition" by Clarence L. Johnson (2010 Johnson Affidavit).

Oral Argument on both motions was held on October 21, 2010. Subsequently, the Staff issued the STP Final EIS (FEIS). *See* NUREG-1937, "Environmental Impact Statement for Combined Licenses (COLs) for South Texas Project Electric Generating Station Units 3 and 4; Final Report," (Feb. 2011).[4] On February 28, 2011, the Board denied both the Applicant's and the Staff's motions for summary disposition of Contention CL-2. *South Texas Project*, LBP-11-07, 73 NRC __ (slip op.). Additionally, the Board rejected all proposed contentions on the DEIS, except for a need for power contention that the Board admitted as reformulated as Contention DEIS-1. *Id*. Contention DEIS-1 is stated as follows:

> NRC Staff's DEIS analysis of the need for power is incomplete because it fails to account for reduced demand caused by the adoption of an energy efficient building code in Texas, the implementation of which could significantly reduce peak demand in the ERCOT region.

Id. at __ (slip op. at 48).

On March 15, 2011, the Staff filed a petition for review of the Board's denial of the Staff Motion for Summary Disposition regarding Contention CL-2. NRC Staff Petition for Review of the Licensing Board's Decision in LBP-11-07 Denying the NRC Staff Motion for Summary Disposition (Mar. 15, 2011) (Staff Petition for Review). The Applicant filed an Answer supporting the Staff's Petition for Review. Applicant's Answer to NRC Staff Appeal of LBP-11-

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[4] The FEIS is contained in two volumes. Volume 1 (ML11049A000) contains the body of the FEIS. Volume 2 (ML11049A001) contains the Appendices. The EPA notice of availability was published on March 4, 2011. Environmental Impacts Statements; Notice of Availability, 76 Fed. Reg. 12,108, 12,108 (Mar. 4, 2011).

07 (Mar. 24, 2011). The Intervenors filed an Answer opposing the Staff's Petition for Review, and the Staff subsequently filed a Reply. Intervenors' Answer in Opposition to NRC Staff's Petition for Review of the Licensing Board's Decision in LBP-11-07 Denying NRC Staff Motion for Summary Disposition (Mar. 25, 2011); NRC Staff Brief Replying to Intervenors' Answer in Opposition to the NRC Staff's Petition for Review of LBP-11-07 (Mar. 30, 2011). The Staff Petition for Review is currently pending before the Commission.

DISCUSSION

I. Legal and Regulatory Requirements

The contentions at issue in this case all arise under the National Environmental Policy Act (NEPA), and the NRC's regulations that implement that statute. 42 U.S.C. §§ 4321 *et seq*; 10 C.F.R. Part 51. NEPA requires that an agency prepare an Environmental Impact Statement (EIS) before approving any major Federal action that will significantly affect the quality of the human environment. 42 U.S.C. § 4332(2)(C).

Under NEPA, the NRC is required to take a "hard look" at the environmental impacts of a proposed action, as well as reasonable alternatives to that action. *See Louisiana Energy Servs., L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 87-88 (1998). This "hard look" is tempered by a "rule of reason" that requires agencies to address only impacts that are reasonably foreseeable – not remote and speculative. *See, e.g., Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-156, 6 AEC 831, 836 (1973). "NEPA does not call for certainty or precision, but an *estimate* of anticipated (not unduly speculative) impacts." *Louisiana Energy Servs.* (National Enrichment Facility), CLI-05-20, 62 NRC 523, 536 (2005) (emphasis in original). Further, "NEPA gives agencies broad discretion to keep their inquiries within appropriate and manageable boundaries." *Louisiana Energy Servs., L.P.*, CLI-98-3, 47 NRC at 103 (citation omitted).

Generally, an Applicant has the burden of proof in a licensing proceeding. 10 C.F.R. § 2.325. In cases involving NEPA contentions, however, the burden shifts to the NRC, because

the NRC, not the Applicant, has the burden of complying with NEPA. *See, e.g., Duke Power Co.* (Catawba Nuclear Station, Units 1 & 2), CLI-83-19, 17 NRC 1041, 1049 (1983). However, because "the Staff, as a practical matter, relies heavily upon the Applicant's ER in preparing the EIS, should the Applicant become a proponent of a particular challenged position set forth in the EIS, the Applicant, as such a proponent, also has the burden on that matter." *Louisiana Energy Servs., L.P.* (Claiborne Enrichment Center), LBP-96-25, 44 NRC 331, 339 (1996), *rev'd on other grounds by Louisiana Energy Servs., L.P.* (Claiborne Enrichment Center) CLI-97-15, 46 NRC 294 (1997) (citing *Pub. Serv. Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-471, 7 NRC 477, 489 n.8 (1978)).

In challenging the Staff's environmental review, intervenors must identify, with some specificity, the alleged deficiencies in the Staff's NEPA analysis. *See Hydro Resources, Inc.* (2929 Coors Road, Suite 101, Albuquerque, NM 87120), CLI-99-22, 50 NRC 3, 13 (1999). While there may be mistakes in the EIS, mistakes that are not significant or material do not indicate that the Staff's NEPA review was inadequate. *See Exelon Generation Co.* (Early Site Permit for Clinton ESP Site), CLI-05-29, 62 NRC 801, 811 (2005) ("[I]n an NRC adjudication, it is Intervenors' burden to show the[] significance and materiality" of mistakes in the EIS). The Staff's NEPA analysis is adequate unless the Staff "has failed to take a 'hard look' at significant environmental questions – i.e., the Staff has unduly ignored or minimized pertinent environmental effects." *See Duke Energy Corp.* (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-03-17, 58 NRC 419, 431 (2003) (discussing what an intervenor must allege, with adequate support, to litigate a NEPA claim). As the Commission has stated, "'[o]ur Boards do not sit to "flyspeck" environmental documents or to add details or nuances. If the ER (or EIS) on its face "comes to grips with all important considerations" nothing more need be done.'" *Clinton ESP,* CLI-05-29, 62 NRC at 811 (quoting *Systems Energy Resources, Inc.* (Early Site Permit for Grand Gulf Site), CLI-05-4, 61 NRC 10, 13 (2005)).

Finally, "in an adjudicatory hearing, to the extent that any environmental findings by the Presiding Officer (or the Commission) differ from those in the FEIS, the FEIS is deemed modified by the decision." *Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-4, 53 NRC 31, 53 (2001). The hearing process serves the public participation purposes of NEPA because it allows for "'more rigorous public scrutiny'" of an EIS than ""circulation for comment."" *See id.* at 53 (quoting *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-819, 22 NRC 681, 707 (1985)).

II. Staff Witnesses

The "Prefiled Direct Testimony of Jessie M. Muir Sponsoring NUREG-1937 Into the Hearing Record" (Exhibit NRC000001), sponsors the introduction of the Staff's FEIS into the record of this proceeding as required by 10 C.F.R. § 2.337(g).[5] The remaining testimony presents the opinions of a panel of witnesses for each of the contentions. For Contention CL-2, the panel of witnesses is as follows: Richard L. Emch, Jr., Jeremy P. Rishel, and David M. Anderson. They have authored the "Prefiled Direct Testimony of Richard L. Emch, Jr., Jeremy P. Rishel, and David M. Anderson Regarding Contention CL-2." (Ex. NRC000004) (CL-2 Testimony). For Contention DEIS-1, the panel of witnesses is as follows: Daniel C. Mussatti and Dr. Michael J. Scott. They have authored the "Prefiled Direct Testimony of Daniel C. Mussatti and Dr. Michael J. Scott Regarding Contention DEIS-1." (Ex. NRC000031) (DEIS-1 Testimony).[6]

A. Staff Witnesses for Contention CL-2

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[5] Volume 1 (ML11049A000) and Volume 2 (ML11049A001) of the FEIS are contained in the following four exhibits: Ex. NRC00003A (Volume 1, through page 2-47), Ex. NRC00003B (Volume 1, from page 2-48 through the end of Chapter 2), Ex. NRC00003C (Volume 1, from Chapter 3 through the end of Volume 1), Ex. NRC00003D (Volume 2).

[6] The Staff's testimony is also supported by numerous exhibits. The list of Staff exhibits (from NRC000001 to NRC000057) is contained in Staff Attachment 1.

Richard L. Emch, Jr., Jeremy P. Rishel, and David M. Anderson are testifying to present the Staff's views with respect to Contention CL-2. CL-2 Testimony at A5a-A5b (Ex. NRC000004).[7] Their testimony presents the opinions of three qualified witnesses and demonstrates that there are no cost-beneficial SAMDAs for the STP site. Mr. Emch and Mr. Rishel discuss the purpose of a SAMDA analysis and how such an analysis is performed, and present the results of the Staff's SAMDA analysis review. *Id.* at A5a. Mr. Anderson will discuss aspects of the Staff's review covering replacement power costs and appropriate inflation accounting. *Id.* at A5b.

Mr. Emch is a Senior Health Physicist who has been employed by the NRC for more than 36 years. *Id.* at A1a. He received a B.S. in Engineering Physics from Louisiana Tech University in 1973 and a M.S. in Health Physics from Georgia Institute of Technology in 1974. *Id.* at A3a. Mr. Emch was a Director of the Protective Measures Team at the NRC's Emergency Operations Center for 15 years and has been a supervisor in the areas of technical specifications, radiation protection, emergency preparedness, design basis accident dose analysis, probabilistic risk assessment, and operating reactor project management. *Id.* Currently, he is assigned to the Environmental Technical Support Branch in the Division of Site and Environmental Reviews in the Office of New Reactors. *Id.* at A2a. Mr. Emch provides technical oversight of NRC staff and contractors involved in the review of the environmental impacts of radiation protection and postulated accidents, including Severe Accident Mitigation Alternatives (SAMA) analyses for combined license applications. *Id.*

Since early 2002, Mr. Emch has been involved in the review of numerous SAMA analyses supporting license renewal and combined license applications. *Id.* at A3a. Mr. Emch

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[7] In the Staff's testimony, each question and answer is consecutively numbered, and citations to testimony in this pleading are to answer numbers.

has also contributed technical input to the NRC's environmental assessments that address SAMDA analyses for the Economic Simplified Boiling Water Reactor (ESBWR) design certification and the Aircraft Impact Rule Amendment to the ABWR design certification. *Id.* at A2a. Additionally, Mr. Emch was one of the authors of LR-ISG-2006-03, "Staff Guidance For Preparing Severe Accident Mitigation Alternatives Analyses," a license renewal interim staff guidance document endorsing NEI 05-01, Revision A, "Nuclear Energy Institute Severe Accident Mitigation Alternatives (SAMA) Analysis Guidance Document." *Id.*

For the STP COL proceeding, Mr. Emch was responsible for the technical oversight of NRC staff and contractors involved in the review of the environmental impacts of radiation protection and postulated accidents, including the SAMA analysis. *Id.* Mr. Emch helped prepare Section 5.11, "Environmental Impacts of Postulated Accidents," of the draft and final versions of the STP EIS. *Id.* at A4a. Mr. Emch also co-authored the "Affidavit of Richard L. Emch, Jr. and James V. Ramsdell, Jr. Concerning Finality of SAMDA Conclusions in ABWR Design Certification as Applied to STP Units 3 and 4," that was submitted in support of the "NRC Staff Motion for Summary Disposition" of Contention CL-2. *Id.*

Jeremy P. Rishel is a Technical Research Scientist employed by Battelle, Pacific Northwest National Laboratory (PNNL). *Id.* at A1b. Mr. Rishel has been employed at PNNL for six years, and his previous experience includes four years working at the Los Alamos National Laboratory (LANL). *Id.* Mr. Rishel received a B.S. (1996) and M.S. (1998) in Meteorology from The Pennsylvania State University. *Id.* at A3b. For the last 10 years, he has been involved in the emergency operation centers at LANL and Hanford, providing consequence assessment modeling support in the event of a chemical, biological, or radiological release. *Id.* Mr. Rishel has assisted in the development of atmospheric dispersion models and has performed meteorological and dispersion modeling to support emergency response at DOE's Hanford Unified Dose Assessment Center. *Id.* at A2b. Mr. Rishel is also a committee chair for DOE's Consequence Assessment Modeling Working Group under the Subcommittee on Consequence

Assessment and Protective Actions. *Id.* Mr. Rishel's current responsibilities include assisting the NRC Staff with environmental reviews for nuclear power plant licensing and license renewals in the areas of meteorology, design-basis and severe accidents, and SAMA analyses. *Id.* Mr. Rishel is a lead reviewer on several EIS's for nuclear reactor license renewal, early site permit (ESP), and COL applications in the areas of meteorology and accidents, which includes SAMDA reviews. *Id.* at A3b.

David M. Anderson is a Senior Research Economist at PNNL, where he has been employed for sixteen years. *Id.* at A1c. Mr. Anderson also worked for four years at the headquarters of Washington Mutual Bank. *Id.* Mr. Anderson received an M.S. in Forest Economics from Oregon State University. *Id.* at A3c. Mr. Anderson has been conducting economic impact studies for more than twenty years, and has been involved in assessing baseload power needs associated with nuclear power plants over the previous four years. *Id.* Mr. Anderson contributed to the preparation of NUREG-1555, *Environmental Standard Review Plan—Standard Review Plans for Environmental Reviews for Nuclear Power Plants*, and subsequent revisions, and has prepared EIS sections on socioeconomics, benefits and costs, need for power, environmental justice and land use for a number of ESP and COL applications. *Id.* Mr. Anderson was also one of the authors of the "Affidavit of James V. Ramsdell, Jr. and David M. Anderson, Concerning the Staff's Review of STPNOC's Updated SAMDA Evaluation," submitted in support of the "NRC Staff Answer to Applicant's Motion for Summary Disposition of Contention CL-2." *Id.* at A4c.

B. Staff Witnesses for Contention DEIS-1

The attached testimony of Daniel C. Mussatti and Dr. Michael J. Scott presents the opinions of two qualified witnesses and demonstrates that the Staff's need for power analysis, presented in the FEIS, is adequate under NEPA and the NRC regulations implementing NEPA, and that the additional analysis requested by the Intervenors does not alter the Staff's conclusions in the FEIS.

Daniel C. Mussatti is Socioeconomist for the NRC's Office of New Reactors (NRO). DEIS-1 Testimony at A2a (Ex. NRC000030). Mr. Mussatti has twenty-two years experience in economic valuation of natural resources and the environment and the economic analysis of regulations, standards, and control technologies. Professional Qualifications of Daniel C. Mussatti (Ex. NRC000032). Since 2006, Mr. Mussatti has been NRO's expert for the determination of the need for power for planned new nuclear generating capacity. DEIS-1 Testimony at A2a (Ex. NRC000030). He is also the technical lead for the maintenance and revision of the socioeconomic, environmental justice, and benefit-cost balancing sections for the NRC's guidance document, NUREG-1555, *Environmental Standard Review Plan—Standard Review Plans for Environmental Reviews for Nuclear Power Plants* (ESRP). *Id.* For the STP COL, Mr. Mussatti has been involved in the development of the DEIS and the FEIS. *Id.* at A4a. In conjunction with staff from PNNL, he assisted in editing sections of the EIS related to socioeconomics, environmental justice, and need for power. *Id.* Mr. Mussatti's testimony addresses how the Staff conducts its need for power analysis for EISs and offers relevant background for the STP need for power analysis.

Dr. Michael J. Scott is a Staff Scientist and Senior Staff Economist at PNNL. *Id.* at A1b. As a senior economist for 30 years at PNNL, Dr. Scott has participated in a number of studies that involved the estimation of long-term growth in electricity demand. *Id.* at A3b. He assists the NRC staff with environmental reviews for nuclear power plant licensing and license renewals in the areas of socioeconomics, environmental justice, need for power, and benefit-cost analysis. *Id.* at A2b. Dr. Scott also assists the Department of Energy Office of Energy and Renewable Energy by providing economic and environmental analysis for its appliance standards programs, developing models for, and assessment of, the macroeconomic impacts of energy efficiency and renewable energy programs, and assisting in the development of integrated assessment models of climatic change in the area of uncertainty propagation. *Id.* For the STP COL, Dr. Scott was the principal author of the FEIS sections dealing with

socioeconomics, environmental justice, need for power, and benefit-cost balance. *Id*. at A4b. Dr. Scott's testimony addresses the Staff's need for power review contained in the FEIS, and specifically addresses the Intervenors' contention that additional analysis of the impacts of new building energy codes on the need for power is necessary.

III. The Intervenors' Contentions Lack Merit and the Board Should Find in Favor of the Staff

A. The Board Should Find in Favor of the Staff on Contention CL-2

As admitted by the Board, Contention CL-2 claims that the Applicant's SAMDA analysis in ER Section 7.5S erroneously calculates replacement power costs by underestimating replacement power costs and by failing to consider disruptive impacts, including ERCOT market price spikes. *South Texas Project*, LBP-10-14, 72 NRC at __ (slip op. at 30). However, as explained below and in the Staff's testimony, the proposed SAMDAs for the ABWR design are far from being cost-beneficial, even after properly accounting for the factors raised by the Intervenors in Contention CL-2.[8]

1. SAMDA Analyses and the Legal Requirements Applicable to Them

SAMAs are safety enhancements intended to reduce the risk of severe accidents. *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC __, __ (Mar. 26, 2010) (slip op. at 3). A SAMA analysis examines the extent to which implementation of the SAMA would decrease the probability-weighted consequences of the analyzed severe accident sequences. *Id.* "NRC SAMA analyses are not a substitute for, and do not represent, the NRC NEPA analysis of potential impacts of severe accidents." *Id.* at __ (slip op. at 37). Rather, SAMA analyses are rooted in a cost-beneficial assessment:

[8] As indicated in its Summary Disposition motion, the Staff believes that the issues raised by the Intervenors in Contention CL-2 have been resolved by rule. The Staff has appealed a Board decision rejecting the Staff's view. *See* Staff Petition for Review. Although the Staff is presenting testimony to address Contention CL-2 for this hearing, the Staff continues to maintain that all SAMDA issues in this proceeding are resolved by rule, and Contention CL-2 should be dismissed on this ground.

> SAMA analysis is used for determining whether particular SAMAs would sufficiently reduce risk – *e.g.*, by reducing frequency of core damage or frequency of containment failure – for the SAMA to be cost-effective to implement. . . . If the cost of implementing a particular SAMA is greater than its estimated benefit, the SAMA is not considered cost-beneficial to implement.

Id. at __ (slip op. at 3). SAMDAs are a subset of SAMAs that focus on design alternatives. *See* Licenses, Certifications, and Approvals for Nuclear Power Plants; Final Rule, 72 Fed. Reg. 49,352, 49,426 (Aug. 28. 2007). Therefore, SAMA analysis principles also apply to SAMDA analyses.

Because SAMA analyses examine alternatives to mitigate environmental impacts, NEPA mitigation principles apply to them. *See Pilgrim*, CLI-10-11, 71 NRC at __ (slip op. at 38). For a mitigation analysis, NEPA does not demand a "fully developed plan" or a detailed examination of specific mitigation measures. *Id.* In addition, NEPA does not require the use of the "best scientific methodology" or the use of an alternative methodology just because it is "'plainly better.'" *Id.* at __ (slip op. at 37) (internal quotation omitted). NEPA also does not require the use of methodologies still under development or the study of phenomena "'for which there are not yet standard methods of measurement or analysis.'" *Id.* (quoting *Town of Winthrop v. FAA*, 535 F.3d 1, 12-13 (1st Cir. 2008)). An agency is free to select its own methodologies so long as they are reasonable. *See Pilgrim*, CLI-10-11, 71 NRC at __ (slip op. at 37).

A SAMA analysis is "neither a worst-case nor a best-case impacts analysis." *Id.* at __ (slip op. at 38). For a SAMA analysis, the "goal is *only* to determine what safety enhancements are cost-effective to implement." *Id.* at __ (slip op. at 39) (emphasis added). Therefore, "[u]nless it looks genuinely plausible that inclusion of an additional factor or use of other assumptions or models may change the cost-benefit conclusions for the SAMA candidates evaluated, no purpose would be served to further refine the SAMA analysis . . . ." *Id.* From this, it follows that for a SAMA analysis, a dispute over a fact is only material if its resolution could lead to the identification of a cost-beneficial (cost-effective) SAMA.

The Staff's testimony explains in greater detail how SAMDA analyses are performed. A SAMDA can result in averted costs "by (1) reducing the frequency of an accident, (2) reducing the consequences of an accident, or (3) reducing both the frequency and consequences of an accident." CL-2 Testimony at A10 (Ex. NRC000004). A SAMDA analysis uses probabilistic risk assessment (PRA) to determine whether the implementation costs for design improvements are equal to, or less than, the accident cost risk they avert. *See id.* at A8-A9. Accident cost risk is an accident's probability multiplied by its monetized consequence. *See id.* at A9. The following formula is used to determine whether a SAMDA is cost-beneficial:

Net Value ($) = Total SAMDA Averted Cost Risk ($) – SAMDA Implementation Cost ($)

Id. at A10.

Averted costs include the following monetized offsite and onsite components:

> Offsite components include the averted costs of public exposure and offsite property damage. Onsite components include the averted costs of occupational exposure, property damage, and replacement power.

Id. The PRA is used to determine the probability (frequency) of a severe accident leading to core damage (the core damage frequency, or CDF). *Id.* The baseline PRA evaluates accident probabilities and consequences without implementing any SAMDAs, and SAMDA benefits are determined by modifying the baseline PRA to account for the effect of implementing the SAMDA. *Id.*

In performing a SAMDA analysis, it is common to assume as an initial screening procedure that each SAMDA could individually eliminate all probability of a severe accident. *Id.* This assumption is conservative because "no one design change can address all possible accident sequences and reduce total accident frequency to zero." *Id.* The total SAMDA averted cost risk produced by this assumption is called the "maximum averted cost." *Id.* If this initial screening procedure results in a SAMDA with a positive net value, the calculation would be refined to consider the specific SAMDA's actual potential for reducing risk. *Id.*

2. The ABWR Design Certification SAMDA Analysis

A SAMDA analysis was performed for the ABWR design certification. The SAMDA evaluation of GE, the design certification applicant, is contained in the "Technical Support Document for the ABWR" (TSD). EPA/SAMDA Submittal for the ABWR from J.F. Quirk to R.W. Borchardt, attach. 1 (Dec. 21, 1994) (ML100210563) (Exs. NRC00009A and NRC00009B). To support the ABWR design certification, the NRC reviewed the TSD and performed an independent evaluation of SAMDAs in its environmental assessment for the ABWR design (ABWR EA) and concluded that there were no cost-beneficial SAMDAs. *See* SECY-96-077, Certification of Two Evolutionary Designs, attach. 2 (Apr. 15, 1996) (ML003708129) (Ex. NRC000013). In Sections 7.3 and 7.5S of its ER, the Applicant updated GE's generic SAMDA analysis to include site-specific characteristics to verify that there are no cost-beneficial SAMDAs for an ABWR design at the STP site. CL-2 Testimony at A21 (Ex. NRC000004).

To provide context for the issues raised by Contention CL-2, the Staff's testimony describes the ABWR design certification SAMDA analysis. *Id.* at A11-A20. The Staff summarizes the baseline PRA used in GE's SAMDA analysis and explains how GE addressed both offsite and onsite costs in its analysis. *Id.* at A12-A13. GE estimated the reduction in CDF that would be associated with implementing each SAMDA, and SAMDAs that did not reduce CDF were not credited with averting onsite costs, which includes replacement power costs. *See id.* at A13. To determine whether a SAMDA was cost-beneficial, GE calculated a cost-benefit ratio and compared this to a $1,000 per person-rem averted standard for offsite exposure. *Id.* The cost-benefit ratio was calculated with the following equation:

$$\text{Cost/benefit ratio} = \frac{\text{SAMDA Implementation Cost (\$)} - \text{SAMDA Averted Onsite Cost (\$)}}{\text{SAMDA Averted Offsite Exposure (person-rem/plant life)}}$$

Id. SAMDAs with a cost-benefit ratio less than or equal to the $1,000 person-rem standard would be considered cost-beneficial to implement. *Id.*

In Table 3 of the Staff testimony, the Staff summarizes the results of the GE analysis for each SAMDA considered, including the implementation cost for each SAMDA, the averted

offsite and onsite costs for each SAMDA, and the reduction in CDF associated with each SAMDA. *See id.* at A13 (Table 3). The SAMDA that is closest to being cost-beneficial has a cost-benefit ratio that is approximately 1,667 times larger than the $1,000 per person-rem standard that was used in GE's analysis. *Id.* at A14. In the ABWR EA, the Staff reviewed GE's SAMDA analysis and applied bounding assumptions to determine whether there were any cost-beneficial SAMDAs for the ABWR design. *Id.* at A18. The Staff also considered the effects of using alternative cost-benefit criteria. *Id.* at A19. Even after considering these alternative criteria, the Staff concluded that no SAMDAs were cost-beneficial for the ABWR design because of the significant margins in the analysis. *Id.* at A20.

3. The Applicant's SAMDA Analysis in ER Sections 7.3 and 7.5S.5

As stated above, the Applicant updated GE's generic SAMDA analysis to verify that there are no cost-beneficial SAMDAs. CL-2 Testimony at A21 (Ex. NRC000004). The Applicant updated the risk estimates to include STP site-specific land-use, population, and meteorological data, and used the MELCOR Accident Consequence Code System (MACCS2) code to estimate the mean accident consequences, including offsite population exposure and property damage. *Id.* at A22. The ER analysis used the cost-benefit methodology in NUREG/BR-0184, *Regulatory Analysis Technical Evaluation Handbook* (Jan. 1997) (ML050190193), to calculate averted offsite and onsite costs. *Id.* The ER analysis also assumed that each SAMDA could individually eliminate all risk, which over-estimates each SAMDAs benefit. *Id.* Even with this conservative assumption, the analysis in ER Section 7.3 (which is for a single ABWR unit) concluded that there were no cost-beneficial SAMDAs. *Id.* at A23 (citing STP ER at 7.3-3 (Sept. 2010) (Rev. 4) (Ex. NRC000014)).

In ER Section 7.5S.5, the Applicant supplemented its SAMDA analysis to include additional averted onsite costs that would be experienced by the other units at the STP site due to a severe accident at one of the proposed units. CL-2 Testimony at A24 (Ex. NRC000004). These averted onsite costs included occupational exposure, cleanup, and replacement power

costs. *Id.* at A25. With respect to replacement power costs, the Applicant's analysis in ER Section 7.5S.5 was based on the following considerations:

> [T]he Applicant assumed that cleanup and refurbishment for STP Units 1 and 2 would take two years, and the other ABWR unit that did not experience a severe accident would take six years to restart based on past experience at Three Mile Island Unit 1 (TMI-1) after the accident at TMI-2. The Applicant relied on guidance in NUREG/BR-0184 to develop averted cost estimates. Short-term replacement power costs were estimated using a $310,000 per day (1993 dollars) cost estimate for a reference 910 MWe reactor; the cost was scaled to the appropriate power level for each STP reactor.

Id. Even with these additional considerations, the Applicant concluded that there were no cost-beneficial SAMDAs. *Id.*

4. Issues Raised by Contention CL-2

In NRC practice, the issues in controversy are determined by the scope of the admitted contention. *See Pilgrim*, CLI-10-11, 71 NRC at __ (slip op. at 28). *See also* 10 C.F.R. § 2.340(b) (providing that in an initial decision in a contested proceeding on a COL application, "the presiding officer shall make findings of fact and conclusions of law on the matters put into controversy by the parties to the proceeding," with the exception of matters designated by the Commission to be decided by the presiding officer). In this case, the Board admitted, in part, proposed Contentions CL-2, CL-3, and CL-4 and combined them into new contention CL-2. *South Texas*, LBP-10-14, 72 NRC at __ (slip op. at 2). The new, reformulated Contention CL-2 is as follows:

> The Applicant's calculation in ER Section 7.5S of replacement power costs in the event of a forced shutdown of multiple STP Units is erroneous because it underestimates replacement power costs and fails to consider disruptive impacts, including ERCOT market price spikes.

Id. at __ (slip op. at 30).[9]

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[9] References to Contention CL-2 in the remainder of this pleading are references to Contention CL-2 as reformulated by the Board unless indicated otherwise.

The scope of a contention is defined both by its terms and its bases. *See Pilgrim*, CLI-10-11, 71 NRC at __ (slip op. at 28). Contentions CL-2 to CL-4 as pled by the Intervenors claimed that the ER Section 7.5S.5 calculation of replacement power costs was deficient for the following reasons:

1) Replacement power costs should be specific to the Electric Reliability Council of Texas (ERCOT) region. *See* Co-location Contentions at 7-8 (Contention CL-2).

2) Replacement power costs should account for the increase of ERCOT market prices due to the market effects of an STP outage. *See id.* at 8-9 (Contention CL-3).

3) Impacts on ERCOT consumers should have been evaluated. *See id.* at 9 (Contention CL-4).

4) The effects of price spikes should have been addressed. *See id.* at 9 (Contention CL-4).

5) The impacts of grid outages should have been addressed. *See id.* at 9-10 (Contention CL-4).[10]

Thus, proposed Contentions CL-2 to CL-4 raised issues only with the assessment of certain economic impacts in the ER Section 7.5S.5 SAMDA analysis and not with any other aspect of the analysis. These other aspects of the ER Section 7.5S.5 SAMDA analysis, therefore, are not within the scope of the admitted contention and are, therefore, only material to the extent that the economic issues raised by the Intervenors are integrated into the existing analysis to determine whether a cost-beneficial SAMDA would be identified.

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[10] Although the majority opinion did not explicitly address the issue of grid outages in its ruling, in a dissenting opinion, Judge Arnold stated that grid outages are outside the scope of the contention because grid outages do not affect replacement power costs, but should instead be included as an offsite economic cost. *See South Texas Project*, LBP-11-07, 73 NRC at __ (slip op., dissent at 2 n.406). Nevertheless, the Staff considered this effect and determined that there are still no cost-beneficial SAMDAs, as explained below.

5. Properly Accounting for Issues Raised by the Intervenors in Contention CL-2 Does Not Lead to the Identification of a Cost-Beneficial SAMDA

In its Summary Disposition Motion, the Applicant addressed each of the issues raised by the Intervenors in Contention CL-2 and concluded that there were no cost-beneficial SAMDAs. The Intervenors raised certain objections to the Applicant's methods in their Answer to the Applicant's motion. In its testimony, the Staff has independently reviewed the Applicant's SAMDA analysis and the objections raised to the Applicant's analysis by the Intervenors. As explained below, the Staff concludes that even after considering all of the Intervenors' concerns, there are no cost-beneficial SAMDAs. CL-2 Testimony at A79 (Ex. NRC000004).

a. Scaling the Applicant's ER Analysis For Inflation Does Not Make Any SAMDA Cost-Beneficial

As part of its analysis to address the issues raised in Contention CL-2, the Applicant, in the affidavit supporting its Summary Disposition Motion, first scaled its analysis to account for inflation. *See* Applicant Aff. at ¶¶ 28-30. The replacement power costs used in the Applicant's ER Section 7.5S.5 analysis were in 1993 dollars because they were taken from NUREG/BR-0184. CL-2 Testimony at A25 (Ex. NRC000004). The Applicant updated the analysis to 2009 dollars by escalating the replacement power costs by a factor of 1.45, based on the Bureau of Labor Statistics' (BLS) producer price index-commodities. *Id.* at A26. After making this adjustment, the Applicant's values for total maximum averted costs were $16,944 (7% discount rate) and $28,655 (3% discount rate). *Id.* The Applicant's calculations were based on the conservative assumption that each SAMDA could individually eliminate all probability of a severe accident. *Id.* at A27. The Applicant also scaled the SAMDA costs given in the TSD for inflation. Applicant Aff. at ¶ 30. The SAMDA costs provided in the TSD were referenced in 1991 dollars. CL-2 Testimony at A13 (Ex. NRC000004). The Applicant reported using the BLS Consumer Price Index to scale SAMDA costs by a factor of 1.58 to arrive at costs expressed in 2009 dollars. *Id.* at A36. The Applicant estimated that the lowest cost SAMDA would be $158,000. *Id.* at A37. Therefore, the value of the lowest cost SAMDA as adjusted for inflation

by the Applicant is more than five times higher than the total maximum averted costs given above.

The Staff's SAMDA analysis, prepared for this testimony, differs from the analysis described above in three areas, but the ultimate conclusions are unchanged. *Id.* at A33. The first difference concerns the scaling of SAMDA costs for inflation. The Staff believes that the Bureau of Economic Analysis' Gross Domestic Product Implicit Price Deflator for Nonresidential Structures is a more appropriate index to use "because SAMDAs relate to structural alternatives in plant design and the GDP deflators are more specific to private capital investment than other inflation indexes such as the Consumer Price Index or the Producer Price Index." *Id.* at A34. The index used by the Staff "is designed to reflect inflation associated with costs of large buildings and other structures and all related systems." *Id.* at A42. Therefore, the Staff would scale SAMDA costs by a factor of 2.25. *Id.* at A34. This would mean that the lowest cost SAMDA would be adjusted from $100,000 in 1991 dollars to $225,000 in 2009 dollars. *Id.* The effect of using the Staff's scaling factor instead of the Applicant's is that it would be less likely that a SAMDA would be considered cost-beneficial. *Id.* at A37.

The Intervenors suggest the use of a refined Core Index of Personal Consumption Expenditures to adjust SAMDA costs. However, the use of an inflation index based on personal consumption expenditures is not a valid approach to scaling SAMDA costs. *Id.* at A42. Indices such as the one suggested by the Intervenors reflect retail inflation faced by persons and households, not inflation associated with large-scale capital expenditures like those of nuclear power plant construction. *Id.*

The second difference between the Staff's SAMDA analysis and the Applicant's concerns the scaling of replacement power costs. The Staff believes that the BLS Producer Price Index for the commodity of "Electric Power" is the appropriate index to use. Based on this BLS index, the Staff calculates an inflation scaling factor of 1.40. *Id.* at A35. The Staff's scaling factor of 1.40 is less than the Applicant's scaling factor of 1.46, making it slightly less likely that

a cost-beneficial SAMDA would result. *Id.* at A37. The third difference concerns the scaling of replacement power costs from NUREG/BR-0184 for capacity factor. The Applicant's estimate of replacement power costs reflects the suggested average capacity factor of 60%-65% from NUREG/BR-0184. *Id.* at A38. The Staff adjusted this capacity factor to account for more recent experience suggesting that STP Units 1 and 2 operated at a combined capacity factor of at least 90 percent in 2010. *Id.* at A39. The Staff applied an adjustment factor of 1.5 based on dividing 90% by 60%. *Id.* at A40. This adjustment reflects the need for replacement capacity availability based on current operations, and would increase replacement power costs. See *id.* at A39-A40.

After making the above adjustments, the Staff's values for total maximum averted costs are $21,909 at a 7% discount rate and $36,504 at a 3% discount rate. *Id.* at A43 & Table 11.[11] These values for total maximum averted costs are less than the Staff-adjusted value of $225,000 for the lowest cost SAMDA. Therefore, the Staff's adjustments do not result in a cost-beneficial SAMDA.

b. Using ERCOT Market Prices Does Not Make Any SAMDA Cost-Beneficial

To address the Intervenors' claim that the ER should have used ERCOT-specific prices to assess replacement power costs rather than values from NUREG/BR-0184, the Applicant updated its analysis to use ERCOT pricing. *See* Applicant Aff. at ¶ 31.[12] In doing so, the Applicant first calculated replacement power costs based on 2009 ERCOT average annual

[11] NRC guidance recommends the use of a 7% real discount rate and, for sensitivity analysis, a 3% discount rate. *Id.* at A16.

[12] The use of ERCOT prices is in lieu of the use of NUREG/BR-0184 values. CL-2 Testimony at A45 (Ex. NRC000004). This means that the Staff's adjustments to the Applicant's use of NUREG/BR-0184 replacement power costs are not relevant to the Applicant's use of ERCOT-specific prices. However, the Staff's inflation scaling of costs of SAMDAs to 2009 dollars continues to be relevant because these are the costs against which the calculation of averted costs are measured.

balancing prices, but also did an alternate calculation using 2008 ERCOT average annual energy balancing prices. CL-2 Testimony at A44 (Ex. NRC000004). By incorporating 2009 ERCOT prices into the SAMDA analysis, maximum averted costs would become $24,615 at a 7% discount rate and $40,783 at a 3% discount rate. *Id.* at A49. ERCOT prices were higher in 2008 than 2009, thus, using 2008 prices would further increase maximum averted costs. *See id.* at A53. The Staff calculates that using 2008 ERCOT prices would cause maximum averted costs to become $52,080 at a 7% discount rate and $84,208 at a 3% discount rate. *Id.*[13] Accounting for 2008 ERCOT prices does not lead to a cost-beneficial SAMDA because none of these values for total maximum averted costs are equal to, or greater than, the Staff-adjusted value of $225,000 for the lowest cost SAMDA. *Id.* As explained above, maximum averted costs based on the use of 2009 ERCOT prices are even lower. Therefore, using ERCOT prices does not result in a cost-beneficial SAMDA.

As for the issue of whether 2008 or 2009 ERCOT prices should be used in the analysis, the Staff agrees with the Applicant's argument that 2009 prices should be used. *See id.* at A51-A52. Specifically, 2009 ERCOT prices should be used because 2009 prices are more recent and the 2008 prices are anomalous in the context of prices after deregulation began in Texas. *See id.* In a SAMDA analysis, the most representative pricing data should be used rather than anomalously high or low values. *See id.* at A54. The use of representative, rather than anomalous data, is appropriate because a SAMA analysis is "neither a worst-case nor a best-case impacts analysis." *Pilgrim*, CLI-10-11, 71 NRC at __ (slip op. at 38). In any event, as shown above, the ultimate analysis conclusions are not affected either way.

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[13] The Staff's calculation of the effect of using 2008 ERCOT market prices differs slightly from the Applicant's because the Staff scaled the Applicant's 2008 value by a factor of 1.025 to convert to 2009 dollars using the BLS Producer Price Index for Electric Power. *Id.* at A53 n.84.

The Intervenors' expert suggests that forecasted prices be used in the analysis rather than 2009 prices, which he considers to be unrepresentative. *See* 2010 Johnson Aff. at ¶¶ 8-9. While forecast prices could be used, this approach could introduce unneeded speculation into the analysis and would also require the forecasting of SAMDA costs to a matching future year. CL-2 Testimony at A54 (Ex. NRC000004). The Staff, however, does not believe that using forecasted prices would affect the conclusions of the analysis. *Id.* The use of "extremely high and purely speculative average prices would be required before replacement power costs would rise to a level sufficient to impact the conclusions of the SAMDA analysis." *Id.* at A55. In any event, the Intervenors' expert conceded that relying on 2008 ERCOT prices was "'not unreasonable' as that approach reflects a period of elevated natural gas prices." *Id.* at A54 (quoting 2010 Johnson Aff. at ¶ 9). As explained below, the Staff has calculated the cumulative effect of accounting for the Intervenors' concerns using 2008 ERCOT prices and still concludes that there are no cost-beneficial SAMDAs.

c. Accounting for Market Effects and Consumer Impacts From All STP Units Shut Down Does Not Make Any SAMDA Cost-Beneficial

The Applicant supplemented its SAMDA analysis to address the Intervenors' claim that the ER should have accounted for the effects on market prices from having all STP units shut down and also accounted for the resulting consumer impacts. Applicant Aff. at ¶ 43. To account for effects on market prices, the Applicant used a simplified spreadsheet model of economic dispatch in the ERCOT region. CL-2 Testimony at A58 (Ex. NRC000004). As explained below, the Staff has made adjustments to this model to address issues raised by the Intervenors or uncovered by the Staff in its review, but even accounting for these adjustments does not result in a cost-beneficial SAMDA.

In responding to the Applicant's Summary Disposition Motion, the Intervenors' expert questioned several aspects of the Applicant's dispatch model. The Intervenors' expert claimed (1) that the Applicant's dispatch model should use the wind capacity factor relied on in ERCOT's

reserve margin calculations, (2) that the Applicant's treatment of ancillary services was simplistic, and (3) that the Applicant's model assumed perfect competition and did not account for the effects of market power. 2010 Johnson Aff. at ¶ 10. Although the Staff agrees that the questions raised by the Intervenors are not unreasonable, accounting for the Intervenors' concerns would have little effect on replacement power costs. CL-2 Testimony at A61 (Ex. NRC000004). For example, adjusting the wind capacity factor downward as suggested by the Intervenors would improve the Applicant's dispatch model, but the Staff has determined that this would result in only a 2.0 percent change in average annual ERCOT prices. *Id.* As for ancillary services, the effects of these services on ERCOT prices are embodied in the hourly marginal prices provided in the Applicant's simplified dispatch model, and even significant changes in these prices would have only a negligible effect. *Id.* With respect to the Intervenors' market power concerns, "the staff believes that the ERCOT pricing data already reflect the effects of market power being wielded, as it reasonably can be assumed that this behavior is understood to occur in a deregulated market such as ERCOT." *Id.*

In conducting its independent review, the Staff made additional modifications to the Applicant's dispatch model. The Staff made a minor adjustment of the nuclear capacity factor assumed in the Applicant's model (increasing 88.5 percent to 90.0 percent) consistent with recent operating experience at STP, but this had no meaningful effect on the prices estimated by the model. *Id.* at A62. The Staff also adjusted the model by scaling the market entry prices of each generation technology such that the resulting average balancing energy price would equal the 2008 ERCOT price used in the Staff's SAMDA analysis. *Id.* at A63.[14]

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[14] The Staff also noticed that the Applicant's model is missing 177 of the expected 8760 hours of load and cost data. *Id.* at A62. The Staff did not attempt to populate the missing hours with representative data because doing so would not be expected to noticeably alter the analysis results. *Id.*

After making the adjustments identified by the Staff, the adjusted dispatch model showed an increase in the 2008 ERCOT average annual energy balancing price from $85.02 per MWh to $89.31 per MWh. *Id.* The resulting maximum averted cost would be $54,424 at a 7% discount rate and $87,914 at a 3% discount rate. *Id.* After adjusting the wind capacity downward as the Intervenors suggest, the 2008 ERCOT average annual energy balancing price would further increase to $91.09 per MWh. *Id.* The revised maximum averted cost would be $55,397 at a 7% discount rate and $89,452 at a 3% discount rate, which is still less than the value of the lowest cost SAMDA. *Id.*

The Staff calculated the impacts on consumers from these price increases by multiplying the total price increase $6.07 per MWh ($91.09 minus $85.02) by the total annual consumption of electricity in ERCOT, and then multiplying this value by the CDF to arrive at a risk-weighted value. *Id.* at A64. The Staff's calculations also assumed a forty year plant life and that the period of higher prices would be six years. *Id.* Accounting for consumer impacts would increase the replacement power costs component of the SAMDA analysis by $76,372. *Id.* The maximum averted cost would become $131,768 at a 7 percent discount rate and $165,824 at a 3 percent discount rate. *Id.* Because these maximum averted costs are less than the Staff-adjusted value of $225,000 for the lowest cost SAMDA, accounting for market effects and consumer impacts in addition to using 2008 ERCOT prices does not result in a cost-beneficial SAMDA. *Id.*

d. Accounting for Price Spikes Does Not Make Any SAMDA Cost-Beneficial

The Applicant also supplemented its SAMDA analysis to address the Intervenors' claim that the ER should have accounted for price spikes caused by having all STP units shut down. Applicant Aff. at ¶ 60. Although the Intervenors did not specifically suggest how price spikes ought to be incorporated into the SAMDA analysis, they suggested that price spikes caused a 20 percent increase to 2008 average balancing prices. CL-2 Testimony at A68 (Ex.

NRC000004). *See* also 2009 Johnson Report at 6. Although the effects of price spikes are already embedded in the ERCOT prices used in the dispatch model, the Staff assumed an additional 20 percent impact on marginal prices. CL-2 Testimony at A71 (Ex. NRC000004). Starting with 2008 ERCOT prices as adjusted for market effects ($91.09 per MWh), an additional 20 percent price increase would add $18.22 per MWh to the average hourly price. *Id.* at A72. The total impact is found by multiplying the total price increase by the total annual consumption of electricity in ERCOT, and then multiplying this value by the CDF to arrive at a risk-weighted value. *Id.* at A72. Accounting for price spikes would increase the replacement power costs component of the SAMDA analysis by $38,204. *Id.* The maximum averted cost would become $169,973 at a 7 percent discount rate and $204,028 at a 3 percent discount rate. *Id.* Because these maximum averted costs are less than the Staff-adjusted value of $225,000 for the lowest cost SAMDA, accounting for price spikes in addition to market effects, consumer impacts, and 2008 ERCOT prices does not result in a cost-beneficial SAMDA. *Id.*

e. The Possible Occurrence of the Grid Outage Scenario Contemplated By Intervenors Is Remote and Speculative, But Even If Grid Outages Are Considered, There Is No Cost-Beneficial SAMDA

Although the Intervenors assert that the ER SAMDA evaluation should account for grid outages resulting from a severe accident at one ABWR unit causing the other three units to shut down, this scenario is a remote and speculative event that need not be accounted for in a NEPA analysis. *See Limerick Ecology Action, Inc. v. NRC*, 869 F.2d 719, 739 (3d Cir. 1989) ("It is undisputed that NEPA does not require consideration of remote and speculative risks"). In the area of severe accidents, the Commission has held that "low probability is the key" to determining whether the effects of a particular accident sequence need to be examined. *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), CLI-90-7, 32 NRC 129, 131 (1990). *See also Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), CLI-90-04, 31 NRC 333, 335 (1990) (holding that if an accident "is

sufficiently unlikely that it can be characterized fairly as remote and speculative, then consideration under NEPA is not required as a matter of law"). In *Vermont Yankee*, the Commission was reluctant either to endorse or reject a holding that accidents with a probability of 2.6 x 10^{-4} per reactor year are remote and speculative. *Vermont Yankee*, CLI-90-04, 31 NRC at 335. In a later proceeding, the Commission upheld a licensing board determination that an accident sequence with a probability conservatively estimated at 2.0 x 10^{-7} per reactor year was remote and speculative for the purposes of NEPA. *Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant), CLI-01-11, 53 NRC 370, 387-88 (2001). The Commission reasoned that because it did not disturb the Board's finding of "extremely low probability," the Commission did not need to determine whether a 1.6 x 10^{-5} accident probability proposed by the intervenor was remote and speculative. *Id.* at 388 n.8.

In this case, the CDF used in the SAMDA analysis is 1.6 x 10^{-7} per reactor year. CL-2 Testimony at A12 (Table 2) (Ex. NRC000004). The Applicant believes that the probability that a grid outage would result from all STP units shutting down is "'far less than 0.1.'" *Id.* at A75 (quoting Applicant Aff. at ¶ 71). "Cumulating the probabilities of an accident at one of the STP units leading to shutdown of the other 3 units, followed by the loss of the ERCOT grid equates to 'far less than 10^{-8} per year' chance of such an event." CL-2 Testimony at A75 (quoting Applicant Aff. at ¶ 71). The Staff believes that "[e]vents with such low probabilities of occurrence would be remote by any measure." *Id.* at A76. The combined probability is far less than the accident probability considered to be remote and speculative in the *Harris* proceeding. *See Harris*, CLI-01-11, 53 NRC at 387-88. In addition, the Staff is not aware of a reliable estimate of grid outage probability and there is a significant range in estimated impacts (between three and ten billion dollars). CL-2 Testimony at A76 (Ex. NRC000004). This adds to the speculative nature of attempting to assess grid outage impacts. *Id. See also Pilgrim*, CLI-10-11, 71 NRC at __ (slip op. at 37) (NEPA does not require the study of phenomena "'for which

there are not yet standard methods of measurement or analysis'") (quoting *Town of Winthrop*, 535 F.3d at 12-13).

However, even assuming a $10 billion impact from the 2003 Northeast blackout and a 10 percent probability of occurrence, the risk-weighted incremental effect on the cost of replacement power is $6,240. CL-2 Testimony at A77 (Ex. NRC000004). The revised maximum averted cost would become $176,213 at a 7 percent discount rate and $210,268 at a 3 percent discount rate. *Id.* Because these maximum averted costs are less than the Staff-adjusted value of $225,000 for the lowest cost SAMDA, accounting for grid outages in addition to price spikes, market effects, consumer impacts, and 2008 ERCOT prices does not result in a cost-beneficial SAMDA. *Id.* at A77.

It should be noted that although the values for maximum averted costs described in the previous paragraph approach the value of the lowest cost SAMDA, these values are based on an analysis containing the following conservative assumptions:

- A single SAMDA is assumed to reduce all risk to zero;
- Averted onsite cleanup costs for the units not experiencing core damage are conservatively assumed to be 30% of the costs for the unit experiencing core damage;
- "Averted onsite replacement power costs conservatively assumes replacement power is required for two years at STP 1 and 2 and six years at STP 3 or 4, even though these units would likely not be damaged or significantly contaminated and would likely be ready, physically, to restart within a matter of months (most of the total CDF is for accident sequences where the containment remains intact)";
- The economic dispatch model "was calibrated to the highest historical prices for the traditionally highest-priced zone of ERCOT";
- An additional 20-percent impact from price spikes was added to the historically high average prices even though these prices embed all price spikes in a given year; and
- Loss of the ERCOT grid was assumed to have a 10 percent probability, in the absence of any authoritative estimate of such a probability.

Id. at A81. Thus, even when considering these additional conservatisms in the analysis, the lowest cost SAMDA is still more expensive than the maximum averted costs.

f. Further Refinements to the SAMDA Analysis

As stated above, the Staff's SAMDA analysis assumed that a single SAMDA would reduce all risk to zero. This is a bounding assumption that overstates each SAMDA's potential to reduce risk. *Id.* at A82. If a potentially cost-beneficial SAMDA is identified by such a procedure, the SAMDA analysis would be further refined by examining the PRA to estimate the actual risk-reduction expected as a result of implementing each SAMDA. *Id.* at A83. "Because the refined analysis would consider the SAMDA's actual risk-reduction potential, the total averted cost would always be less than the total maximum averted cost assumed in the screening analysis." *Id.* SAMDA cost estimates would also be refined to more accurately reflect actual costs. *Id.*

For this testimony, the Staff further refined the SAMDA analysis to consider the extent to which each SAMDA would reduce CDF. *Id.* at A84-A86. SAMDAs that did not reduce CDF were not credited with averting any onsite costs, which includes replacement power costs. *Id.* at A84, A86. The lowest cost SAMDAs do not reduce CDF. *Id.* at A84. Therefore, a refined analysis would credit these SAMDAs with $0 averted onsite costs, not $176,127. *Id.* Even assuming that these SAMDAs completely eliminated the maximum averted offsite cost of $86, the ratio of the SAMDA's cost to its averted cost would be 2,616. *Id.* The Staff's review found that it is the comparatively higher-cost SAMDAs that appreciably reduce accident frequency. *Id.* at A86. Table 14 of the Staff's testimony summarizes its evaluation of SAMDAs that reduce CDF. *Id.* at A86 (Table 14). Based on its review, the Staff concludes that the SAMDA that is closest to being cost-beneficial is SAMDA 9b, Alternate Pump Power Source. *Id.* at A86 & Table 14. Because this SAMDA reduces CDF by 52.0 percent, it is credited with averting onsite cost by $91,586. *Id.* at A86 (Table 14). Adding this value to the actual averted offsite cost of $45 leads to a total actual averted cost of $91,631 for this SAMDA. *Id.* This SAMDA, however,

has an inflation-adjusted implementation cost of $2,686,500. *Id.* Therefore, SAMDA 9b, which is the SAMDA that is the closest to being cost-beneficial, has an implementation cost that is 29.3 times greater than the total costs it could avert. *Id.* at A86. Therefore, there are no cost-beneficial SAMDAs for the STP site even if the Intervenors' concerns are accounted for. *Id.*

6. Conclusion Regarding Contention CL-2

The only goal of a SAMDA analysis is to determine whether a SAMDA is cost-effective to implement. *See* Pilgrim, CLI-10-11, 71 NRC at __ (slip op. at 39). The Staff's independent review of the Applicant's SAMDA analysis shows that even after conservatively accounting for all of the Intervenors' concerns, all SAMDAs considered for the ABWR design are far from being cost-beneficial. Contention CL-2 is without merit, and the Board should find in favor of the Staff.

B. Need For Power Contention DEIS-1

1. NEPA Requirements Applicable to Need for Power Analyses

The assessment of need for power has historically been equated "with the benefits of the proposed action" for the cost-benefit balance consideration. Nuclear Energy Institute; Denial of Petition for Rulemaking, 68 Fed. Reg. 55,905, 55,909 (Sept. 29, 2003) (NEI Rulemaking Petition Denial). While need for power assessments are required, they "'should not involve burdensome attempts to precisely identify future conditions. Rather, it should be sufficient to reasonably characterize the costs and benefits associated with proposed licensing actions.'" *South Carolina Electric & Gas Co. & South Carolina Public Service Authority (Also Referred to as Santee Cooper)* (Virgil C. Summer Nuclear Station, Units 2 and 3), CLI-10-01, 71 NRC __, __ (Jan. 7, 2010) (slip op. at 21) (quoting NEI Rulemaking Petition Denial, 68 Fed. Reg. at 55,910).

The Commission has also recognized that long-range forecasts of need for power are especially uncertain because they depend on many factors, and many of these factors are, themselves, inherently uncertain. *Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4), CLI-79-5, 9 NRC 607, 609-10 (1979). There is a substantial margin of uncertainty in any forecast of future electric power demands, and "[a]s with most methods of

predicting the future, load forecasting involves at least as much art as science." *Niagara Mohawk Power Corp.* (Nine Mile Point Nuclear Station, Unit 2), ALAB-264, 1 NRC 347, 365 (1975). A forecast "should not be discarded as fatally flawed simply because the future course of events is sufficiently clouded to give rise to the possibility of a significant margin of error. . . .[T]he most that can be required is that the forecast be a reasonable one in light of what is ascertainable at the time made." *Kansas Gas and Electric Co. and Kansas City Power and Light Co.* (Wolf Creek Generating Station, Unit No. 1), ALAB-462, 7 NRC 320, 328 (1978) (citations omitted).

In *Nine Mile Point*, the Appeal Board did not find a difference of two years in the date of predicted need for the plant to be a statistically meaningful distinction—the two-year difference was within the margin of error implicit in such predictions. ALAB-264, 1 NRC at 365. Similarly, the Appeal Board noted that, if power from a proposed project is genuinely needed, then that benefit should not be discounted because there is a possibility that the need for power may develop closer to the end than the beginning of the forecast spectrum. *Id.* at 368.

Furthermore, need for power forecasts that are conservative, *i.e.*, tending to project future needs closer to the high than the low end of the demand spectrum, are not automatically suspect because the consequences of demand outstripping capacity are far more serious than the consequences of unneeded generating capacity. *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 410 (1976); *Nine Mile Point*, ALAB-264, 1 NRC at 368-69.

2. FEIS Discussion of Need for Power

Chapter 8 of the FEIS presents the assessment of the review team, which was composed of NRC staff, NRC contractors, and U.S. Army Corps of Engineers staff, of the need for power in the Electric Reliability Council of Texas (ERCOT) region. DEIS-1 Testimony at A4a, A8. The ERCOT region is the relevant service area for evaluating the need for power from STP Units 3 and 4. *Id.* at A22. ERCOT is a nonprofit corporation subject to oversight by the

Public Utility Commission of Texas (PUCT) and the Texas Legislature, and it has responsibility for managing the flow of electric power to Texas customers representing approximately 85 percent of the State's electric load. *Id.* at A23 (citing FEIS at 8-2 (Ex. NRC00003C)). ERCOT is also the central planning organization for electricity needs in the region, and its analyses and reports are the key measures for determining resource needs in Texas. *Id.* (citing FEIS at 8-4 (Ex. NRC00003C)).

The review team focused on the time period from 2015 to 2020 for two reasons. *Id.* at A19. First, the Applicant's ER proposed that commercial operation would begin in March 2015 and March 2016 for the units. *Id.* (citing ER at 1.1-4) (Ex. NRC000036). Second, in the absence of an acceptable need for power evaluation by a state or regional agency, NRC guidance directs the Staff to conduct its own analysis and focus on the time period from the date of application through the third year of commercial operation. *Id.* (citing ESRP 2007 at 8.2.1-3 (Ex. NRC000039)). Based on the Applicant's proposed construction schedule, the year 2020 is a reasonable estimate of the third year of commercial operation. *Id.*

The review team considered the need for baseload generation in the ERCOT region because the Applicant stated that the purpose of STP Units 3 and 4 is to provide baseload generation. *Id.* at A16. In accordance with NRC guidance, the review team relied upon the forecasts and analyses created by (or for) ERCOT after determining that these forecasts and analyses were (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. *Id.* at A24, A25. The ERCOT forecasts are systematic because ERCOT uses industry best-practice econometric methods and has a process that is open to review by numerous stakeholders representing diverse viewpoints and market segments. *Id.* at A25. The review team found the comprehensive criterion to be satisfied because ERCOT considers trends in customer demand, changes in the generation profile, trends in generation by fuel source, forecasts for future electricity sales, transmission congestion, demand management, and electric reliability assessments. *Id.* The ERCOT

forecasts are subject to confirmation in that they are independently reviewed, confirmed, and consolidated by PUCT and the North American Electric Reliability Corporation. *Id.* Further, ERCOT uses historical information as a check on its past forecasting performance. *Id.* Finally, the review team found the ERCOT forecasts to be responsive to forecast uncertainty because they consider the effects of weather uncertainty, particularly temperature, on demand and reserve margin, in addition to considering economic and demographic uncertainty, policy uncertainty, and potential changes to generating resources. *Id.*

For reliability planning, the need for power is a function of the maximum demand for power that is predicted plus a buffer, referred to as reserve margin, of additional available generating capacity. *Id.* at A17. In the ERCOT region, analysts generally use the maximum peak hourly load (peak summer load) as a starting point for planning purposes. *Id.* Because its forecasts focus on peak load, the need for baseload power was not identified by ERCOT. *Id.* at A30. Therefore, the review team had to use data and projections on peak power demand to determine baseload power needs. *Id*.

As stated in the FEIS, the review team first calculated the overall need for generating resources in each year by adding a reserve margin to the projected summer peak demand, which results in the maximum need for generating resources at peak demand. *Id.*; FEIS at 8-26 (Ex. NRC00003C). Then, the review team identified the approximate need for baseload power plants by looking at the minimum demand of the system that occurred during 80 percent of the hours in a year on a load duration curve because baseload plants address this minimum demand and operate almost continuously. *Id.* The review team obtained an estimate of 28,215 MW for 2009 from the load duration curve and then further adjusted that number to account for the fact that a reserve margin does not need to be added to the demand for baseload generating resources because there are plenty of reserve units, such as peaking and intermediate load units, available at the minimum demand to provide additional power if necessary. *Id.* The review team determined that the need for baseload power resources is

approximately 39 percent of the maximum demand for generating resources. *Id.* (citing FEIS at 8-26 (Ex. NRC00003C)).

In the FEIS, the review team considered the combined output of both proposed units at STP to be approximately 2,700 MW. DEIS-1 Testimony at A33 n.12 (Ex. NRC000031) (citations omitted). Using the ERCOT forecast, the Staff calculated that there would be a baseload power need from 0 megawatts (MW) with no plant retirements to 2,337 MW with retirements of plants over 50-years old in 2015 and from 1,995 MW to 6,845 MW in 2020. DEIS-1 Testimony at A32 (Ex. NRC000031). Even when the review team factored into the forecast its sensitivity analyses, which reduced the forecast after assuming new energy conservation programs and additional installed wind generation capability, the review team still concluded there was a need for power from STP Units 3 and 4. *See id.* at A32, A33, A56; FEIS at 8-25 to 8-26 (Ex. NRC00003C). By 2015, if any operating large power plant in the ERCOT region retired, there would be a demand for one or possibly two of the proposed STP units. *Id.* at A33. By 2020, even without any retirements, there would be a need for at least one of the proposed STP units, and under the scenario with a low range of plant retirements, there would be a need for baseload power generation equal to both proposed STP units plus an additional two to three units. *Id.*

In conclusion, the review team found that there is an expected future shortage of baseload power in the ERCOT region. FEIS at 8-32 (Ex. NRC00003C). The proposed units at STP could address the growth in demand for baseload power and the need for replacement of retiring baseload units in the ERCOT region. *Id.* Based on its analysis, the review team concluded that there is a justified need for the planned capacity of both the proposed STP units. *Id.*

3. Issue Raised by DEIS-1

Contention DEIS-1 states as follows:

> NRC Staff's DEIS analysis of the need for power is incomplete because it fails to account for reduced demand caused by the adoption of an energy efficient building code in Texas, the implementation of which could significantly reduce peak demand in the ERCOT region.

South Texas Project, LBP-11-07, 73 NRC at __ (slip op. at 48). The Staff is treating this contention as a challenge to the need for power analysis contained in the FEIS because the FEIS has since been issued and the challenged analysis is substantially similar.[15]

4. The FEIS Did Not Need to Consider the Issue Raised by DEIS-1

At the time the FEIS was published, the most recent ERCOT forecast, compiled in 2010, did not include the adoption of new statewide building energy codes, which occurred later in 2010. *Id.* at A25 at 21-22. ERCOT did not include the potential new rules when generating its 2010 forecast because it does not give credit to legislation, rules, or programs that are not yet in existence. *Id.* As the ERCOT forecasts satisfied the four reliability criteria in NRC guidance, it was reasonable for the Staff to rely upon the analyses, assumptions, and methodologies employed by ERCOT in its assessment of the need for power. *See* FEIS at E-77 (Ex. NRC00003D).

Furthermore, as noted in the FEIS, the reduction in energy demand that the new building energy codes will produce is uncertain, and either was contained in the ERCOT forecast or likely to have a small impact. *Id.*; DEIS-1 Testimony at A39-A40 (Ex. NRC000031). New energy codes have been adopted by Texas municipalities throughout the 2000-2010 decade ahead of statewide passage of new building energy code standards in 2010. Therefore, much of the impact from newer standards would have been included in the ERCOT forecast because the energy savings would have been reflected in the trend in electricity consumption during the

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[15] In the FEIS, the review team did respond to comments received on the DEIS regarding the building energy codes and explained why the new codes were not factored into the review team's calculations in the FEIS.

period that formed the basis for ERCOT's forecast. FEIS at 8-26 (Ex. NRC00003C); DEIS-1 Testimony at A35-A39 (Ex. NRC000031).

The review team considered the size of the impact to be uncertain for a number of other reasons. DEIS-1 Testimony at A40 (citing FEIS at E-76 to E-77) (Ex. NRC00003D). First, because there is some overlap in the target end-uses of the PUCT utility savings programs and the building energy codes, double-counting of impacts is a concern and building energy codes should not be credited for savings resulting from the Public Utility Commission of Texas (PUCT) programs. *Id.* Second, because the new building energy codes would apply only to new structures, their effect depends on how many new structures are built under the new codes. *Id.* Third, only end uses that are actually subject to the building energy codes should be considered, and new codes would not address growth in the increased electrification of household services or increased commercial and industrial equipment loads. *Id.* Fourth, the amount of savings is influenced by how well the code is enforced. *Id.* Fifth, the building energy community recognizes the "take-back" or "rebound" effect, which describes the phenomenon of customers increasing their use of electricity because a given level of comfort would require less energy and cost less to maintain. *Id.* For space heating and cooling, one recent survey found this effect to be in the range of one to 30 percent. *Id.* (citation omitted).

Because it was reasonable for the Staff to rely upon ERCOT's need for power forecasts and because the reduction in electricity demand resulting from the adoption of the new building energy codes was uncertain, the Staff was not obligated to perform a detailed analysis of the effects of the codes in the FEIS. The Staff did address the adoption of the new building energy codes and described its reasons for not performing a detailed analysis. The Staff's review was based upon the best available data, including forecasts from ERCOT, the organization charged by Texas law with electricity planning for the region. Therefore, the Staff fulfilled its NEPA responsibilities in the FEIS. *See Virgil C. Summer Nuclear Station*, CLI-10-01, 71 NRC at __ (slip op. at 21) (quoting NEI Rulemaking Petition Denial, 68 Fed. Reg. at 55,910). As discussed

below, even if the new building energy codes adopted by Texas were considered, the conclusion contained in the FEIS that there is a need for power in the ERCOT region in the relevant time frame, 2015-2020, did not change.

5. Properly Considering an Energy Building Code in Texas Does Not Significantly Reduce Peak or Baseload Demand in the ERCOT Region

In order to address the issue raised in Contention DEIS-1, the Staff performed analyses beyond those contained in the FEIS to evaluate the potential impact the adoption of the building energy codes would have on demand. The building energy codes that Texas adopted in June 2010, the 2009 International Residential Code (IRC) and the 2009 International Energy Conservation Code (IECC), could have an effect on four energy use sectors. DEIS-1 Testimony at A42. The 2009 IRC would affect single-family housing, and the 2009 IECC would impact multifamily housing, commercial buildings, and industrial buildings. *Id.*

In 2007, the American Council for an Energy-Efficient Economy (ACEEE) estimated the effect of future building energy codes on residential electricity demand in all of Texas. *Id.* at A43 (citing ACEEE 2007 at Appendix A (Ex. STP000008)). The Intervenors cited to this same ACEEE report in support of Contention DEIS-1. DEIS Contentions at 4 n.9 (citing the David Power Report at 4, which cites the ACEEE report at 4 & n.12). The Intervenors referenced the ACEEE report for the proposition that adoption of the 2009 IECC could reduce peak summer demand by 2,362 MW by the year 2023. David Power Report at 4.

In order to make it applicable to the ERCOT 2010 forecast, the Staff adjusted the residential savings forecast contained in the ACEEE report in several respects. DEIS-1 Testimony at A44 (Ex. NRC000031). At a minimum, it is "necessary to 1) subtract savings achieved before 2011 in the ACEEE forecast (334 MW), 2) scale the estimated statewide savings to the ERCOT region, and 3) adjust the statewide savings to the 2010 ERCOT reference forecast, which is lower than the ACEEE reference forecast." *Id.* (citation omitted). *See also id.* at A45-A48. The Staff also assumed that the ACEEE did not include energy losses

that occur through transmission and distribution and so increased savings by approximately six percent. *Id.* at A48. The Staff's adjustment to the forecast is likely to be an overestimate of what the residential building energy codes would achieve because the actual amount of savings depends on how effectively builders are trained to meet the code, the quality of code enforcement, and the amount of "take-back" or "rebound" effect on the part of consumers. *Id.* at A50.

After the Staff adjusted the ACEEE peak demand forecast, the savings were reduced by approximately one-half. *Id.* at A49. The savings are also approximately equal to one percent of the ERCOT reference forecasts for the period 2015 to 2020. *Id.* (citing FEIS at Table 8-2 (Ex. NRC00003C)). For comparison, the uncertainty in ERCOT's peak demand forecast for 2015 due to unusually hot or cold weather is approximately eight times the adjusted ACEEE savings forecast for that year. *Id.* Assuming that baseload generation equals 44 percent of peak demand, the incremental need for baseload generation would be reduced by 187 MW in 2015 and 367 MW in 2020. *Id.* at A56, Table 4.

The Staff could not find any forecasts of the impact of the 2009 IECC building energy code standards on peak demand in commercial or industrial buildings in the ERCOT region. *Id.* at A51. However, the Staff prepared an estimate of the impact of the 2009 IECC on commercial and industrial demand. *Id.* at A52. For commercial and industrial buildings, the Staff started with a national estimate of the potential percentage savings of electricity in commercial buildings constructed under the 2009 IECC standard compared with new buildings constructed under the IECC 2006 standard. *Id.* Although the estimate was produced for commercial buildings, the Staff used it for industrial buildings as well because the uses of electricity in industrial buildings that would be affected by building energy codes are very similar to those in commercial buildings. *Id.* The comparison with the 2006 standard is appropriate because the 2006 standard was essentially the average code adopted by Texas jurisdictions in 2010. *Id.* at A35 and Attachment 2. Because many Texas jurisdictions had adopted building energy codes that

were more stringent than what the State had required, the population-weighted average value code for the State was approximately the value for the 2006 IECC code.[16] *Id.* The difference between the 2006 IECC and 2009 IECC code for commercial electricity demand is approximately three percent. *Id.* (citation omitted). Because no official entity in Texas provides reference forecasts for the future growth in the commercial and industrial building electricity demand, the Staff used statewide historical data to estimate growth in demand for these sectors based on average pre-recession growth rates from 2000 through 2008. *Id.* The growth rate was 4.13 percent per year for commercial buildings and 0.74 percent per year for industrial buildings. *Id.* (citing Attachments 4 and 5). The Staff scaled the estimates of future commercial and industrial electricity demand growth in Texas to the ERCOT region, then applied the three percent savings rate to the reference increase in demand expected as a result of construction of new buildings, and finally adjusted the estimate to account for its impact on peak demand and baseload demand. *Id.*

For commercial building electricity demand, the Staff began with a recent estimate of commercial electricity consumption in Texas, which was about 32.7 percent of the total electricity consumed. *Id.* at A53. Then, the Staff estimated the portion of commercial electricity consumption that would be affected by building energy codes and concluded that no adjustment was necessary for commercial buildings because the three percent savings estimate calculates savings for the whole building, including end uses unaffected by building energy codes. *Id.*

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[16] As explained in the DEIS-1 Testimony at Attachment 2 (Ex. NRC000031), the version of the IECC code in use in a Texas jurisdiction was assigned a numerical value. If a jurisdiction had no code in place, the code year value was 0; for the 2000 or 2001 version, the value of 1 was assigned; for the 2003 code, 2 was assigned; for 2006 code, 3 was assigned; and for the 2009 code, 4 was assigned. Those code values were then multiplied by the 2010 population in each jurisdiction to obtain a weighted average score. For Texas, the weighted average code value was 2.99, which is approximately equal to 3, the numeric value assigned to the 2006 version of the IECC code.

Next, the Staff estimated commercial peak electricity demand in ERCOT for 2010 from the last year with actual commercial electricity data consumption available, 2008. *Id.* Then, the Staff estimated the growth rate of new commercial building electricity demand in the absence of new building energy codes after 2010. *Id.* The Staff used an average of the pre-recession growth rates from 2000 through 2008, which was 4.13 percent per year. *Id.* The Staff assumed this rate would be the trend after 2010 in commercial electricity consumption in the ERCOT region and that the peak commercial consumption would also grow at this rate. *Id.* As a result, the Staff determined that there would be a cumulative increase in commercial building demand of 4,583 MW in 2015 and 10,193 MW in 2020. *Id.* The Staff notes that this is an overestimate because it attributes all new commercial electricity demand to new buildings and end uses to which the new building energy codes would apply, but historically, some of the increase in commercial electricity consumption is a result of more intensive use of electricity in existing buildings. *Id.*

The Staff next multiplied the projected commercial demand by the three percent savings rate expected as a result of the adoption of the 2009 IECC code, and also adjusted the figure (in the same manner as for residential buildings) for electricity lost in transmission and distribution. *Id.* The peak commercial savings including line losses is 146 MW in 2015 and 323 MW in 2020. *Id.* Finally, the Staff calculated the need for baseload generation resources, and assuming baseload generation is 44 percent of peak demand, the incremental need for baseload generation would be reduced by 64 MW in 2015 and by 142 MW in 2020. *Id.*

For industrial building electricity demand, the method used was essentially the same as that used for the commercial buildings, except industrial sector data were used. *Id.* at A54. However, since most industrial sector energy use, *e.g.*, pumps, motors, and other equipment, is not subject to building energy codes, the Staff estimated the proportion of industrial energy demand that would be affected by building energy codes using a survey conducted by the

Energy Information Administration. *Id.* Then, the Staff forecasted the reference rate of growth in industrial electricity demand. *Id*.

Industrial electricity use accounts for approximately 30.5 percent of total electricity consumed in Texas. *Id.* at A55 (citation omitted). Although there were no sources that discussed the industrial sector, the Energy Information Administration survey provided information on electricity end uses related to building facilities for the manufacturing sector, and the Staff assumed this subset of the manufacturing sector is equivalent to the industrial sector. *Id.* The electricity end uses that are related to building facilities and would therefore be covered by the building energy codes were facility heating, ventilation, and air conditioning; facility lighting; and other facility support. *Id.* These end uses account for 16.3 percent of the total industrial electricity use. *Id.* (citing Attachment 6). After scaling this number to the ERCOT region, which is about 85 percent of the total Texas demand, the portion of industrial building electricity consumption that could be affected by building energy codes in 2008 was 14,666 million kilowatt hours. The Staff then calculated industrial building peak demand based on the assumption that, as in the commercial building analysis, peak demand in ERCOT is approximately 1.8 times the average level of demand throughout the year. *Id.* The Staff calculated the percentage that industrial building peak demand is of ERCOT total peak demand, and applied that percentage to ERCOT's 2010 peak demand, for an ERCOT industrial building annual peak demand of 3,104 MW in 2010. *Id.*

As with the commercial building analysis, the Staff estimated the growth rate in industrial building electricity demand in the absence of new building energy codes. *Id.* The Staff used an average of the growth rates from 2000 through 2008, which was 0.74 percent per year. *Id.* (citing Attachment 5). The Staff assumed that this growth rate is a trend in industrial building electricity demand and that peak demand attributable to new industrial buildings would also grow at approximately the same rate. *Id.* The Staff calculated "a cumulative reference increase in industrial building demand of 117 MW in 2015 and 237 MW in 2020." *Id.* The growth in

demand from 2010 would be the target of the new building energy codes. *Id.* However, this is an overestimate because it attributes all new industrial building electricity demand to components that would be subject to the new building energy codes. *Id.*

The Staff applied a three percent reduction in electricity use as a result of the new codes, and increased the savings by the same factors used in the commercial analysis to account for line losses in transmission and distribution. *Id.* The resulting peak industrial building savings including line losses would be approximately 4 MW in 2015 and 8 MW in 2020. *Id.* Assuming baseload generation equals 44 percent of peak demand, the incremental need for baseload would be reduced by 1.6 MW in 2015 and 3.3 MW in 2020. *Id.*

In summary, the Staff's analysis of the impacts of the new building energy codes on the demand in residential, commercial, and industrial buildings demonstrates that peak demand would be reduced by less than one percent in 2015 and by approximately 1.5 percent in 2020. *Id.* at A56. These percentages fall within the year-to-year variability in the impacts on demand of hot or cold weather. *Id.* Thus, the Staff concluded that "the building energy codes reduce the need for baseload generation by 253 MW in 2015 and by 513 MW in 2020." *Id.* As discussed previously, the Staff's calculations are likely to be overestimates for several reasons: some of the growth in electricity demand is not due to new building components that would be subject to the codes, some of the calculated savings are lost due to the "take-back" or "rebound" effect, and the ERCOT forecasts implicitly assume that a significant number of Texas jurisdictions would have adopted the 2009 building energy codes even in the absence of State action. *Id.* When the reduction in demand associated with the new building codes for all three energy sectors is factored into the FEIS's analysis of the need for power, the Staff still finds that there is a need for baseload power in the ERCOT region in the period from 2015 to 2020. *Id.* at A57.

Considering that it is likely that at least some of the oldest existing plants in the ERCOT region will retire in the next ten years[17] and that the total reduction in energy demand calculated by the Staff is likely to be an overestimate, the Staff concludes that "there likely still is a need for baseline power in the ERCOT region equivalent to at least one and probably more than both STP Units 2 and 4." *Id.*

6. Conclusion Regarding Contention DEIS-1

The Staff adequately addressed the need for power in Chapter 8 of the FEIS. The FEIS discussion of the need for power reasonably characterized the predicted need for power in the ERCOT region over the relevant time frame for the proposed units at STP. *See Summer*, CLI-10-01, 71 NRC at __ (slip op. at 21) (quoting NEI Rulemaking Petition Denial, 68 Fed. Reg. at 55,910). As the Commission has recognized, long-range forecasts of need for power include uncertainties because they depend upon a number of factors, many of which are inherently uncertain. *See Shearon Harris*, CLI-79-5, 9 NRC at 609-10. The Staff did not include a detailed analysis of the impact of new building energy codes adopted by Texas in 2010 because the impacts were speculative, likely to be partially accounted for already in the ERCOT forecasts, and likely to be minor. However, the Staff performed a detailed analysis of the impacts of these building energy codes to respond to Contention DEIS-1, and in doing so, confirmed that these codes would have a minor impact on the need for power in the ERCOT region during the relevant time frame and that the Staff's conclusion in the FEIS that there is a need for power is still valid.

ERCOT projects peak demand and average demand to grow in the region between 2010 and 2019. FEIS at Figure 8-2 and 8-10 (Ex. NRC00003C). Because there is an increasing

[17] ERCOT does not directly include the potential retirement of existing resources in its forecasts unless the retirement is nearly certain. DEIS-1 Testimony at A25 (at 22), A26. However, its annual Capacity, Demand, and Reserves report shows the consequences of retiring all plants of particularly old vintages, *i.e.*, those 30-, 40-, and 50-years old. *Id.*

trend in electricity demand in the ERCOT region and because it is likely that building energy codes will have only a minor impact on demand, even if the forecasted date of predicted need for the proposed STP units is delayed due to reduced demand from the building energy codes, this will not have a significant impact on the need for power analysis. As noted by the Appeal Board, even if there is a one or two year difference in date of the predicted need for a plant, it is not statistically meaningful because of the margin of error inherent in such forecasting. *See Nine Mile Point,* ALAB-264, 1 NRC at 365. The Staff calculated a reduction in peak demand due to building energy codes of 1,167 MW in 2020. DEIS-1 Testimony at A56, Table 4 (Ex. NRC000031). ERCOT predicted that peak energy demand would grow by 11,710 MW between 2010 and 2020. FEIS at Table 8-2 (Ex. NRC00003C). Because baseload demand in the ERCOT region equals about 44 percent of peak demand (*id.* at 8-10), baseload demand would rise by approximately 5,152 MW by 2020, but the building energy codes would only reduce demand by 513 MW by 2020.

For these reasons, the Intervenors' Contention DEIS-1 does not have merit, and the Board should find that the new building energy efficiency codes do not significantly impact the need for power analysis.

CONCLUSION

For the reasons discussed above, the Staff submits that the Intervenors' contentions are without merit and that the Staff's environmental review complies with the requirements of NEPA. Accordingly, Intervenors' Contentions should be resolved in favor of the Staff.

Respectfully submitted,

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Dated at Rockville, Maryland
This 9th day of May 2011

Staff Attachment 1

Submitted: May 9, 2011

Nuclear Innovation North America LLC, Docket Nos. 52-12-COL and 52-13-COL
August 2011 Contested Hearing

NRC Staff Hearing Exhibits

NRC Staff Exhibit #	Witness/Panel	Description
NRC000001	J. Muir	"Prefiled Direct Testimony of Jessie M. Muir Sponsoring NUREG-1937 Into the Hearing Record" and "Affidavit of Jessie M. Muir Concerning Prefiled Testimony Sponsoring NUREG-1937 Into The Hearing Record."
NRC000002	J. Muir	Statement of Professional Qualifications for Jessie M. Muir.
NRC00003A NRC00003B NRC00003C NRC00003D	J. Muir	NUREG-1937, Volumes 1 and 2, Final Environmental Impact Statement for Combined Licenses (COLs) for South Texas Project Electric Generating Station Units 3 and 4: Final Report (Feb. 2011). Volume 1 (ML11049A000) and Volume 2 (ML11049A001) of the FEIS are contained in the following four exhibits: Ex. NRC00003A (Volume 1, through page 2-47), Ex. NRC00003B (Volume 1, from page 2-48 through the end of Chapter 2), Ex. NRC00003C (Volume 1, from Chapter 3 through the end of Volume 1), Ex. NRC00003D (Volume 2).
NRC000004	R. Emch, Jr.; J. Rishel; D. Anderson	"Prefiled Direct Testimony of Richard L. Emch, Jr., Jeremy P. Rishel, and David M. Anderson Regarding Contention CL-2" and "Affidavit of Richard L. Emch, Jr., Concerning Prefiled Testimony Regarding Contention CL-2" and "Affidavit of Jeremy P. Rishel Concerning Prefiled Testimony Regarding Contention CL-2" and "Affidavit of David M. Anderson Concerning Prefiled Testimony Regarding Contention CL-2."
NRC000005	R. Emch, Jr.	Statement of Professional Qualifications for Richard L. Emch, Jr.
NRC000006	J. Rishel	Statement of Professional Qualifications for Jeremy P. Rishel.
NRC000007	D. Anderson	Statement of Professional Qualifications for David M. Anderson.
NRC00008A NRC00008B	R. Emch, Jr.; J. Rishel; D. Anderson	NUREG/BR-0184, Regulatory Analysis Technical Evaluation Handbook (Jan. 1997) (ML050190193) (portions). Ex. NRC00008A includes the cover page, pages 1.1 and 1.2, and chapter 4. Ex. NRC00008B includes chapter 5 and pages B.1 and B.2.

Submitted: May 9, 2011

Nuclear Innovation North America LLC, Docket Nos. 52-12-COL and 52-13-COL
August 2011 Contested Hearing

NRC Staff Hearing Exhibits

NRC Staff Exhibit #	Witness/Panel	Description
NRC00009A NRC00009B	R. Emch, Jr.; J. Rishel; D. Anderson	Technical Support Document for the ABWR, attachment 1 to NEPA/SAMDA Submittal for the ABWR from J.F. Quirk to R.W. Borchardt (Dec. 21, 1994) (ML100210563). NRC00009A includes the Technical Support Document through page 30. NRC00009B begins on page 31 with "Attachment A: Evaluation of Potential Modifications to the ABWR Design."
NRC000010	R. Emch, Jr.; J. Rishel; D. Anderson	NUREG/BR-0058, Rev. 4, Analysis Guidelines of the U.S. Nuclear Regulatory Commission (Sept. 2004) (ML042820192).
NRC000011	R. Emch, Jr.; J. Rishel; D. Anderson	NUREG/CR-3568, Handbook for Value Impact Analysis (cover pages and page 3.15) (Dec. 1983) (ML062830096).
NRC000012	R. Emch, Jr.; J. Rishel; D. Anderson	NUREG/BR-0058, Rev. 2, Analysis Guidelines of the U.S. Nuclear Regulatory Commission (cover page and page 22) (Nov. 1995) (ML111180434).
NRC000013	R. Emch, Jr.; J. Rishel; D. Anderson	"Final Environmental Assessment by the Office of Nuclear Reactor Regulation, NRC, Relating to the Certification of the US Advanced Boiling Water Reactor Design, Docket No. 52-001," attachment 2 to SECY-96- 077, Certification of Two Evolutionary Designs (Apr. 15, 1996) (ML003708129).
NRC000014	R. Emch, Jr.; J. Rishel; D. Anderson	Environmental Report for STP, Units 3 and 4, Section 7.3, Rev. 4 (Sept. 2010) (ML102860574).
NRC000015	R. Emch, Jr.; J. Rishel; D. Anderson	NUREG/CR-6349, Cost Benefit Considerations in Regulatory Analysis (cover pages and pages 3-2 and 4-8) (Oct. 1995) (ML103050362).

Submitted: May 9, 2011

Nuclear Innovation North America LLC, Docket Nos. 52-12-COL and 52-13-COL
August 2011 Contested Hearing

NRC Staff Hearing Exhibits

NRC Staff Exhibit #	Witness/Panel	Description
NRC000016	R. Emch, Jr.; J. Rishel; D. Anderson	Environmental Report for STP, Units 3 and 4, Section 7.2, Rev. 4 (Sept. 2010) (ML102860573).
NRC000017	R. Emch, Jr.; J. Rishel; D. Anderson	Environmental Report for STP, Units 3 and 4, Section 7.5S, Rev. 4 (Sept. 2010) (ML102860576).
NRC000018	R. Emch, Jr.; J. Rishel; D. Anderson	Bureau of Economic Analysis - National Economic Accounts National Income and Product Accounts Table; Table 1.1.9. Implicit Price Deflators for Gross Domestic Product. (retrieved Apr. 21, 2011) (available at http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=13&ViewSeries=NO&Java=no&Request3Place=N&3Place=N&FromView=YES&Freq=Year&FirstYear=1991&LastYear=2009&3Place=N&Update=Update&JavaBox=no#).
NRC000019	R. Emch, Jr.; J. Rishel; D. Anderson	Bureau of Labor Statistics' Producer Price Index for the commodity of "Electric Power" (BLS 2011| Producer Price Index-Commodities: Series Id: WPU054| 2009/1993) (retrieved Mar. 23, 2011) (available at http://data.bls.gov/timeseries/wpu054 by inputting the year range 1993 to 2009).
NRC000020	R. Emch, Jr.; J. Rishel; D. Anderson	US EIA – Texas Nuclear Profile (Sept. 2010) (available at http://www.eia.doe.gov/cneaf/nuclear/state_profiles/texas/tx.html#_ftnref2).
NRC000021	R. Emch, Jr.; J. Rishel; D. Anderson	Bureau of Economic Analysis, NIPA Handbook: Chapter 5: Personal Consumption Expenditures (pages 5-1 to 5-3). (retrieved May 4, 2011) (NIPA Handbook available at http://www.bea.gov/national/Index.htm. Chapter 5 specifically available at http://www.bea.gov/national/pdf/NIPAhandbookch5.pdf).

Submitted: May 9, 2011

Nuclear Innovation North America LLC, Docket Nos. 52-12-COL and 52-13-COL
August 2011 Contested Hearing

NRC Staff Hearing Exhibits

NRC Staff Exhibit #	Witness/Panel	Description
NRC000022	R. Emch, Jr.; J. Rishel; D. Anderson	Bureau of Economic Analysis, NIPA Handbook: Chapter 6: Private Fixed Investment (pages 6-1 to 6-3) (retrieved May 2, 2011) (available at http://www.bea.gov/national/pdf/NIPAhandbookch6.pdf).
NRC000023	R. Emch, Jr.; J. Rishel; D. Anderson	Potomac Economics, Ltd., 2009 State of the Market Report for the ERCOT Wholesale Electricity Markets (cover page and pages 1, 3, 7, and 29) (July 2010) (available at http://www.puc.state.tx.us/wmo/documents/annual_reports/2009annualreport.pdf).
NRC000024	R. Emch, Jr.; J. Rishel; D. Anderson	Applicant Document STP_173.xls, "Unit Dispatch – Removing All STP Units" (Sept. 14, 2010) (PDF printout of spreadsheet-excerpts).
NRC000025	R. Emch, Jr.; J. Rishel; D. Anderson	Applicant Document STP_175.xls, "Unit Dispatch Base Case" (Sept. 14, 2010) (PDF printout of spreadsheet-excerpts).
NRC000026	R. Emch, Jr.; J. Rishel; D. Anderson	Staff Document - NRC-Staff-modified STP_175.xls, "Unit Dispatch Base Case – Modified to Use 2008 ERCOT Prices and 90 Percent Capacity Factor for Nuclear" (May 9, 2011) (PDF printout of spreadsheet-excerpts).
NRC000027	R. Emch, Jr.; J. Rishel; D. Anderson	Staff Document - NRC-Staff-modified STP_173 – no wind adjustment.xls, "Unit Dispatch – Removing All STP Units – Modified to Use 2008 ERCOT Prices and 90 Percent Capacity Factor for Nuclear" (May 9, 2011) (PDF printout of spreadsheet-excerpts).
NRC000028	R. Emch, Jr.; J. Rishel; D. Anderson	Staff Document - NRC-Staff-modified STP_173 – with wind adjustment.xls, "Unit Dispatch – Removing All STP Units – Modified to Use 2008 ERCOT Prices, 90 Percent Capacity Factor for Nuclear, and 9 Percent Capacity Factor for Wind" (May 9, 2011) (PDF printout of spreadsheet-excerpts).

Submitted: May 9, 2011

Nuclear Innovation North America LLC, Docket Nos. 52-12-COL and 52-13-COL
August 2011 Contested Hearing

NRC Staff Hearing Exhibits

NRC Staff Exhibit #	Witness/Panel	Description
NRC000029	R. Emch, Jr.; J. Rishel; D. Anderson	ERCOT Press Release, 2/2/2011 (available at http://www.ercot.com/news/press_releases/2011/nr02-02-11a).
NRC000030	R. Emch, Jr.; J. Rishel; D. Anderson	Applicant Document STP_174.xls, "Calculations to Support Joint Affidavit" (Sept. 14, 2010) (PDF printout of spreadsheet).
NRC000031	D. Mussatti; M. Scott	"Prefiled Direct Testimony of Daniel C. Mussatti and Dr. Michael J. Scott Regarding Contention DEIS-1" and "Affidavit of Daniel C. Mussatti Concerning Prefiled Testimony Regarding Contention DEIS-1" "Affidavit of Dr. Michael J. Scott Concerning Prefiled Testimony Regarding Contention DEIS-1"
NRC000032	D. Mussatti;	Professional Qualifications of Daniel C. Mussatti
NRC000033	M. Scott	Professional Qualifications of Dr. Michael J. Scott
NRC000034	D. Mussatti; M. Scott	U.S. Army Corps of Engineers and U.S. Nuclear Regulatory Commission 2008. *Memorandum of Understanding: Environmental Reviews Related to the Issuance of Authorizations to Construct and Operate Nuclear Power Plants*. September 12, 2008. Accession No. ML082540354.
NRC000035	D. Mussatti; M. Scott	U.S. Department of Energy-Energy Information Administration (DOE/EIA). 2010. "Electricity Market Module." Assumptions to the Annual Energy Outlook 2010. Report #:DOE/EIA-0554(2010). Available at http://www.eia.gov/oiaf/aeo/assumption/electricity.html.
NRC000036	D. Mussatti; M. Scott	South Texas Project Nuclear Operating Company (STPNOC). 2010. South Texas Project Units 3 and 4 Combined License Application, Part 3, Environmental Report. Sect. 1.1, 8.0, 8.1, and 8.2. Revision 4, Bay City, Texas. Accession No. ML102860592.
NRC000037	D. Mussatti; M. Scott	Electric Reliability Council of Texas (ERCOT), Media Kit: Maps, http://www.ercot.com/content/news/mediakit/maps/ERCOT_Region_map.jpg

Submitted: May 9, 2011

Nuclear Innovation North America LLC, Docket Nos. 52-12-COL and 52-13-COL
August 2011 Contested Hearing

NRC Staff Hearing Exhibits

NRC Staff Exhibit #	Witness/Panel	Description
NRC000038	D. Mussatti; M. Scott	U.S. Nuclear Regulatory Commission (NRC). 2000. *Environmental Standard Review Plan—Standard Review Plans for Environmental Reviews for Nuclear Power Plants.* NUREG-1555, Rev. 0 – Vol. 2. Sect. 8.0. NRC, Washington, D.C. ML003701937.
NRC000039	D. Mussatti; M. Scott	U.S. Nuclear Regulatory Commission (NRC). 2007. *Environmental Standard Review Plan—Standard Review Plans for Environmental Reviews for Nuclear Power Plants.* NUREG-1555, Rev. 1 – Sect. 8.1, 8.2.1, 8.2.2, 8.3, 8.4. NRC, Washington, D.C. ML071810022, ML071810025, ML071810028, ML071810031, ML071810034.
NRC000040	D. Mussatti; M. Scott	U.S. Nuclear Regulatory Commission (NRC). 2010. Staff Memorandum "Addressing Construction and Preconstruction Activities, Greenhouse Gas Issues, General Conformity Determinations, Environmental Justice, Need for Power, Cumulative Impact Analysis, and Cultural/Historical Resources Analysis Issues in Environmental Impact Statements." Rev. 0. ML100760503.
NRC000041	D. Mussatti; M. Scott	Electric Reliability Council of Texas (ERCOT). 2010a. 2010 ERCOT Planning: Long-Term Hourly Peak Demand and Energy Forecast. Austin, Texas. Available at http://www.ercot.com/content/news/presentations/2010/2010%20Long-Term%20Hourly%20Peak%20Demand%20and%20Energy%20Forecast.pdf.
NRC000042	D. Mussatti; M. Scott	Electric Reliability Council of Texas (ERCOT). 2010g. Report on Existing and Potential Electric System Constraints and Needs, December, 2010. Ch. 1-5. Available at http://www.ercot.com/content/news/presentations/2011/2010%20Constraints%20and%20Needs%20Report.pdf.
NRC000043	D. Mussatti; M. Scott	North American Electric Reliability Corporation (NERC). 2010. 2010 Long-Term Reliability Assessment. October 2010. Excerpts. Available at http://www.nerc.com/files/2010_LTRA_v2-.pdf.
NRC000044	D. Mussatti; M. Scott	Donohoo, K. 2007. "Long Term Demand and Energy Forecasting – Planning." Presentation to 2007 Load Forecasting Forum Austin Control Center January 24, 2007. Available at http://www.ercot.com/calendar/2007/01/20070124-LoadForcast1. (Donohoo 2007).

Submitted: May 9, 2011

Nuclear Innovation North America LLC, Docket Nos. 52-12-COL and 52-13-COL
August 2011 Contested Hearing

NRC Staff Hearing Exhibits

NRC Staff Exhibit #	Witness/Panel	Description
NRC000045	D. Mussatti; M. Scott	Electric Reliability Council of Texas (ERCOT). 2010c. ERCOT Using New Forecasting Tool to Prepare for Wind Variability. ERCOT press release. March 25, 21010. Available at http://www.ercot.com/news/press_releases/2010/nr-03-25-10a.
NRC000046	D. Mussatti; M. Scott	Electric Reliability Council of Texas (ERCOT). 2010d. Draft Minutes of the Board of Directors Meeting of Electric Reliability Council of Texas, Inc. November 16, 2010. Available at http://www.ercot.com/committees/board.
NRC000047	D. Mussatti; M. Scott	Electric Reliability Council of Texas (ERCOT). 2010f. ERCOT Long-Term System Assessment, December 2010. Austin, Texas. Available at http://www.ercot.com/content/news/presentations/2011/ERCOT%202010%20Long%20Term%20System%20Assessment.pdf.
NRC000048	D. Mussatti; M. Scott	Kim, H., J. Baltazar, and J. Haberl. 2011. *Estimates of Energy Cost Savings Achieved from 2009 IECC Code-Compliant Single-Family Residences In Texas*. ESL-TR-11-01-01. Energy Systems Laboratory, Texas Engineering Experiment Station, Texas A&M University System. Available at http://www-esl.tamu.edu/docs/terp/2011/ESL-TR-11-01-01.pdf.
NRC000049	D. Mussatti; M. Scott	Building Codes Assistance Project. 2010. Building Codes Assistance Project, Code Status: Texas; Code Status: Commercial. Available at http://bcap-energy.org/node/96; http://bcap-ocean.org/code-status-commercial.
NRC000050	D. Mussatti; M. Scott	Sorrell, S., J. Dimitropoulos, M. Sommerville. 2009. Empirical Estimates of the Direct Rebound Effect: A review. Energy Policy 37: 1356-1371. Excerpts. Available at http://www.sciencedirect.com/science/article/B6V2W-4VFJSC3-1/2/953ff14d93eeb211fc0bc94ec4def56d.
NRC000051	D. Mussatti; M. Scott	Electric Reliability Council of Texas (ERCOT). 2008. About ERCOT. Austin, Texas. Accessed May 13, 2009 at http://www.ercot.com/about/index.

Submitted: May 9, 2011

Nuclear Innovation North America LLC, Docket Nos. 52-12-COL and 52-13-COL
August 2011 Contested Hearing

NRC Staff Hearing Exhibits

NRC Staff Exhibit #	Witness/Panel	Description
NRC000052	D. Mussatti; M. Scott	U.S. Department of Energy-Energy Information Administration (DOE/EIA). 2006a. Annual Energy Outlook 2006 with Projections to 2030. Supplemental Tables to the Annual Energy Outlook 2006, Table 61. Electric Power Projections by Electricity Market Module Region, Electric Reliability Council of Texas. Available at: http://www.eia.gov/oiaf/archive/aeo06/supplement/index.html.
NRC000053	D. Mussatti; M. Scott	Halverson, M. E. Richman, B. Liu, D. Winiarski. 2010. ANSI/ASHRAE/IESNA Standard 90.1-2007 Preliminary Determination Quantitative Analysis. PNNL-19789. Pacific Northwest National Laboratory, Richland, Washington 99352. Available at http://www.energycodes.gov/status/documents/determinations_com_quantitative07.pdf.
NRC000054	D. Mussatti; M. Scott	U.S. Department of Energy-Energy Information Administration (DOE/EIA). 2009. Electric Power Annual 2009 - State Data Tables: Retail Sales of Electricity by State by Sector by Provider, 1990-2009. Electric Power Annual with data for 2009 Report Released: November 23, 2010. Filtered for State: Texas and Industry Sector Category: Total Electric Industry. Available at http://www.eia.gov/cneaf/electricity/epa/epa_sprdshts.html.
NRC000055	D. Mussatti; M. Scott	U.S. Department of Energy-Energy Information Administration (DOE/EIA). 2003. Commercial Building Energy Consumption Survey. Table E5A. Electricity Consumption (kWh) by End Use for All Buildings, 2003. Released September 2008. Available at: http://www.eia.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set19/2003pdf/e05a.pdf .
NRC000056	D. Mussatti; M. Scott	U.S. Department of Energy-Energy Information Administration (DOE/EIA). 2006b. 2006 Energy Consumption by Manufacturers--Data Tables. Table 5.5 End Uses of Fuel Consumption, 2006; Level: National and Regional Data; Row: End Uses; Column: Energy Sources, including Net Electricity; Unit: Physical Units or Btu. Released March 2010. Available at http://www.eia.doe.gov/emeu/mecs/mecs2006/pdf/Table5_5.pdf. (EIA 2006b).

Submitted: May 9, 2011

Nuclear Innovation North America LLC, Docket Nos. 52-12-COL and 52-13-COL
August 2011 Contested Hearing

NRC Staff Hearing Exhibits

NRC Staff Exhibit #	Witness/Panel	Description
NRC000057	D. Mussatti; M. Scott	U.S. Census Bureau. 2010. Population and Housing Occupancy Status: 2010 - State – Place. 2010 Census Redistricting Data (Public Law 94-171) Summary File. GCTPL-2. Filtered for Texas. Available at: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid= DEC_10_PL_GCTPL2.ST13&prodType=table.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
NUCLEAR INNOVATION NORTH AMERICA LLC	)	Docket Nos. 52-012 & 52-013
	)	
(South Texas Project, Units 3 & 4)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the NRC Staff Initial Statement of Position, with Staff Attachment 1 and Exhibits NRC000001 to NRC000057, have been served upon the following persons by Electronic Information Exchange this 9th day of May 2011:

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