

October 7, 2010

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
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)
STP NUCLEAR OPERATING COMPANY) Docket Nos. 52-012 & 52-013
)
)
(South Texas Project, Units 3 & 4))

NRC STAFF ANSWER TO
APPLICANT'S MOTION FOR SUMMARY DISPOSITION OF CONTENTION CL-2

INTRODUCTION

Pursuant to 10 C.F.R. § 2.1205 and the Atomic Safety and Licensing Board's (Board's) Initial Scheduling Order, dated October 20, 2009, the staff of the U.S. Nuclear Regulatory Commission (Staff) answers STP Nuclear Operating Company's (Applicant's) motion for summary disposition of Sustainable Energy and Economic Development Coalition, the South Texas Association for Responsible Energy, and Public Citizen's (Intervenors') Contention CL-2. STP Nuclear Operating Company's Motion for Summary Disposition of Contention CL-2 (Sept. 14, 2010) (Applicant Summary Disposition Motion).¹ For the reasons set forth below and in the attached "Affidavit of James V. Ramsdell and David M. Anderson Concerning the Staff's Review of STPNOC's Updated SAMDA Evaluation" (Staff Affidavit) (Staff Attachment 1), the

¹ Attached to the Applicant's motion is 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).

Staff agrees with the Applicant that no genuine issue of material fact exists and the Applicant is entitled to a decision as a matter of law.²

BACKGROUND

On September 20, 2007, STP Nuclear Operating Company (Applicant), 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 proposed units are known as South Texas Project (STP), Units 3 and 4.

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 __* (Aug. 27, 2009) (slip op.); *South Texas Project Nuclear Operating Co. (South Texas Project Units 3 & 4), LBP-09-25, 70 NRC __* (Sept. 29, 2009) (slip op.). Contention 21 states, "Impacts 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 (Co-location Submission). Subsequently, the Applicant filed a motion to

² Pursuant to Board Order, the Intervenors' and Staff's deadline for responding to the Applicant's motion was extended to October 8, 2010. Order (Granting Intervenors' Motion for Additional Time to Answer), at 2 (Oct. 1, 2010).

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 Intervenor proposed that Contention 21 be amended. Intervenor's Response to Applicant's Motion to Dismiss Contention 21 as Moot (Dec. 14, 2009). Additionally, the Intervenor filed four new contentions regarding co-location issues. Intervenor's 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 Intervenor attached a report by their expert titled "Review of Replacement Power Costs For Unaffected Units At the STP Site" (Intervenor Costs Report).

The Applicant and Staff opposed all of the new contentions. Applicant's Answer Opposing New and Revised Contentions Regarding Environmental Report Section 7.5S (Jan. 22, 2010) (Applicant Answer); NRC Staff's Answer to the Intervenor's Amended and New Accident Contentions (Jan. 22, 2010) (Staff Answer). The Intervenor filed a combined reply to the Staff and Applicant Answers. Intervenor's Consolidated Response to NRC Staff's Answer to the Intervenor's New Accident Contentions and Applicant's Answer Opposing New Contentions Regarding Applicant's Environmental Report Section 7.5S (Jan. 29, 2010) (Intervenor Reply).

The Environmental Protection Agency 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 on March 26, 2010. Environmental Impacts Statements; Notice of Availability, 75 Fed. Reg. 14,594, 14,595 (Mar. 26, 2010). On July 2, 2010, the Board dismissed formerly admitted Contention 21 and denied amended Contention 21 and Co-location Contention CL-1. *South Texas Project Nuclear Operating Co.*

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

(South Texas Project Units 3 & 4), LBP-10-14, 72 NRC __ (July 2, 2010) (slip op.).⁴ The Board admitted, in part, Intervenor's 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). The Applicant then filed "STP Nuclear Operating Company's Request for Leave to File and Motion for Reconsideration of the Board's Decision to Admit Contention CL-2" on July 12, 2010, but the Board denied this motion. Memorandum and Order (Ruling on Motion for Reconsideration of Contention CL-2) (Aug. 10, 2010).

The Staff filed a motion for summary disposition of Contention CL-2 that is still pending before the Board. NRC Staff Motion for Summary Disposition (July 22, 2010) (Staff Summary Disposition Motion). The Intervenor's oppose the Staff motion, but the Applicant supports it. Intervenor's Response to Staff's Motion for Summary Disposition (Aug. 11, 2010); STP Nuclear Operating Company's Answer Supporting the NRC Staff Motion for Summary Disposition of Contention CL-2 (July 29, 2010).

DISCUSSION

I. Legal Standards

The standards for summary disposition under 10 C.F.R. § 2.1205 are the same as those under 10 C.F.R. § 2.710(d)(2). 10 C.F.R. § 2.1205(c) ("In ruling on motions for summary disposition, the presiding officer shall apply the standards for summary disposition set forth in subpart G of this part"). A party is entitled to summary disposition as to all or any part of the matters involved in the proceeding "if the filings in the proceeding, depositions, answers to interrogatories, and admissions on file, together with the statements of the parties and the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter of law." 10 C.F.R. § 2.710(d)(2). "The standards are based upon those the federal courts apply to motions for summary judgment under Rule 56 of

⁴ The Board also dismissed formerly admitted Contentions 8, 9, 14, and 16, and denied amended Contention 8 and Contentions MCR-1 to MCR-5. *Id.*

the Federal Rules of Civil Procedure.” *Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC ___, ___ (Mar. 26, 2010) (slip op. at 11-12) (citing *Advanced Medical Systems, Inc.* (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 102 (1993)).

The movant bears the initial burden of showing that there is no genuine issue as to any material fact, which it attempts to do by means of a required statement of material facts not at issue and any supporting materials that accompany its dispositive motion. *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-23, 49 NRC 485, 491 (1999). If the opposing party fails to counter each adequately supported material fact with its own statement of material facts in dispute and supporting materials, the movant's facts will be deemed admitted. *Advanced Medical Systems*, CLI-93-22, 38 NRC at 102-03. See also 10 C.F.R. § 2.710(b) (“[A] party opposing the motion may not rest upon the mere allegations or denials of his answer,” but rather, “must set forth specific facts showing that there is a genuine issue of fact”). “[T]he mere existence of *some* alleged factual dispute between the parties will not defeat an otherwise properly supported motion for summary judgment; the requirement is that there be no *genuine* issue of *material* fact.” *Anderson v. Liberty Lobby*, 477 U.S. 242, 247-48 (1986) (emphasis in original). Also, “[o]nly disputes over facts that might affect the outcome’ of a proceeding would preclude summary disposition.” *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip op. at 12) (quoting *Liberty Lobby*, 477 U.S. at 248).

In addition, the Commission will reject attempts to add new arguments in an answer to a summary disposition motion that could have been raised earlier. See *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip op. at 29-31). In *Pilgrim*, the new arguments were rejected because they were not fairly encompassed by the contention as originally pled and admitted and because the intervenor did not attempt to amend the contention to add the new arguments. *Id.* at ___ (slip op. at 31).

II. Summary Disposition is Warranted

Contention CL-2, as admitted by the Board, raises issues concerning the severe accident mitigation design alternatives (SAMDA) analysis in the STP Environmental Report (ER). *South Texas*, LBP-10-14, 72 NRC at ___ (slip op. at 31). As explained in the Staff Summary Disposition Motion, Contention CL-2 should be dismissed in its entirety because all SAMDA issues are resolved in this COL proceeding pursuant to 10 C.F.R. Part 52, Appendix A, Section VI.B.7.

As discussed below, however, the Applicant Summary Disposition Motion also demonstrates that there is no genuine dispute of material fact and that summary disposition is warranted. The Applicant argues that there are no cost-beneficial SAMDAs even if the methodology suggested by the Intervenors is used in the SAMDA analysis. Applicant Summary Disposition Motion at 15-16. SAMDAs are a subset of SAMAs. See Licenses, Certifications, and Approvals for Nuclear Power Plants, 72 Fed. Reg. 49,352, 49,426 (Aug. 28, 2007). For a SAMA analysis, the “goal is *only* to determine what safety enhancements are cost-effective to implement.” *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip op. at 39) (emphasis added). Therefore, there is no reason to refine a SAMA analysis “[u]nless it looks genuinely plausible” that a refinement “may change the cost-benefit conclusions for the SAMA candidates evaluated.” *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. As discussed below, the Staff agrees that the Applicant’s analysis shows that a cost-beneficial SAMDA is not identified even if the economic issues raised by the Intervenors are incorporated into the ER Section 7.5S.5 SAMDA analysis.⁵ For this reason, there is no genuine issue of material fact, and the Applicant is entitled to a decision as a matter of law.

⁵ As discussed in the attached affidavit, the Staff would approach certain portions of the analysis differently, but these differences are not material and the Staff agrees that there are no cost-beneficial SAMDAs.

10 C.F.R. § 2.710(d)(2). See also *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip op. at 12) (stating that only disputes over facts with the potential to affect the outcome of the proceeding would preclude summary disposition).

A. The Issues in Dispute

To determine whether there is a genuine issue of material fact, it is first necessary to ascertain the issues in dispute. In NRC practice, the issues in dispute are determined by the scope of the admitted contention. See *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip op. at 28). In this case, the Board admitted, in part, 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).⁶

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).

⁶ 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.

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

Significantly, Contentions CL-2 to CL-4 only raised issues 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 only material to the extent that the economic issues raised by the Intervenor are integrated into the existing analysis to determine whether a cost-beneficial SAMDA would be identified.

The scope of an admitted contention is also based on the board's discussion of the contention when admitting it. See *Pilgrim*, CLI-10-11, 71 NRC at __ (slip op. at 13-16) (discussing the licensing board decision admitting the contention to determine the admitted contention's scope). The Board admitted Contention CL-2 as a contention on SAMDAs. See *South Texas*, LBP-10-14, 72 NRC at __ (slip op. at 31). In admitting Contention CL-2 the Board noted, "[a]s all the parties apparently agree, Contention CL-2 challenges the adequacy of the replacement power costs in the Applicant's ER Amendment that are fundamental to the SAMDA analysis, which is a subset of severe accident mitigation alternatives ('SAMA') analysis." *Id.* (internal footnote omitted). See also *id.* at __ (slip op. at 32) (concluding that Contention CL-2 met the materiality requirement of 10 C.F.R. § 2.309(f)(1)(iv) because the Intervenor asserted that consideration of their issues "could raise the overall monetized impacts to a point in which a SAMDA is cost-effective") (quoting Intervenor Reply at 13). In addition, the Staff's summary disposition motion noted that Contention CL-2 was a SAMDA contention, and the Intervenor did not contest this. See Staff Summary Disposition Motion at 6-7; Intervenor's Response to Staff's Motion for Summary Disposition (Aug. 11, 2010).

The Staff recognizes that, generally speaking, the economic issues raised by Intervenor can apply to analyses of non-design SAMAs, but the ER Section 7.5S.5 analysis and Contention CL-2 are limited to SAMDAs. In performing the cost-benefit comparison in ER Section 7.5S.5, the Applicant concluded, for an accident originating at Units 3 or 4, that there

was “no cost-effective ABWR operation *design* change.” Co-location Submission at 7 (emphasis added). For an accident originating at one of the existing units, the Applicant stated, “None of the *severe accident mitigation design alternatives* considered for the ABWR would be cost effective and mitigate the potential impacts (contamination and down time) from a large release severe accident at the existing units.” *Id.* (emphasis added). ER Section 7.5S.5 is focused on SAMDAs, and because the Intervenors have no admitted contention alleging a failure to identify additional SAMAs, the admitted contention is necessarily limited to the SAMDA analysis conducted in ER Section 7.5S.5.

In addition, in the relevant environmental documents for this proceeding, the only SAMAs that have been specifically identified and for which estimated costs are available are the SAMDAs in the “Technical Support Document for the ABWR,” Revision 1 (TSD). EPA/SAMDA Submittal for the ABWR from J.F. Quirk to R.W. Borchardt, attach. 1 (Dec. 21, 1994) (ML100210563).⁷ Neither the STP ER nor the STP DEIS specifically identified additional SAMAs. See ER at 7.3-3 (Sept. 16, 2009) (Rev. 3) (ML092931583); DEIS at 5-111 (recognizing that STPNOC did not develop procedural and training alternatives, but instead committed to evaluating specific administrative controls when the design is finalized and plant administrative processes and procedures are being developed). SAMA analyses involve a comparison of the cost of implementing a particular SAMA with its estimated benefit to determine whether the SAMA is cost-beneficial. See *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip op. at 3). Therefore, performing the analysis requires an identification of SAMAs and an estimation of the costs of these SAMAs.

Contention CL-2 is also limited to severe accidents originating at the *proposed* ABWR units (Units 3 and 4). The ER Section 7.5S.5 evaluation examines scenarios in which there is a

⁷ As explained in the Staff Summary Disposition Motion, the ABWR TSD contains the SAMDA analysis for the ABWR design certification that was performed by the design certification applicant, GE Nuclear Energy. See Staff Summary Disposition Motion at 8-9.

severe accident at one of the STP units, and the other units have to shut down for cleanup and refurbishment and for policy reasons. See Co-location Submission at 7. Although ER Section 7.5S.5 discusses the economic costs of a severe accident originating at the existing units, the Board held that “any allegations involving only STP Units 1 and 2 are outside the scope of this proceeding and cannot be considered by this Board, which is solely concerned with the licensing of proposed STP Units 3 and 4.” See *South Texas*, LBP-10-14, 72 NRC at ___ (slip op. at 25 n.140). See also Staff Answer at 25-26 (explaining that the impacts of severe accidents at the existing units are not material because the National Environmental Policy Act (NEPA) focuses on the impacts of the proposed action, and the proposed action here is the licensing of Units 3 and 4, not Units 1 and 2).

Finally, the replacement power cost for the severe accident at the originating unit is not within the scope of Contention CL-2. The replacement power cost for a proposed unit experiencing a severe accident was calculated by the Applicant in ER Section 7.3, and this calculation was never challenged by the Intervenor. ER Section 7.5S.5 only calculates the replacement power costs for the other units, which are temporarily shut down because of the accident at the originating unit. See Co-location Submission at 6-7, 9.

In summary, Contention CL-2 is limited to the economic issues raised by Intervenor and the integration of these issues into the existing ER SAMDA analysis for a severe accident at one of the proposed units (Units 3 and 4). The replacement power cost for the unit where the accident occurs is not a disputed issue in this proceeding.

B Contention CL-2 Should Be Dismissed

Contention CL-2 should be dismissed because there is no issue of genuine fact and the Applicant is entitled to a decision as a matter of law. As explained below, even if the economic issues raised by the Intervenor are integrated into the existing ER SAMDA analysis, no cost-beneficial SAMDA is identified. Because the only goal of a SAMDA analysis is to determine whether there is a cost-beneficial SAMDA, see *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip op. at 39),

the issues raised in Contention CL-2 will not affect the outcome of the proceeding. Summary disposition, therefore, is warranted. See *id.* at ___ (slip op. at 12) (Summary disposition would only be precluded by factual disputes potentially affecting the outcome of the proceeding).

1. There Is No Genuine Issue of Material Fact Regarding the Existing ER Evaluation

As discussed above, Contention CL-2 encompasses the economic issues raised by the Intervenor and how these issues are integrated into the existing ER SAMDA analysis for a severe accident at a proposed unit. The facts regarding the existing ER SAMDA evaluation, which is based on the methodology outlined in NUREG/BR-0184, *Regulatory Analysis Technical Evaluation Handbook* (Jan. 1997) (STP Attachment 4), are addressed in Sections I through III of the Applicant Statement of Material Facts. The Staff affidavit addresses proposed material facts I.A to I.F, II.A to II.E, and III.B to III.H in Sections I through III. See Staff Aff. ¶¶ 3-5. The Staff does not dispute these proposed facts with the exception of proposed facts I.D, II.C, and III.F. The Staff Affidavit explains why proposed material facts I.D, II.C, and III.F should be modified and proposes appropriate modifications. See *id.* Significantly, however, the Staff still agrees that there are no cost-beneficial SAMDAs using the approach and methodology outlined in NUREG/BR-0184, even after accounting for the modifications proposed by the Staff. See *id.* ¶ 5(e).

The Staff, however, is not addressing proposed material facts I.G, II.F, and III.A. because they are entirely outside the scope of the admitted contention. Summary disposition standards “are based upon those the federal courts apply to motions for summary judgment under Rule 56 of the Federal Rules of Civil Procedure.” *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip op. at 11-12). For summary judgment purposes, the notion of materiality “includes only those questions that are within the range of allowable controversy in a lawsuit. Under this standard, a fact is material if it tends to resolve any of the issues *that have been properly raised by the parties.*” 10A Charles Alan Wright, Arthur R. Miller, & Mary Kay Kane, *Federal Practice &*

Procedure § 2725, at 419 (3d ed. 1998) (emphasis added). In NRC licensing proceedings, issues are raised through the contention process, and the issues in dispute are determined by the scope of the admitted contention. See *Pilgrim*, CLI-10-11, 71 NRC at ___ (slip op. at 28). See also *id.* at ___ (slip op. at 31) (New arguments in an answer to a summary disposition motion will be rejected if they are not fairly encompassed by the contention as pled and admitted).

Proposed material fact I.G addresses external events and low power and shutdown events. See Applicant Statement of Material Facts at 2. The Applicant's SAMDA analysis, however, relies on the core damage frequency for internal events at full power, so external, low power, and shutdown events are not material to the resolution of Contention CL-2. See *id.* at 5 (proposed material fact III.F.2); Applicant Aff. ¶ 22. Proposed material fact II.F addresses severe accidents originating at STP Units 1 and 2, see Statement of Material Facts at 3, but the environmental impacts of an accident at the existing units are not material to this proceeding, which concerns the licensing of Units 3 and 4. See *South Texas*, LBP-10-14, 72 NRC at ___ (slip op. at 25 n.140). See also Staff Answer at 25-26. Proposed material fact III.A addresses the ER Section 7.3 evaluation of SAMAs involving administrative controls, see Statement of Material Facts at 3, but Contention CL-2 is based on ER Section 7.55.5, which addresses SAMDAs, and is not based on ER Section 7.3. See Co-location Submission at 7 (ER Section 7.5S.5); *South Texas*, LBP-10-14, 72 NRC at ___ (slip op. at 30) (stating the admitted Contention CL-2 in terms of the ER Section 7.5S analysis). For the above reasons, proposed material facts I.G, II.F, and III.A are not material facts.

2. There Is No Genuine Issue of Material Fact Regarding the ER SAMDA Evaluation as Updated to Address Contention CL-2

Sections IV through VIII of the Applicant Statement of Material Facts address the ER SAMDA evaluation as updated to account for the economic issues raised by the Intervenors in Contention CL-2. As explained above, the Intervenors raised the following economic issues: (1) replacement power costs specific to the ERCOT region, (2) increase in ERCOT market prices

due to the market effects of an STP outage, (3) impacts on ERCOT consumers, (4) effects from price spikes, and (5) the impacts of grid outages. See Co-location Contentions at 7-10. The Applicant has addressed all of these issues and concludes that no cost-beneficial SAMDA results. See Applicant Statement of Material Facts at 5-9 (Sections IV through VIII).⁸ The Staff does not dispute any of the proposed material facts in Sections IV through VIII. See Staff Aff. ¶¶ 6-10.⁹

As explained above, no genuine issue of material fact exists, and the Applicant is entitled to a decision as a matter of law. 10 C.F.R. § 2.710(d)(2). Therefore, Contention CL-2 should be dismissed.

CONCLUSION

As shown in the Applicant's updated SAMDA evaluation, as modified by the Staff Affidavit, no cost-beneficial SAMDA is identified even if the economic issues raised by the Intervenors are incorporated into the existing ER Section 7.5S.5 SAMDA analysis. For this

⁸ In original Contention CL-4, the Intervenors raised the issue of *indirect* impacts from price spikes. See Co-location Submission at 9. Although the Applicant does not explicitly address indirect price spike impacts, the Intervenors concerns are focused on frequent price spikes and severe periods of price spikes. See Intervenors Costs Report at 6. The Applicant indirectly addresses the Intervenors' concerns in this regard by (1) accounting for additional price spike impacts beyond 2008 ERCOT prices, (2) explaining that historical price spikes have been primarily due to inefficient zonal management techniques rather than generating station outages, and (3) explaining that inefficient zonal management techniques will be eliminated beginning in December 2010 through the implementation of a nodal market design. See Applicant Statement of Material Facts at 7-8 (proposed material facts VII.B and VII.C). The Staff agrees that the proposed material facts in Section VII are correct. See Staff Aff. ¶ 9. Therefore, the Staff does not believe that there is a genuine issue of material fact regarding indirect effects from price spikes.

⁹ The Applicant updates the ER Section 7.3 calculation of replacement power costs for the unit where the accident occurs. See Statement of Material Facts at 5-6 (proposed material facts IV.A, IV.C, V.A, and V.B); Applicant Aff. ¶¶ 33, 38, and 41. As explained above, however, the ER Section 7.3 calculation of replacement power costs at the unit where the accident occurs is outside the scope of Contention CL-2. Therefore, the updates to the ER Section 7.3 calculations are not material facts.

reason, there is no genuine issue of material fact, and the Applicant is entitled to a decision as a matter of law. 10 C.F.R. § 2.710(d)(2). Contention CL-2 should be dismissed in its entirety.

Respectfully submitted,

/Signed (electronically) by/

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Dated at Rockville, Maryland
this 7th day of October 2010

REQUIRED CERTIFICATION

I certify that I have made a sincere effort to make myself available to listen and respond to the moving party, and to resolve the factual and legal issues raised in the motion, and that my efforts to resolve the issues have been unsuccessful.

/Signed (electronically) by/

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NUCLEAR REGULATORY COMMISSION

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STP NUCLEAR OPERATING COMPANY) Docket Nos. 52-012 & 52-013
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(South Texas Project, Units 3 & 4))

CERTIFICATE OF SERVICE

I hereby certify that copies of the "NRC STAFF ANSWER TO APPLICANT'S MOTION FOR SUMMARY DISPOSITION OF CONTENTION CL-2," with attachments, have been served upon the following persons by Electronic Information Exchange this 7th day of October 2010:

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STAFF ATTACHMENT 1

October 7, 2010

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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(South Texas Project, Units 3 & 4))

AFFIDAVIT OF JAMES V. RAMSDELL AND DAVID M. ANDERSON
CONCERNING THE STAFF'S REVIEW OF STPNOC'S UPDATED SAMDA EVALUATION

James V. Ramsdell (JVR) and David M. Anderson (DMA),¹ do hereby state as follows:

1(a). (JVR) I am a scientist on the technical staff of the Pacific Northwest National Laboratory, Radiological and Nuclear Science and Technology Division. I have been involved in atmospheric transport and dispersion studies for more than 40 years, and I have been involved in modeling the consequences of radiological releases for more than 30 years. I was project manager for the preparation of NUREG-1555, *Environmental Standard Review Plan*, and was the overall project manager for the environmental reviews of more than 10 license renewal applications and for the Clinton, North Anna, and Grand Gulf early site permit applications. In addition, I have prepared EIS sections on meteorology, air quality, and postulated accidents for a number of COL applications. I prepared DEIS Section 5.11.3, "Severe Accident Mitigation Alternatives." A statement of my professional qualifications is attached hereto.

1(b). (DMA) I am a Senior Research Economist on the technical staff of the Pacific Northwest National Laboratory, Energy and Efficiency Division. I have been involved in

¹ In this Affidavit, the identity of the affiant who supports each numbered paragraph is indicated by the notation of his initials in parentheses.

economic impact studies for more than 20 years, and I have been involved in assessing baseload power needs associated with nuclear power plants over the previous 4 years. I contributed to the preparation of NUREG-1555, *Environmental Standard Review Plan*, and subsequent revisions and have prepared EIS sections on socioeconomics, benefits and costs, need for power, environmental justice and land use for a number of ESP and COL applications. A statement of my professional qualifications is attached hereto.

2. (JVR, DMA) In this affidavit, we discuss the staff's review of STPNOC's updated SAMDA evaluation, performed in response to the Intervenors' Contention CL-2, and the Statement of Material Facts accompanying the STPNOC motion for summary disposition, dated September 14, 2010. The updated SAMDA evaluation is contained in the proposed ER revision dated November 10, 2009, and the affidavits accompanying the STPNOC motion for summary disposition.

3. (JVR) I have reviewed the statements made in paragraphs A through F of Section I. Proposed Project in the Statement of Material Facts. The statements are correct with the exception of paragraph D, which should be modified to become: "STP Units 3 and 4 each have a net electrical output rating of approximately 1300 MWe." The basis for this modification is that the net electrical output for the proposed ABWR reactors is given as 1300 MW(e) in Sections 1.1.2.3, 3.1.2 and 3.2.1 of the STPNOC Environmental Report and on page 3-3 of the NRC Staff's Draft Environmental Impact Statement, rather than the 1350 MW(e) stated in paragraph I.D of the Statement of Material Facts. This error is not material because the costs for the STPNOC motion are based on scaling to 1350 MW(e), which would increase the potential benefits of SAMDAs over scaling to 1300 MW(e). Thus, the STPNOC analysis is conservative.

4(a). (JVR) I have reviewed the statements made in paragraphs A, B, D, and E of Section II. SAMDAs of the Statement of Material Facts; they are correct.

4(b). (JVR, DMA) The statement in paragraph C of Section II is correct if one uses the Bureau of Labor Statistics' Consumer Price Index (CPI) to adjust SAMDA costs for inflation.

4(c). (DMA, JVR) However, the Bureau of Economic Analysis' Gross Domestic Product Implicit Price Deflator for Nonresidential Structures is the appropriate index to use to adjust the cost of SAMDAs for inflation because SAMDAs relate to structural alternatives in plant design and the GDP deflators are more specific to private capital investment than the CPI. The CPI measures changes in price faced by retail consumers across a typical "market basket" and would not be appropriate for escalating the costs of SAMDAs. Using this index, the lowest-cost ABWR SAMDA is approximately \$225,000, rather than \$158,000, which is the amount provided in paragraph C. Therefore, paragraph C should be modified to become: "The lowest-cost SAMDA for an ABWR is \$100,000 in 1991 dollars. In 2008 or 2009 dollars, the lowest-cost SAMDA is approximately \$225,000." This difference, however, is not material in that it does not change the conclusions.

5(a). (JVR) I have reviewed the statements made in paragraphs B and C of Section III. STPNOC's SAMDA Evaluation in ER Sections 7.3 and 7.5S.5 of the Statement of Material Facts; they are correct. The statements in paragraphs D, E, F, and G are correct insofar as they reflect the procedure followed in the STPNOC-updated SAMDA analysis.

5(b). (JVR) The outage duration assumptions in paragraph III.D are reasonable.

5(c). (DMA) The discount rate assumption in paragraph III.E is reasonable.

5(d). (JVR) However, the scaling discussed in paragraph III.F is incomplete. The scaling should include consideration of the plant capacity factor as well as the power level. The capacity factor assumed in NUREG/BR-0184 is 60 to 65%. NUREG/BR-0184, *Regulatory Analysis Technical Evaluation Handbook*, at 5.51 (Jan. 1997) (STP Attachment 4). Recent operational experience at STP Units 1 and 2 indicates that they are operating with a 95 to 96% capacity factor. U.S. Energy Information Administration (Sept. 2009, accessed Sept. 2010) (Staff Attachment 2). Although the Benefit-Cost analysis in ER Section 10.4.1.1, Rev. 3, (Sept. 16, 2009) (ML092931597), assumes a capacity factor range of 85 to 93%, it is reasonable to assume that the proposed ABWR Units would also operate with a 95% capacity

factor for the purpose of screening SAMDA costs. With these values, a capacity scaling factor of 1.58 (95/60) should be included in the estimates of replacement power costs for the unaffected units. Therefore, the following should be added to the Statement of Material Facts as paragraph F.3 of Section III: "The NUREG/BR-0184 short-term replacement power cost value given in paragraph III.C, above, should be multiplied by a scaling capacity factor of 1.58 to account for the difference between the capacity factor assumed in NUREG/BR-0184 and the 95% capacity factor that is reasonable to assume for this analysis."

5(e). (JVR) After considering the factors mentioned above, I conclude that the statement in paragraph III.H is correct. Using the approach and methodology outlined in NUREG/BR-0184, there are no cost-beneficial SAMDAs. The cost of replacement power would have to increase substantially before the lowest-cost SAMDA would pass initial screening. The difference between benefits and costs would be even larger than they are using the NUREG/BR-0184 analysis if the actual potential benefits of the SAMDAs based on reduction of risk were to be considered, rather than assuming that each SAMDA eliminated all risk.

6. (DMA, JVR) We reviewed the statements in paragraphs A, B, and C of Section IV. ERCOT Cost Data of the Statement of Material Facts; they are correct.

7. (DMA, JVR) We reviewed the statements in paragraphs A and B of Section V. Intervenors' Replacement Power Cost Estimates of the Statement of Material Facts; they are correct.

8. (DMA, JVR) We reviewed the statements in paragraphs B and C of Section VI. ERCOT Market Effects of the Statement of Material Facts; they are correct. Paragraph A represents a reasonable assumption.

9. (DMA, JVR) We reviewed the statements in paragraphs A, B, and C of Section VII. Price Spikes of the Statement of Material Facts; they are correct.

10. (DMA, JVR) We reviewed the statements in paragraphs A, B, and E of Section VIII. Grid Outages of the Statement of Material Facts; they are correct. Paragraphs C and D represent reasonable assumptions.

11. (JVR) I hereby certify under penalty of perjury that the foregoing is true and correct to the best of my knowledge, information, and belief.

12. (DMA) I hereby certify under penalty of perjury that the foregoing is true and correct to the best of my knowledge, information, and belief.

Executed in Accord with 10 CFR § 2.304(d)

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RESUME

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EDUCATION

B.S.	General Sciences, Oregon State University, Corvallis, Oregon	1961
M.S.	Meteorology, Oregon State University	1962
	Graduate Study, Atmospheric Sciences, University of Washington, and Joint Center for Graduate Study, Richland, Washington	1968-1976

EXPERIENCE

Mr. Ramsdell has been a member of the Battelle staff since 1967. He has worked as an individual contributor, as a member of intra- and interdisciplinary research teams, and as a project leader for intra- and interdisciplinary research teams. His areas of expertise include: research planning and organization, dispersion modeling, and applied atmospheric boundary layer description. He has reviewed manuscripts for the editors of: *Science*, *Journal of Climate and Applied Meteorology*, *Atmospheric Environment*, *Health Physics*, *Nuclear Technology*, *Solar Energy*, and the *Journal of Energy*, and he has been on review teams for the U.S. Department of Energy, the U.S. Nuclear Regulatory Commission, the U.S. Environmental Protection Agency, and the National Research Council. In addition, he has made presentations to National Academy of Sciences Review Panels, to the U.S. Nuclear Regulatory Commission's Advisory Committee on Reactor Safeguards, and has appeared as a witness in hearings before the U.S. Nuclear Regulatory Commission's Atomic Safety and Licensing Board.

- Review of Applications for Construction and Operation of New Nuclear Power Plants. Mr. Ramsdell is the assistant project manager for several U.S. Nuclear Regulatory Commission projects related to the review of applications for new nuclear power plants. These projects include work to develop the infrastructure to support application reviews by NRC and PNNL staff, readiness assessment reviews of progress in preparation of applications, and review of the applications. In addition, Mr. Ramsdell has contributed technically in each of these areas. He has helped prepare review guidance, he has led readiness assessment teams, and he is a subject matter expert for review of the meteorological and accident assessment portions of the applications. Mr. Ramsdell also assists in the review of Emergency Plans submitted as part of the applications.
- Program Plan for Environmental Review of Nuclear Reactor New Deployment. At NRC's request, in late 2005 and early 2006 a team of senior PNNL staff, under Mr. Ramsdell's direction, prepared a program plan for PNNL's environmental review of applications for new power reactors. The program plan addressed the scheduling, staffing, and resources needed to conduct simultaneous environmental reviews for as many 12 new nuclear power plants in the 2007 through

2009 time frame. The plan addressed infrastructure and preapplication measures to support the reviews. Finally, the plan addressed risks to schedules and actions to ameliorate those risks. This program plan formed the basis for a 5-year Basic Ordering Agreement with NRC that has a value of about \$10 million per year.

- Review of Early Site Permit Applications. Mr. Ramsdell is the manager of projects assisting the U.S. Nuclear Regulatory Commission in reviewing applications and preparing environmental impact statements for Early Site Permits (ESP) for new nuclear power plants. Three ESP applications were submitted in the fall of 2003. Draft EISs were completed in late 2004 and early 2005, and Final EISs were published in 2006. Mr. Ramsdell presented oral and written testimony before the NRC Atomic Safety and Licensing Board for the hearings, which have been completed on the three applications, and the three early site permits have been issued. Review of a fourth ESP application started in August 2006 and the EIS was published in August 2008.
- Environmental Impact Statements for Nuclear Power Plant License Renewal. Mr. Ramsdell is the manager of a project that is assisting NRC staff in preparation of site specific supplements to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, NUREG-1437. These supplements contain site-specific reviews of environmental issues related to renewal of nuclear power plant operating licenses for which generic conclusions could not be reached in NUREG-1437. In addition, the supplements address issues that were not considered previously, or for which there is new information.
- Tornado Climatology. In April 2005, Mr. Ramsdell completed an update of the 1986 climatology of tornadoes in the contiguous United States that was prepared for the U.S. Nuclear Regulatory Commission. The climatology, which covers more than 46,000 tornado segments observed between 1950 and August 2003, estimates tornado strike probabilities for 1°, 2°, and 4° latitude and longitude boxes. Design wind speeds with probabilities of being exceeded by 10^{-5} , 10^{-6} , and 10^{-7} per year are also estimated for these boxes. Design wind speeds are also estimated for three regions of the country at the three probability levels. This climatology was updated again in December 2006 to evaluate the implications of a change in the relationship between tornado damage and maximum wind speed proposed by the National Weather Service.
- Dispersion Modeling. Mr. Ramsdell is a lead scientist in development of applied atmospheric dispersion models at Battelle. He specializes in development of models for atypical applications. He has developed and validated models for dispersion under low wind speed conditions and for dispersion in the vicinity of buildings. He developed a set of models to evaluate potential consequences of a release of material associated with a potential collapse of the shelter covering the Chernobyl Unit 4 reactor. He developed and validated the dispersion model used in the Hanford Environmental Dose Reconstruction (HEDR) Project which examined the consequences of the release of ^{131}I from the Hanford Site, and he developed the atmospheric dispersion and dose calculation models that are part of the U.S. Nuclear Regulatory Commission's Radiological Assessment System for Consequence Analysis (RASCAL).

Each of these models represented an advance in the state of the art of applied dispersion modeling. The models of dispersion in low wind speed conditions and in the vicinity of buildings are being considered by the U.S. Nuclear Commission for use as standard models for regulatory purposes. The Chernobyl model included multiple plumes with variation of particle sizes and densities as a function of distance within a Gaussian model framework, The RATCHET code, developed for the Centers for Disease Control and Prevention as part of the HEDR Project, explicitly treats uncertainty in the input data to produce a range of

estimates of concentration in the environment that are consistent with the available data and has become the standard dispersion model for use in Dose Reconstruction Studies for DOE sites. RASCAL is used by the U.S. Nuclear Regulatory Commission and others to estimate source terms, atmospheric dispersion, and doses during emergencies at nuclear power plants. Version 3.0.5 of RASCAL includes a model for UF₆ releases at fuel cycle facilities. This new model combines a dense-gas dispersion model with a thermodynamic model of the reaction of UF₆ and water. Version 3.0.5 of RASCAL also includes calculations that provide intermediate phase dose estimates for comparison with EPA's protective action guides. Mr. Ramsdell is currently leading the project to update RASCAL and to update the NRC's PAVAN code, which was last updated in the 1980s.

Mr. Ramsdell also assisted in upgrading the atmospheric dispersion models in the GENII code; upgrading the atmospheric dispersion models used in assessing nuclear power plant control room habitability; and development of a Monte Carlo model to estimate release rates from environmental monitoring data.

- Generic Environmental Impact Statements for Decommissioning Nuclear Power Plants. Mr. Ramsdell was part of a PNNL team that reviewed the environmental impacts of decommissioning nuclear power reactors. Based on the results review, the team prepared an update to NRC's *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities*, NUREG-0586.
- Environmental Impacts of Extending Reactor Fuel Burnup Above 60 GWd/MTU. Mr. Ramsdell led a study to evaluate the environmental impacts of increasing the burnup of reactor fuel (increasing the energy extracted from the fuel). This study included evaluation of changes in the radionuclide inventory in the fuel and releases of radionuclides to the gaps in fuel rods as burnup increases, changes in impacts associated with the front-end of the nuclear fuel cycle and normal reactor operations, changes in potential impacts of postulated reactor accidents, changes in impacts of transportation of spent nuclear fuel, and the economic effects of increasing fuel burnup.
- Environmental Review Plans. Mr. Ramsdell managed a project to review and update the U.S. Nuclear Regulatory Commission's *Environmental Standard Review Plans for the Environmental Review of Construction Permit Applications for Nuclear Power Plants*. These environmental standard review plans (ESRPs) had not been updated since they were written in the late 1970s. The updated document, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants*, NUREG-1555, was published for public comment in October 1997. The final document was published in March 2000. A supplement to the ESRPs, dealing specifically with environmental reviews associated with nuclear power plant license renewal, was also published in March 2000.

As part of this project PNNL assisted the NRC staff in preparation of a supplement to its *Final Environmental Statement Related to the Operation of the Watts Bar Nuclear Plant, Units 1 and 2*. Another portion of the project involved assisting the NRC staff in identification of the measures necessary to ensure that activities in and around nuclear power plants comply with and further the purposes of the Endangered Species Act.

- Emergency Response Planning. Mr. Ramsdell has been an NRC observer for nuclear power plant emergency exercises and a member of emergency response facility appraisal teams. He has been involved in several studies related to emergency response planning. He led a team that reviewed criteria used by NRC to evaluate dispersion models for emergency response applications. The review covered the areas of: non-buoyant releases from

buildings and building vents, elevated release diffusion rates, and identification of fumigation conditions and fumigation climatology.

- Extreme Wind Analyses. Mr. Ramsdell was lead scientist in the development of techniques for estimating extreme winds for use by the NRC in probabilistic risk assessments. This work has led to new techniques for adjusting extreme winds to a standard measurement height and computation of tornado strike probabilities. Published products include a tornado climatology for the contiguous United States and a report that describes a procedure for estimating extreme winds using readily available wind data.
- Environmental Impact Statements. Mr. Ramsdell has contributed to both the preparation of environmental impact statements for Battelle's industrial customers and the review of early (1970s) environmental reports submitted to the Nuclear Regulatory Commission. In 1974 he wrote a detailed review of the instrumentation for meteorological monitoring programs at nuclear power plant sites. Mr. Ramsdell is involved in the continuing evaluation of the environmental impacts of the development of the Department of Energy's Hanford Area.

PROFESSIONAL AFFILIATIONS

American Meteorological Society
Health Physics Society

JAMES V. RAMSDELL, JR.

Scientific Articles

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Presentations

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Ramsdell, J. V. 1981. "Atmospheric Transport Modeling." Paper presented at the Nuclear Regulatory Commission Workshop on Meteorological Aspects of Emergency Response Plans for Nuclear Power Plants, December 1-3, 1981, Menlo Park, California.

David M. Anderson
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SUMMARY

Performed, planned, managed, and published technical economic and policy analysis in the areas of regional economics, community economic development, socioeconomic impact assessment, economic and market survey analysis, energy economics, and agriculture and natural resource economics.

- + National Environmental Policy Act (NEPA) planning and economic impact modeling.
- + Nuclear Regulatory Commission Early Site Permit and License Renewal EIS Team.
- + Local economic development analytical support.
- + National and regional economic input-output modeling and analysis.
- + Economic and performance analysis of energy efficiency issues.
- + Natural resource economics including tourism, water, agriculture, forestry.
- + Environmental justice and other socioeconomic analysis.
- + Database and GIS development and application.
- + Energy efficiency policy analysis.
- + Banking regulatory performance assessment.
- + Internet measurement and web development.
- + Computer resource in most application software.

EDUCATION

M.S. Forest Economics, Oregon State University, 1991
B.S. Forest Resources, Oregon State University, 1989

EXPERIENCE

SENIOR RESEARCH ECONOMIST

Battelle Pacific Northwest Division, Pacific Northwest National Laboratory, Richland, Washington, 1991-1997, and 2001-.

Performed, planned, managed, and published technical economic and policy analysis in the areas of regional economics, community economic development, socioeconomic impact assessment, economic and market survey analysis, energy economics, and agriculture and natural resource economics.

- + National Environmental Policy Act (NEPA) planning and economic impact modeling for NRC and other Federal agencies.
- + Resource Coordinator or subject matter expert for NRC New Reactors Office in the areas of Socioeconomics/Environmental Justice, Need for Power, and Land Use resources.

- + Utility grid energy efficiency analysis and transmission planning.
- + Critical Infrastructure Protection and other DHS economic analysis.
- + National and regional economic input-output modeling and analysis.
- + Economic and performance analysis of energy efficiency issues.
- + Natural resource economics including tourism, water, agriculture, forestry.
- + Database and GIS development and application.
- + Energy efficiency policy analysis.
- + Banking regulatory performance assessment.

CORPORATE COMMUNITY REINVESTMENT ANALYST

Washington Mutual Bank, Community Reinvestment Resources Department, Seattle, Washington, 1997-2001.

- + Initiated and developed the analysis and reporting capability relating to the Community Reinvestment Act (CRA) at Washington Mutual, the nation's largest residential lender.
- + Analyzed and reported national, regional, and localized mortgage, consumer, and small business lending performance, including analytical mapping.
- + Developed goals and associated measures for administration of CRA lending programs nationally, including a 10-year \$120 billion Community Commitment.
- + Tracked the regional economies of Washington Mutual's nationwide markets.
- + Performed detailed demographic, political, and market analyses of specific underserved banking markets such as low and moderate-income borrowers, minority markets, traditionally underserved neighborhoods, and rural markets.
- + Regularly prepared presentation materials, figures, and summaries for executive management and the CEO.
- + Supported a nationwide staff of outreach officers by providing them with market performance, regional economic, analytical mapping, and lending performance reporting products.
- + Developed large-scale databases to support corporate lending performance reporting needs.
- + Developed regulatory exam materials for use by bank examiners to aide in determining CRA compliance ratings.
- + Led the technology needs assessment effort in the Department, including complete systems reengineering and integration of internet functionality as part of a corporate initiative.
- + Integrated CRA performance reporting systems of acquired institutions in three major corporate mergers.

RESEARCH ASSISTANT

Oregon State University, College of Forestry, Corvallis, Oregon, 1989-1991

Graduate Research Assistant in the Forest Economics program. Participated in numerous natural resource economics and policy research activities including work to develop innovative approaches to managing the recovery of the Northern spotted owl on federal lands in Oregon. Also contributed to a market research study of Alpine Lakes Wilderness permittees. Assisted in design of complex survey instrument and sampling methodology. Provided survey database technical support to several market research studies. Masters Thesis project involved modeling of tourism expenditures on the Mount Hood National Forest to determine their economic impact on the Portland metro area economy. Began as an undergraduate research assistant, 1987-89.

INDEPENDENT CONSULTANT

Self Employed, Corvallis, Oregon, 1988-1991

Consulted on research projects peripheral to the Oregon State University, College of Forestry. These included natural resource interpretation design, field research on resource interpretation site development, socioeconomic research, and travel and tourism research projects. Various intermittent projects for professors working on the side from 1988-1991.

RECREATION RANGER

U.S. Bureau of Land Management, Burns District, Burns, Oregon, Summer 1988.

Responsible for visitor services on the 2.7 million acre Andrews Resource Area. Duties included visitor services and monitoring within the 200,000 acre Steens Mountain Recreation Lands. Administered the "Interim Management Plan" for 1.1 million acres of proposed wilderness including inventory, reconnaissance, and restoration of damaged sites. Undergraduate Internship: Produced visitor use report and economic valuation of Steens recreation.

COMPUTER LAB TECHNICAL SUPPORT

O.S.U. College of Forestry, Corvallis, Oregon, 1987-1989.

Responsible for operation of the College's PC workstation computer facility that services the entire forestry education and research communities of Oregon State University. Helped students and staff learn computer techniques. Taught training and orientation courses. Served as teaching assistant in several computer applications courses.

PROGRAM ASSISTANT

O.S.U. Outdoor Recreation Center, Corvallis, Oregon, 1987-1990

Responsible for development and implementation of "Discovery Program". Planned and administered outdoor recreation program's trips and outdoor classes in the areas of hiking, backpacking, canoeing, nordic and alpine skiing, mountain climbing, caving, whitewater rafting, and wildlife viewing for the University community.

PARK RANGER

U.S. Army Corps of Engineers, Cottage Grove and Dorena Projects, Cottage Grove, Oregon, Summer 1987.

Responsible for visitor services on Cottage Grove and Dorena Reservoir projects. Duties included interacting with park and campground visitors in several developed parks and campgrounds, monitoring of undeveloped primitive campsites, providing interpretive services, including dam tours, and assisting in wildlife habitat restoration activities.

CANNERY WORKER

Various companies and plants, Salem/Stayton/Brooks, Oregon, Summers of 1980-1986.

Jobs included raw product inspection, equipment sanitation, fork lift driver, product freezing tunnel operator, and general equipment trouble shooting. Products ranged from berries and cherry crops to corn, green beans, broccoli, and cauliflower crops.

PUBLICATIONS:

Anderson DM, VL Bailey, KA Cort, RJ Orth, and MJ Scott. 2008. "Biofuel Mandates and Mass Balance: Community-Level Socioeconomic and Land Use Impacts in the Pacific Northwest." Presented by David Anderson (Invited Speaker) at Joint Genomics: GTL Awardee Workshop VI and Metabolic Engineering 2008, Bethesda, MD on February 11, 2008. PNNL-SA-59012.

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Anderson DM. 2002. "FY 2000 Buildings Energy Savings Estimates under Uncertainty: Developing Approaches for Incorporating Risk into Buildings Program Energy Efficiency Estimates." PNNL-14075, Pacific Northwest National Laboratory, Richland, WA.

Anderson DM, Scott MJ, Bunn AL, Fowler RA, Prendergast EL, Miley TB and Eschbach TO. 2002. "2001 Columbia River Recreation Survey -- Implications for Hanford Site Integrated Assessment." PNNL-13840, Pacific Northwest National Laboratory, Richland, WA.

Anderson, D. M., 1997, "Practicing Responsible Tourism: International Case Studies in Tourism Planning and Development," a book review, *Journal of Regional Science* 37(2):373-374, 1997.

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Anderson, D. M., P. Godoy-Kain, A. Y. Gu, C. A. Ulibarri, 1996, Socioeconomic Effects of DRAFT Power Marketing Options for the Central Valley and Washoe Projects: 2005 Regional Economic Impact Analysis Using IMPLAN, PNNL-11135, Pacific Northwest National Laboratory, Richland, Washington, April 1996.

Anderson, D. M., 1995, Economic Impact of Selected Energy-Intensive Industries on the Economies of the United States, California, Georgia, Michigan, Ohio, and Texas. Invited presentation at the First Industrial Energy Efficiency Symposium and Exposition, Washington, DC, May 1-3, 1995; sponsored by the DOE Office of Industrial Technology.

Anderson, D. M., 1995, "Everyday Travel Through Cyberspace", *Inventor-Assistance Program News*, No. 39, February, 1995, pp. 5-10. A publication of the Department of Energy's States Inventors Initiative.

Anderson, D. M., T. L. Marsh, D.E. Deonigi, 1994, "Developing Food Production and Consumption Information for Use in Dose Estimation", PNWD-SA-3960 HEDR, Poster Session Presented at the Health Physics Society 39th Annual Meeting, San Francisco, California, June 26-30, 1994.

Anderson, D.M., and M. J. Scott, 1993, "Valuing the Salmon Resource: Columbia River Stocks Under Climate Change and Fisheries Enhancement", *Proceedings of the 27th Annual Pacific Northwest Regional Economic Conference*, pp. 83-88. Northwest Policy Center, University of Washington, Seattle, Washington.

Anderson, D.M., D.J. Bates, T.L. Marsh, 1993, "Estimation of 1945 to 1957 Food Consumption," PNWD-2113-HEDR, Battelle Pacific Northwest Division, Richland, Washington.

Anderson, D.M., S.A. Shankle, M.J. Scott, D.A. Neitzel, and J.C. Chatters, 1992, "Costs of Climate Change: Economic Value of the Yakima River Salmon", PNNL-SA-20998, Presented at the 67th Annual Conference of the Western Economics Association International, San Francisco, California, July, 1992.

Anderson, D.M., S.A. Shankle, M.J. Scott, D.A. Neitzel, and J.C. Chatters, 1993, "Costs of Climate Change: Economic Value of the Yakima River Salmon", *Contemporary Policy Issues*, XI:4, October 1993, pp. 82-94.

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Cort KA, DM Anderson, DB Belzer, JA Dirks, and DJ Hostick. 2005. "Technical Appendix: GPRA FY06 Building Technologies Program Documentation." *Projected Benefits of Federal Energy Efficiency and Renewable Energy Programs FY 2006 - FY 2050*. DOE-EERE, Washington, DC.

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Department of Energy, 1996, "Waste Isolation Pilot Plant Disposal Phase Draft Supplemental Environmental Impact Statement," DOE/EIS-0026, (preparer), Carlsbad Area Office, Department of Energy, Carlsbad, New Mexico, November 1996.

Department of Energy, 1995, "Dual Axis Radiographic Hydrodynamic Test Facility Final Environmental Impact Statement," DOE/EIS-0228, (preparer), Pacific Northwest National Laboratory, Richland, Washington, August, 1995.

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Dirks JA, DJ Hostick, KA Cort, DM Anderson, SC McDonald, and JP Dion. 2004. "Scenario-Based R&D Portfolio Analysis: Informing the Tough Decisions." Presented at ACEEE 2004 Summer Study in Buildings, Pacific Grove, CA on August 23, 2004. PNNL-SA-40057, Pacific Northwest National Laboratory, Richland, WA.

Elliott DB, DM Anderson, DB Belzer, KA Cort, JA Dirks, and DJ Hostick. 2004. "Methodological Framework for Analysis of Buildings-Related Programs: The GPRA Metrics Effort." PNNL-14697, Pacific Northwest National Laboratory, Richland, WA.

Elliott DB, DM Anderson, DB Belzer, KA Cort, JA Dirks, and DJ Hostick. 2004. "Baseline Inputs for BEAMS: Data used in preparing Methodological Framework for Analysis of Building-Related Programs: The GPRA Metrics Effort," June 2004 . PNNL-14696, Pacific Northwest National Laboratory, Richland, WA.

Fathelrahman EM, DM Anderson, and Kinter-Meyer. 2003. "Market Penetration of Competing New Technology: A Maximum Likelihood Estimation (MLE) Approach to Modeling the Emergence of the Electronic Ballast." *Proceedings of the 2003 International Energy Program Evaluation Conference*. IEPEC, Seattle, WA.

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Hostick DJ, KA Cort, DB Belzer, JA Dirks, DB Elliott, DM Anderson, and JP Dion. 2003. "Measurement and Baseline Issues Related to Evaluating a Diverse Portfolio of Federally-Supported Building Energy-Saving Programs." *Proceedings of the 2003 International Energy Program Evaluation Conference*. IEPEC, Seattle, WA.

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Kavanaugh, D.C., D.M. Anderson, T.L. Marsh, A.D. Lee, S. Onisko, 1994, "Key Elements Affecting Manufactured Home Household Investments in Energy-Efficiency: An Empirical Analysis." DOE/BP-2335, Bonneville Power Administration, March 1994, Portland, Oregon.

Kavanaugh, D.C., and D.M. Anderson, 1993, "Regional Analysis of Alternative Energy Paths", Working Paper presented at the 15th Annual Conference of the International Association for Energy Economics, October 11, 1993, Seattle, Washington.

Kavanaugh, D.C., D.M. Anderson, P.J. Barton, K.F. Gygi, C.D. McGee, W.H. Monroe, L.J. Sandahl, G.A. Wright, AES Corp., 1993, "A Simulation Model for Resource and Rate Impacts in the Western Area Power Administration Service Areas," PNNL-8721, Battelle Pacific Northwest National Laboratory, Richland, Washington.

Kavanaugh, D.C., D.M. Anderson, G.S. Sullivan, 1992, "Economic Analysis of the Camp Pendleton Lighting Retrofit Program," Report prepared for the Energy Systems Modernization Office, Pacific Northwest Laboratory, Richland, Washington.

Kavanaugh, D.C., R. Berrens, D.M. Anderson, K.R. Hughes, J.E. Englin, 1992, "Approaches and Plan for the Analysis of Recreation Participation and Valuation on Federal Hydroelectric Projects on the Columbia River System," Report prepared for U.S. Army Corps of Engineers, Bonneville Power Administration, and U.S. Bureau of Reclamation, by Battelle Portland, Portland, Oregon.

Kintner-Meyer M, Anderson DM and Hostick DJ. 2003. "Final Report for the Energy Efficient and Affordable Small Commercial and Residential Buildings Research Program -- Project 6.6 - Development of the Assessment Framework". PNNL-14343, Pacific Northwest National Laboratory, Richland, Washington.

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Lester, M., and D.M. Anderson, 1995, "The Distribution of Minority and Low-Income Populations of the Western Sacramento Region (Western Area Power Administration)," BSRC-700/95/006, Battelle Seattle Research Center, Seattle, Washington.

Livingston OV, DM Anderson, and RS Butner. 2010. "CGE Approach to Estimating Employment, Income, and Revenue Impacts of Biofuel Mandates in Pacific Northwest Regions." Presented by Olga Livingston (Invited Speaker) at 2010 Genomic Science Contractor-Grantee and Knowledgebase Workshop , Arlington, VA on February 8, 2010. PNNL-SA-70745.

Marsh, T.L., D.M. Anderson, W.T. Farris, T.A. Ikenberry, B.A. Napier, G.L. Wilfert, 1992, "Commercial Production and Distribution of Fresh Fruits and Vegetables: A Scoping Study on the Importance of Produce Pathways to Dose," PNWD-2022-HEDR, Battelle Pacific Northwest National Laboratory, Richland, Washington.

Nuclear Regulatory Commission, 2010. "Draft Environmental Impact Statement for Combined Licenses (COLs) for Levy Nuclear Plant Units 1 and 2." NUREG-1941 (preparer), Draft Report for Public Comment. Office of New Reactors, Washington, DC.

Nuclear Regulatory Commission, 2010. "Draft Environmental Impact Statement for Combined Licenses for Virgil C. Summer Nuclear Station Units 2 &3." NUREG-1939 (preparer), Draft Report for Public Comment. Office of New Reactors, Washington, DC.

Nuclear Regulatory Commission, 2006. "Environmental Impact Statement for an Early Site Permit Regarding the Grand Gulf Early Site Permit Site." NUREG-1817 (preparer), Draft & Final Report. Office of Nuclear Reactor Regulation, Washington, DC.

Nuclear Regulatory Commission, 2006. "Environmental Impact Statement for an Early Site Permit (ESP) at the Exelon ESP Site." NUREG-1815 (preparer), Draft & Final Report. Office of Nuclear Reactor Regulation, Washington, DC.

Nuclear Regulatory Commission, 2005. "Generic Environmental Impact Statement for License Renewal, Supplement 25; Regarding Brunswick Steam Electric Plant, Units 1 and 2." NUREG-1437 Supplement 25 (preparer), Draft Report for Public Comment. Office of Nuclear Reactor Regulation, Washington, DC.

PNNL, 1995, "IRAP Land Use Task: Preliminary Report on the Feasibility of Irrigated Agriculture Land Use on the Hanford Site," Draft PNNL Report prepared for DOE-RL, Pacific Northwest National Laboratory, Richland, Washington, September, 1995.

Roop JM, DA Anderson, RW Schultz, and DB Elliott. 2007. "SEADS 3.0 Sectoral Energy/Employment Analysis and Data System." PNNL-17011, Pacific Northwest National Laboratory, Richland, WA.

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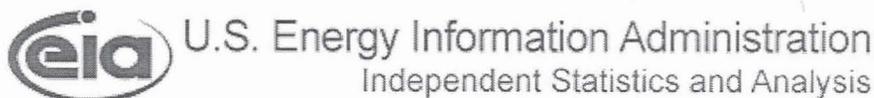
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STAFF ATTACHMENT 2



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South Texas Project, Texas

Update: September 10, 2009
Next Update: September 2010

South Texas Project

Net Generation and Capacity, 2008

Unit	Net Capacity MW(e)	Generation (Million Kilowatt Hours)	Capacity Factor (Percent)	Type	On Line Date	License Expiration Date
1	1,280	10,767	96	PWR	8/25/1988	8/20/2027
2	1,280	10,726	95	PWR	6/19/1989	12/15/2028
	2,560	21,493	96			

PWR =pressurized light water reactors.
Sources

Description: The twin reactors at the South Texas Project (STP) site, according to the unique reactors feature, were the largest reactors ever constructed in the United States.¹ But even with four large reactors (including the two at Comanche Peak) and vast energy resources, Texas anticipates growth in demand will outpace current supply. Both of the Lone Star State's nuclear plants are planning to add reactors. According to Potential New Commercial Reactors in the United States , STP was the second company to file a combined license application for new reactors. As of September 30, 2008, a total of 14 applications have been submitted.

South Texas, Unit 1

Nuclear Steam System Supplier (NSSS Vendor) = Westinghouse
Architect Engineer = Bechtel
Owner = NRG Energy (44 percent), CPS Energy (40 percent) and Austin Energy (16 percent)
Operator (Licensee) = South Texas Project Nuclear Operating Company

South Texas, Unit 2

Nuclear Steam System Supplier (NSSS Vendor) = Westinghouse
Architect Engineer = Bechtel
Owner = NRG Energy (44 percent), CPS Energy (40 percent) and Austin Energy (16 percent)
Operator (Licensee) = South Texas Project Nuclear Operating Company

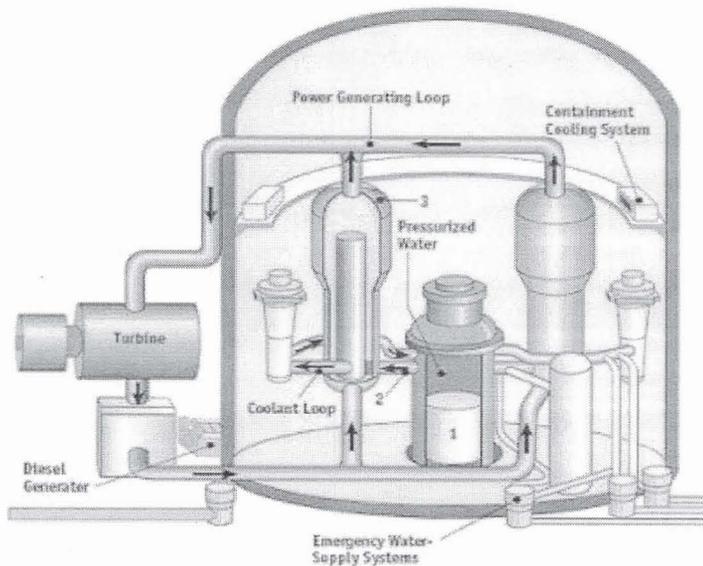
Pressurized-Water Reactor (PWR)

In a typical commercial pressurized light-water reactor (1) the reactor core generates heat, (2) pressurized-water in the primary coolant loop carries the heat to the steam generator, (3) inside the steam generator heat from the primary coolant loop vaporizes the water in a secondary loop producing steam, (4) the steam line directs the steam to the main turbine causing it to turn the turbine generator, which produces electricity. The unused steam is exhausted to the condenser where it is condensed into water. The resulting water is pumped out of the condenser with a series of pumps, reheated, and pumped back to the steam generator. The reactors core contains fuel assemblies which are cooled by water, which is force-circulated by electrically powered pumps. Emergency cooling water is supplied by other pumps, which can be powered by

U.S. Nuclear Power Plants by State

State	Plants
Alabama	Browns Ferry Farley (Joseph M. Farley)
Arizona	Palo Verde
Arkansas	Arkansas Nuclear One
California	Diablo Canyon San Onofre
Connecticut	Millstone
Florida	Crystal River 3 St Lucie Turkey Point
Georgia	Hatch (Edwin I. Hatch) Vogtle
Illinois	Braidwood Byron Clinton Dresden LaSalle County Quad Cities
Iowa	Duane Arnold
Kansas	Wolf Creek
Louisiana	River Bend Waterford
Maryland	Calvert Cliff
Massachusetts	Pilgrim
Michigan	Donald C. Cook Enrico Fermi (Fermi) Palisades
Minnesota	Monticello Prairie Island
Mississippi	Grand Gulf
Missouri	Callaway
Nebraska	Cooper Fort Calhoun
New Hampshire	Seabrook
New Jersey	Hope Creek Oyster Creek Salem Creek
New York	Fitzpatrick (James A. Fitzpatrick) Indian Point Nile Mile Point R.E. Ginna (Ginna, or Robert E. Ginna)
North Carolina	Brunswick McGuire Shearon-Harris(Harris)
Ohio	Davis-Besse Perry
Pennsylvania	Beaver Valley Limerick Peach Bottom

onsite diesel generators. Other safety systems, such as the containment cooling system, also need power.



© U.S. Nuclear Regulatory Commission

South Carolina

Tennessee

Texas

Vermont

Virginia

Washington

Wisconsin

Susquehanna
Three Mile Island

Catawba
H.B. Robinson
Oconee

Virgil C. Summer
(Summer)

Sequoyah

Watts Bar

Comanche Peak

South Texas

Vermont Yankee

North Anna

Surry

Columbia Generating
Station

Kewaunee

Point Beach

Containment: According to the U.S. Nuclear Regulatory Commission, the containment is dry, ambient pressure.²

¹Subsequently, each of the three reactors at Palo Verde in Arizona were updated and now exceed them in capacity.extrafootnote

²Dry, Ambient Pressure: a reactor containment design whose safety has been evaluated on the basis of having a dry air atmosphere at ambient pressure (0 psig) prior to the onset of a loss of coolant accident or steam pipe break. The containment design (concrete and steel tendons) must be able to take the full thermal and pressure stresses associated with the rapid energy release (steam) from a major pipe break.

Sources for Data in Table: **Capacity**, for purposes of this report, is the net summer capability as reported in Energy Information Administration (EIA) Form EIA-860, "Annual Electric Generator Report." **Capacity Factor** is a percentage calculation in which the maximum possible generation (based on net summer capability) is divided into the actual generation then multiplied by 100. **Generation** is the net electricity output reported by plant owners on Form EIA-906, "Power Plant Report." **Type of Unit:** All U.S. commercial reactors currently in operation are one of two types: **BWR** (boiling water reactor) or **PWR** (pressurized light water reactor). The type, on-line date, and the license expiration date are published annually in *Information Digest* by the U.S. Nuclear Regulatory Commission.

see also:

- annual nuclear statistics back to 1953
- projected electricity capacity to 2030
- international electricity statistics