

Company ("SCE&G"). Those contentions are that:

- a. The design and operating procedures are not in the COLA.
- b. The COLA does not consider aircraft attacks and/or the impacts of fires from aircraft attacks.
- c. SCE&G has overestimated the need for power to be provided by the proposed facility; has underestimated the cost of the proposed Summer reactors; and has failed to value alternatives including energy efficiency and renewable sources of power..

DESCRIPTION OF THE PROCEEDING

This proceeding concerns the COLA for the proposed Virgil C. Summer Nuclear Station, Units 2 and 3 ("Summer") filed pursuant to 10 C.F.R. Part 52 Subpart C by SCE&G on March 27, 2008. Acceptance of the application for docketing by the NRC was sent to SCE&G on July 31, 2008.² Notice of hearing and opportunity to petition for to intervene was published at 73 F.R. 60362 on October 10, 2008. The COLA incorporates by reference 10 C.F.R. § 52 Appendix D which includes the Westinghouse AP1000 pressurized water reactor Design Control Document ("DCD") Revision 16.³ although the AP1000 DCD Revision 16 has been replaced by Revision 17 in Docket No. 52-006.

² Published at 73 F.R. 45793 on August 6, 2008.

³ The AP1000 DCD Revision 16 reference documents are also available at www.nrc.gov/reactors/new-reactors/col/summer.html

STANDING OF PETITIONERS

The Sierra Club is the oldest and largest non-profit grassroots environmental organization in the world with some 750,000 members, 65 Chapters, over 400 local groups. The South Carolina Chapter has nine local groups with some 5,800 members across the state. The Club's mission is to explore, enjoy, and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; to educate and enlist humanity to protect and restore the quality of the natural and human environment; and to use all lawful means to carry out these objectives. The Club and its members actively promote safe energy solutions including energy efficiency and renewable energy resources to combat the climate crisis. The organization has been actively involved in a variety of issues involving nuclear power production and waste disposal in South Carolina. The South Carolina Chapter of the Club has offices and meeting space at 1314 Lincoln Street #211, Columbia, South Carolina 29301. Many of its members are customers of SCE&G who live, work, recreate and use natural resources near the existing Summer nuclear plant and the site of the proposed Summer reactors.

Friends of the Earth is a non-profit environmental advocacy organization with members in all the 50 states including South Carolina and its headquarters in Washington, DC. FoE is affiliated with Friends of the Earth International, the world's largest environmental advocacy network with member organizations in 70 countries. FoE has worked for over 38 years to promote a healthy and just world and has been a leading advocate for safe and sustainable energy. It has worked to show how it is possible to shift the U.S. and global economies to a cleaner energy basis, using the

latest in efficiency improvements, along with renewable energy sources such as wind, geothermal, and solar power. Members of FoE are ratepayers of SCE&G and neighbors of the site of the proposed nuclear facility.

Members of Sierra Club and FoE live, work, travel, recreate, use and enjoy natural resources in the vicinity of the proposed nuclear facility. They breathe the air, drink and use the water, eat food grown in the vicinity of the proposed project

Pursuant to 10 C.F.R. § 2.309, a request for hearing or petition to intervene is required to address (1) the nature of the petitioner's right under the Atomic Energy Act ("AEA") to be made a party to the proceeding; (2) the nature and extent of the petitioner's property, financial, or other interest in the proceeding; and (3) the possible effect of any order that may be entered in the proceeding on the petitioner's interest.

Other standing requirements are found in NRC case law.⁴ As summarized by the Atomic Safety and Licensing Board ("ASLB"), these standing requirements are as follows:

In determining whether a petitioner has sufficient interest to intervene in a proceeding, the Commission has traditionally applied judicial concepts of standing. See *Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 1)*, CLI-83-25, 18 NRC 327, 332 (1983) (citing *Portland General Electric Co. (Pebble Springs Nuclear Plant, Units 1 and 2)*, CLI-76-27, 4 NRC 610 (1976)). Contemporaneous judicial standards for standing require a petitioner to demonstrate that (1) it has suffered or will suffer a distinct and palpable harm that constitutes injury-in-fact within the zone of interests arguably protected by the governing statutes (e.g., the Atomic Energy Act of 1954 (AEA), the National Environmental Policy Act of 1969 (NEPA)); (2) the injury can be fairly traced to the challenged action; and

⁴ *Pacific Gas & Electric Co. (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation)*, LBP-02-23, 56 NRC 413, 426 (2002).

(3) the injury is likely to be redressed by a favorable decision. See *Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plants), LBP-99-25, 50 NRC 25, 29 (1999). An organization that wishes to intervene in a proceeding may do so either in its own right by demonstrating harm to its organizational interests, or in a representational capacity by demonstrating harm to its members. See *Hydro Resources, Inc.* (2929 Coors Road, Suite 101, Albuquerque, NM 87120), LBP-98-9, 47 NRC 261, 271 (1998). To intervene in a representational capacity, an organization must show not only that at least one of its members would fulfill the standing requirements, but also that he or she has authorized the organization to represent his or her interests. See *Private Fuel Storage, L.L.C.* (Independent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 168, *aff'd on other grounds*, CLI-98-13, 48 NRC 26 (1998).

Standing to participate in this proceeding is demonstrated by the attached Declarations of the following members of the Sierra Club and Friends of the Earth, people who live in South Carolina within 50 miles of the proposed site and who have authorized the Sierra Club or FoE to represent their interests in this proceeding: Susan Corbett, West Columbia, South Carolina; Thomas W. Clements, Columbia, South Carolina; Leslie A. Miner, Columbia, South Carolina; Pam Greenlaw, Columbia, South Carolina; Maxine Warshauer, Columbia, South Carolina. As demonstrated by the attached Declarations, the members of Sierra Club and FoE live near the proposed site, i.e., within 50 miles, although many live much closer. Thus, they have presumptive standing by virtue of their proximity to the proposed nuclear plants that may be constructed on the site.⁵ In *Diablo Canyon*, the Atomic Safety and Licensing Board noted that petitioners who live within 50 miles of a proposed nuclear power plant are presumed to have standing in reactor construction permit and operating license cases,

⁵ *Diablo Canyon, supra*. 56 NRC at 426-427, citing *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-01-6, 53 NRC 138, 146, *aff'd*, CLI-01-17, 54 NRC 3 (2001).

because there is an "obvious potential for offsite consequences" within that distance.

Here, the granting of a combined operating license ("COL") to SCE&G would permit the construction and operation of two nuclear reactors on the Summer site in Fairfield County, South Carolina. The Sierra Club and FoE's members seek to protect their lives, health and safety and economic interests as customers and ratepayers of SCE&G by opposing the issuance of a COL to SCE&G. The Sierra Club and FoE seek to ensure that no COL is issued by the Commission unless SCE&G demonstrates full compliance with the AEA, the National Environmental Policy Act ("NEPA") and all other applicable laws and regulations.

Further, *locus standi* is based on three requirements: injury, causation and redressability. The Sierra Club and FoE hereby request to be made parties to the proceeding because: (1) construction and operation of a nuclear reactor at Summer would present a tangible and particular harm to the health and well-being of the Sierra Club and FoE's members living within 50 miles of the site and who are ratepayers of the company; (2) the Commission has initiated proceedings for a COL, the granting of which would directly affect the Sierra Club, FoE and its members; and (3) the Commission is the sole agency with the power to approve, to deny or to modify a license to construct and operate a commercial nuclear power plant.

LEGAL CONSIDERATIONS

Of primary importance, the AEA prohibits the Commission from issuing a license to operate a nuclear power plant if it would be "inimical to the common defense and

security or to the health and safety of the public.”⁶ Public safety is “the first, last, and a permanent consideration in any decision on the issuance of a construction permit or a license to operate a nuclear facility.”⁷ As detailed below in the Sierra Club and FoE’s contentions, SCE&G’s COLA also fails to comply with the NEPA requirement that it fully address the environmental impacts of constructing and operating the proposed Summer reactors.

The AEA sets minimum standards for safe and secure operation of nuclear facilities, while NEPA requires the Commission to consider and attempt to avoid or mitigate significant adverse environmental impacts of licensing those facilities. Although the statutes have some overlapping concerns, they establish independent requirements.⁸ It is “unreasonable to suppose that [environmental] risks are automatically acceptable, and may be imposed upon the public by virtue of the AEA, merely because operation of a facility will conform to the Commission’s basic health and safety standards.”⁹ NEPA goes beyond the AEA, by requiring the consideration of alternatives for reducing or avoiding adverse environmental impacts of NRC licensing actions.¹⁰

⁶ 42 U.S.C. §2133(d).

⁷ Petition for Emergency and Remedial Action, 7 NRC at 404, citing *Power Reactor Development Corp. v. International Union of Electrical Radio and Machine Workers*, 367 U.S. 396, 402 (1961).

⁸ *Limerick Ecology Action v. NRC*, 869 F.2d 719, 729-30 (3rd Cir. 1989) (“*Limerick Ecology Action*”) (holding that the AEA does not preclude NEPA).

⁹ *Limerick Ecology Action*, quoting *Citizens for Safe Power v. NRC*, 524 F.2d 1291, 1299 (D.C. Cir. 1975).

¹⁰ 10 C.F.R. § 51.71(d).

NRC regulations for implementation of the AEA provide that a nuclear power plant must be designed against accidents that are "anticipated during the life of the facility." 10 C.F.R. § 50.34(a)(4) provides that a construction permit application for a nuclear power plant must include:

a preliminary analysis and evaluation of the design and performance of structures, systems, and components of the facility with the objective of assessing the risk to public health and safety resulting from operation of the facility and including determination of the margins of safety during normal operations and transient conditions anticipated during the life of the facility, and the adequacy of structures, systems, and components provided for the prevention of accidents and the mitigation of the consequences of accidents.

Again, the NRC relies in large part on the "adequacy of structures, systems and components" to prevent and mitigate the "anticipated" accidents, i.e., the design-basis accidents ("DBAs"), for both new and existing reactors.¹¹ DBAs include low-frequency but credible events. The applicant for a license and the resulting Environmental Impact Statement ("EIS") prepared by the NRC must analyze and evaluate the adequacy of the plant to protect the public health and safety from these accidents.

The NRC designates accidents that are more complex and less likely than design basis accidents as "severe accidents," i.e., "those involving multiple failures of equipment or function and, therefore, whose likelihood is generally lower than design-basis accidents but whose consequences may be higher." Although severe accidents are "beyond the substantial coverage of design-basis events," they constitute "the major risk to the public associated with radioactive releases from nuclear power

¹¹ NUREG-1437, Generic Environmental Impact Statement for License Renewal of Nuclear Plants at 5-1 (1996) ("License Renewal GEIS").

plant accidents.”¹²

NEPA procedures require the NRC to prepare an EIS for any major licensing action significantly affecting the quality of the human environment.¹³ The goal of the EIS is to analyze and evaluate the ability of the plant to operate safely; first that the plant is in compliance with safety rules, and protects against “anticipated” accidents and design basis accidents, and the “reasonably foreseeable” impacts which have “catastrophic consequences, even if their probability of occurrence is low.”¹⁴ In licensing hearings, the Commission has required that the EIS address the probability of severe accidents and how to prevent them if at all possible, or mitigate them if they cannot be prevented.¹⁵

In the EIS for the present operating license, 10 C.F.R. 51.53(c)(ii)(L) requires that the license applicant and the NRC consider alternatives to mitigate severe accidents if the NRC staff has not previously evaluated Severe Accident Mitigation Alternatives (“SAMAs”) for the applicant’s plant in an EIS document. Both the Environmental Report (“ER”) prepared by SCE&G and the EIS prepared by the NRC staff must present “alternatives for reducing adverse impacts,” including the severe accidents.¹⁶ This requirement is:

¹² “Policy Statement on Severe Accidents Regarding Future Designs and Existing Plants,” 50 F.R. 32,138, 32,139 (August 8, 1985) (“Severe Accident Policy Statement”).

¹³ 10 C.F.R. §§ 51.71 and 51.91.

¹⁴ 40 C.F.R. § 1502.22(b)(1).

¹⁵ See, e.g., *Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant), CLI-01-11, 53 NRC 370, 387 (2001).

¹⁶ 10 C.F.R. § 51.53(c)(3)(iii), citing 10 C.F.R. § 51.45(c).

based on the Commission's NEPA regulations that require a review of severe [accident] mitigation alternatives in its environmental impact statements (EISs) and supplements to EISs, as well as a previous court decision that required review of severe mitigation alternatives (referred to as SAMAs) at the operating license stage. See, *Limerick Ecology Action v. NRC*, 869 F.2d 719 (3d Cir. 1989).¹⁷

The NRC staff's responsibility in preparing the EIS is to conduct a fair and independent analysis of the impacts of the proposed action on the environment in order to give the decisionmaker a useful tool, based on solid scientific and technical data, to make a decision to grant or deny the COLA.

OVERVIEW OF THE CONTENTIONS

A COL is authorization from the NRC to construct and operate a nuclear power plant at a specific site. Before issuing a COL, the NRC staff is required to complete safety and environmental reviews of the application in compliance with the AEA and NEPA. The Sierra Club and FoE seek to intervene because operation of the two proposed nuclear reactors would endanger the health and safety and economic interests of its members and other people living within 50 miles of the proposed reactors. The costs and risks of the proposed reactors are unnecessary and wholly out of proportion to any possible benefit.

As determined by the ASLB, a contention is admissible when it meets the requirements in 10 C.F.R. § 2.309(f)(1):

(1) A request for hearing or petition for leave to intervene must set forth with particularity the contentions sought to be raised. For each contention, the request or petition must:

¹⁷ 61 F.R. at 28,481.

- (i) Provide a specific statement of the issue of law or fact to be raised or controverted;
- (ii) Provide a brief explanation of the basis for the contention;
- (iii) Demonstrate that the issue raised in the contention is within the scope of the proceeding;
- (iv) Demonstrate that the issue raised in the contention is material to the findings the NRC must make to support the action that is involved in the proceeding;
- (v) Provide a concise statement of the alleged facts or expert opinions which support the requestor's/petitioner's position on the issue and on which the petitioner intends to rely at hearing, together with references to the specific sources and documents on which the requestor/petitioner intends to rely to support its position on the issue; and
- (vi) Provide sufficient information to show that a genuine dispute exists with the applicant/licensee on a material issue of law or fact. This information must include references to specific portions of the application (including the applicant's environmental report and safety report) that the petitioner disputes and the supporting reasons for each dispute, or, if the petitioner believes that the application fails to contain information on a relevant matter as required by law, the identification of each failure and the supporting reasons for the petitioner's belief.

A thorough recitation of relevant case law regarding the admissibility of contentions was recently presented in *Duke Energy Carolinas, LLC (William States Lee Nuclear Station, Units 1 and 2)*, LBP-08-17, 68 NRC ____ (slip op. at 4-10) (September 22, 2008).

The rule on admissibility of contentions is "strict by design," but the relevant case law clearly holds that this restriction is not so strict that a contention cannot or should not be admitted. *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349 (2001). A variety of contentions have been admitted by ASLBs at a number of the latest rounds of petitions on the adequacies of COLAs. See for example, *Tennessee Valley Authority*, (Bellefonte Nuclear Power

Plant, Units 3 and 4), LBP-08-16, 68 NRC ____ (slip op.) (September 12, 2008).

The Sierra Club and FoE herein sets forth with particularity their proposed contentions. For each contention, the Sierra Club and FoE demonstrate that the issues raised are within the scope of the proceeding, that the issues are material to the Commission's licensing responsibilities, and that there exists a genuine dispute between the petitioners and the licensee. In its contentions, the Sierra Club and FoE present the specific issues of law or fact to be raised, the bases for the contentions and statements of fact or expert opinion in support of the contentions. For each of the contentions, the legal considerations included in the section above are also incorporated.

[The Sierra Club's contentions are divided into two categories, environmental and technical.¹⁸ The following are the contention names and the page number on which each begins in this Petition:

Contention 1 (AP 1000 Deficiencies), page 12..

Contention 2 (Aircraft attacks), page 17.

Contention 3 (Need for Power, Cost of Action and Alternatives), page 24.

CONTENTIONS

Contention 1 (AP1000 Deficiencies).

The COLA is incomplete at this time because many of the major safety

¹⁸ The contentions are described as follows: the Environmental Contentions are designated EC-#, Technical Contentions as TC-#. These classifications are fairly arbitrary and most of the contentions express overlapping concerns, so that an environmental contention has technical and safety concerns related to it, and vice versa.

components and procedures proposed for the Summer reactors are only conditionally designed at best. In its COLA, SCE&G has adopted the AP1000 DCD Revision 16 which has not been certified by the NRC and with the filing of Revision 17 by Westinghouse, Revision 16 will no longer be reviewed by the NRC Staff. SCE&G is now required to resubmit its COLA as a plant-specific design or to adopt Revision 17 by reference and provide a timetable when its safety components will be certified. Either the plant-specific design or adoption of AP1000 Revision 17 would require changes in SCE&G's application, the final design and operational procedures. Regardless of whether the components are certified or not, the COLA cannot be reviewed without the full disclosure of all designs and operational procedures.

Support for contention. The most significant elements of the proposed reactors, i.e., the design and operational practices, are lacking in the COLA. The DCD for the AP1000 Revision 16 has been adopted by reference for the proposed Summer reactors and is, as such, part of the application.¹⁹ Westinghouse submitted its AP1000 DCD Revision 15 to the NRC in March 2002, and although the NRC issued a final rule certifying the design in January 2006, Westinghouse then submitted Revision 16 in 2007, with an estimated completion date for certification that was extended until at least mid-2011.²⁰ However, Westinghouse recently filed a new revision, Revision 17, on

¹⁹ Appendix D to 10 C.F.R. Part 52 and the AP1000 DCD Revision 16.

²⁰ www.nrc.gov/reactors/new-reactors/new-licensing-files/new-rx-licensing-app-legend.pdf (October 22, 2008). For discussion of AP1000 DCD Revision 16 process, see www.nrc.gov/reactors/new-reactors/design-cert/amended-ap1000.html.

September 22, 2008.²¹ With the submittal of Revision 17, there is now no estimated completion date for the certification of the AP1000 reactors and at the same time, the proposed Summer reactors remain tied to Revision 16.

It is impossible to conduct a meaningful technical and safety review of the COLA without knowing the final design of the reactors as they would be constructed by SCE&G. On its face, the DCD is incomplete; even after the certification of several "Tier 1" components in December 2005, there remain a number of serious safety inadequacies in the AP1000 Revision 16 design that have not been satisfactorily addressed. For example, in the January 18, 2008, letter to Westinghouse docketing AP1000 revision 16²², there was discussion of an incomplete recirculation screen design, i.e., the "sump problem," a necessary component to the emergency cooling system that will affect the design for the proposed Summer reactors.²³ The AP1000 reactors also have unresolved instrumentation and controls problem is that will ultimately impact the safety of the facility.

Even the so-called "certified" components that have been approved depend on the interaction with non-certified components. These non-certified "Tier 2" components are not trivial, but run the gamut of containment, control room set up, seismic

²¹ The cover letter to Revision 17 was not entered into the ADAMS system until approximately October 17, 2008. ADAMS Accession No. ML082380866. Revision 17 was not entered into ADAMS until the week of November 22, 2008. ADAMS Accession No ML083230868. Revision 17 is now available at www.nrc.gov/reactors/new-reactors/design-cert/amended-ap1000.html.

²² ADAMS Accession No. ML073600743.

²³ Union of Concerned Scientists, "Regulatory Malpractice: The NRC's Handling of the PWR Containment Sump Problem," October 2003. Available at http://www.ucsusa.org/clean_energy/nuclear_safety/regulatory-malpractice-nrcs-handling-of-the-pwr-containment-sump-problem.html

qualifications, fire areas, heat removal, human factors engineering design, plant personnel requirements, operator decision-making, alarms and piping. These non-certified components interact with Tier 1 components and each other to a significant degree. During the certification process, any or all of these may be modified by the Commission, and as a result, require the applicant to modify its application. These lead to one of the basic problems for all reviewers of the COLA for SCE&G and other utilities; it is impossible to conduct the probabilistic risk assessment ("PRA") for the proposed Summer reactors without a final design and operations procedures.

On its face, Revision 17 demonstrates that the DCD, and as a result, the COLA, is incomplete and that there remain a number of serious safety inadequacies in the AP1000 design that have not been satisfactorily addressed. In addition to the still unresolved issues in Revision 16 presented above, the uncertified components specifically addressed in Revision 17, include turbine design changes, physical security, human factors engineering, responses to seismic activities and adverse weather conditions, radiation protection measures, technical specifications for valves and piping, accident analyses, and aircraft impact. During the Revision 17 certification process, any or all of these may be modified by the Commission, and as a result, require the applicant to modify its application.

The Commission in denying a motion in another licensing proceeding to indefinitely postpone the notice of hearing because of the lack of certified design and operational components under Revision 16, stated that

If the Petitioners believe the Application is incomplete in some way, they may file a contention to that effect. Indeed, the very purpose of NRC adjudicatory hearings is to consider claims of deficiencies in a license

application; such contentions are commonplace at the outset of NRC adjudications.

Progress Energy Carolina, Inc. (Shearon Harris Nuclear Power Plant, Units 2 and 3), CLI-08-15, 68 NRC ____ (slip op.) (June, 23, 2008). The validity of this contention does not depend on whether the ultimate design or operational procedures are certified or not; the COLA is incomplete and cannot be reviewed by the NRC staff or affected petitioners. It is clear that the missing components and procedures are crucial in assessing the safety and impacts of the proposed reactors.

Compounding the lack of final designs and operational procedures in the COLA, there is presently no timetable for resolution of these issues. When Westinghouse submitted its AP1000 Revision 16 to the NRC in March 2002, the estimated completion date for full certification was expected to be 2008, although this was extended until mid-2011.²⁴ There has been no announced timetable for the completion of Revision 17, and the Sierra Club and FoE have no confidence that several of the fundamental issues can be resolved.

An assessment of risk is required for a COLA review, and that depends on the ultimate design of the reactor and how all of the components interact with each other. Likewise, the ER culminates in the assessment of DBAs, and then the severe accidents to develop the severe accident mitigation design. The NRC staff's Environmental Assessment on the AP1000 Revision 15 was conducted in 2005, prior to the submittal of the Summer application, and cannot be relied upon for Revisions 16 and 17, or the

²⁴ www.nrc.gov/reactors/new-licensing/design-cert/amended-ap1000.html
www.nrc.gov/reactors/new-licensing/new-licensing-files/new-rx-licensing-app-legend.pdf (May 29, 2008).

Summer COLA. Without having the current configuration, design and operating procedures in the application, the risk assessment and SAMAs cannot be determined. Until major components are incorporated into the COLA for a full review, much of the interaction between the various components cannot be resolved.

Conclusion. Without having the current configuration, design and operating procedures in the application, the risk assessment and SAMAs cannot be determined. Until major components are incorporated into the COLA for a full review, much of the interaction between the various components cannot be resolved. The deficiencies in the Summer COLA are manifold with much of the technical descriptions of major components of the plant subject to change. Regardless of whether the reactor components would be certified or not at some time in the future, the COLA does not contain the necessary information on major design and operational components, nor is there any timetable for when these components may be certified.

Contention 2 (Aircraft crashes).

SCE&G's ER, Chapter 7, "Postulated Accidents," fails to satisfy NEPA and the NRC rules because it does not address the environmental impacts of a successful attack by either the accidental or deliberate and malicious crash of a fuel-laden and/or explosive-laden aircraft and resulting severe accidents of the aircraft's impact and penetration on the facility. SCE&G is required to identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practicable and with reduced reliance on operator actions, the effects of the

aircraft impact on the key safety functions, such as core cooling capability, containment integrity, spent fuel cooling capability and spent fuel pool integrity.

Support for contention. NRC regulations for the implementation of the AEA provide that a nuclear power plant must be designed against accidents that are "anticipated during the life of the facility." 10 C.F.R. § 50.34(a)(4) provides that a construction permit application for a nuclear power plant must include:

a preliminary analysis and evaluation of the design and performance of structures, systems, and components of the facility with the objective of assessing the risk to public health and safety resulting from operation of the facility and including determination of the margins of safety during normal operations and transient conditions anticipated during the life of the facility, and the adequacy of structures, systems, and components provided for the prevention of accidents and the mitigation of the consequences of accidents.

SCE&G's COLA for the proposed Summer reactors does not assess the consequences of an aviation attack and the resulting impact, penetration, explosion and fire. The potential for accidents caused by deliberate malicious actions and the resulting equipment failures is not only reasonably foreseeable, but is likely enough to qualify as a design-basis threat ("DBT"), i.e., an accident that must be designed against under NRC safety regulations.²⁵

²⁵ John Large, "The Implications of 11 September for the Nuclear Industry," presented at Nuclear Terrorism, Disarmament Forum, page 35; www.largeassociates.com/terrorismUNDismament.pdf

In its 1982 analysis, the Argonne National Laboratory submitted its "Evaluation of Aircraft Hazards Analysis for Nuclear Power Plants," NUREG-2859, to the NRC.²⁶ This study focused on accidental aircraft crashes but the same threat analysis can and should be made for the impacts of deliberate malicious actions at the proposed Summer reactors. NUREG 2859 at page 5 identifies that:

The major threats associated with an aircraft crash are the impact loads resulting from the collision of the aircraft with power plant structures and components and the thermal and/or overpressure effects which can arise due to the ignition of the fuel carried by the aircraft.

At least since the Argonne study in 1982, it has been well known that compared to other causes of accidents, aviation attacks are some of the most severe.

These same concerns about the inadequacy of nuclear plants to withstand aircraft accidents and attacks were raised in at least two more recent studies. In March 2000, the NRC requested that the Turkey Point nuclear plant respond to agency questions about the expanded aircraft operations at the nearby Homestead Air Force Base. In the response, the owner of the plant informed that a number of postulated aircraft impacts would lead to fuel damage, i.e., conditional core damage probability,

²⁶ After being made public for almost two decades, NUREG-2859 was apparently removed from the public ADAMS system and elsewhere on the NRC website after the terrorist attacks of September 11, 2001, because of the sensitive nature of some of the specifics described in it. At a hearing on the COL, Petitioners may introduce the entire document into the record because it remains relevant to aircraft attacks, both accidents and deliberate malicious actions.

and core failure.²⁷ In October 2000, the NRC released a study of the spent fuel pool hazard at nuclear power plants undergoing decommissioning.²⁸ That study determined that the impacts of an aircraft attack were possible, and the results were potentially devastating.

The Commission by order dated February 25, 2002, initiated rulemaking to require all operating power reactor licensees to develop and adopt mitigative strategies to cope with large fires and explosions from any cause, including beyond-design-basis aircraft impacts.²⁹ In response and to fulfill its Congressional mandate under Section 651 of the Energy Policy Act of 2005, the NRC initiated and completed a review of its Design Basis Threats.³⁰ The purpose of the rulemaking was to see if the nuclear plants were safe from attacks because "the need for enhancement was recognized due to the escalation of domestic threat levels." On January 29, 2007, the Commission disapproved the recommended rulemaking but directed the NRC Staff to further revise reactor security regulations.

Despite the much-discussed acknowledgment by the NRC and other federal agencies that nuclear power plants are potential targets for attack, the Commission still had not addressed active protection measures against aviation attacks as it considered

²⁷ Letter from R.J. Hovey, Vice President – Turkey Point Plant to NRC, "Response to Request for information Regarding the Potential Risk of the Proposed Civil and Government Aircraft Operation at Homestead Air Force Base on the Turkey Point Plant," May 2, 2000.

²⁸ NRC, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," October 2000.

²⁹ 67 F.R. 9792 (March 4, 2002).

³⁰ "Final Rulemaking to Revise 10 C.F.R. § 73.1, Design Basis Threat (DBT) Requirements," SECY-06-0219, October 30, 2006.

the “passive measures already in place . . . are appropriate for protecting nuclear facilities from an aerial attack.”³¹ The 9th Circuit Court of Appeals held this position to be unreasonable and required the NRC to investigate aviation threats.³² In an issue brief, the Union of Concerned Scientists rebutted the NRC’s position that “nuclear power plants are inherently robust structures that our studies show provide adequate protection in a hypothetical attack by an airplane.”³³ All of the studies conducted by the NRC and outside parties have shown that nuclear reactors cannot withstand aviation attacks, and that attacks on containment structures and spent fuel pools can be devastating.

After further review and comment, the NRC then published a proposed rule that would have required applicants to assess the effects of the impact of a large, commercial aircraft on the nuclear power facility.³⁴ Based on the assessment, the applicant would have been required to include in its application a description and evaluation of design features, functional capabilities, and strategies to avoid or mitigate, to the extent practicable, the effects of the aircraft impact with reduced reliance on operator actions. Both applicants, such as SCE&G herein, and vendors, such as Westinghouse for its AP1000 design,³⁵ would be required to assess the risks from

³¹ *Ibid.*, page 4.

³² *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006), cert. den. 549 US ___ (06-466, January 16, 2007).

³³ Lochbaum, “The NRC’s Revised Security Regulations,” February 1, 2007. Available at www.ucsusa.org-20070201-ucs-aircraft-fire-hazards.pdf

³⁴ 72 F.R. 56287 (October 3, 2007).

³⁵ See Contention TC-1 above.

aviation attacks and demonstrated that the reactor design could safely handle them.

In the "Final Rule – Consideration of Aircraft Impacts for New Nuclear Power Reactors (RIN 3150-AI19)," SECY-08-0152 (October 15, 2008), (the "Final Rule"), the NRC staff is now seeking approval of final amendments to the NRC regulations that would require applicants for new nuclear power reactors to perform a design-specific assessment of the effects of the impact of a large, commercial aircraft. The applicant would be required to identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on the following key safety functions:

- core cooling capability
- containment integrity
- spent fuel cooling capability
- spent fuel pool integrity

In addition, these amendments contain requirements for control of changes to any design features or functional capabilities credited for avoiding or mitigating the effects of an aircraft impact.

The NRC Staff memo on the Final Rule describes the lengthy process undertaken to reach the current rule. The safety-related basis for the rule is that:

The impact of a large, commercial aircraft is a beyond-design-basis event and the NRC's requirements that apply to the design, construction, testing, operation, and maintenance of design features and functional capabilities for design basis events will not apply to design features or

functional capabilities selected by the applicant solely to meet the requirements of this rule. The objective of this rule is to require nuclear power plant designers to perform a rigorous assessment of design features and functional capabilities that could provide additional inherent protection to avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of an aircraft impact.³⁶

The Final Rule relocates security-related provisions of 10 C.F.R. Part 73 to a new paragraph (hh) in 10 C.F.R. § 50.54, "Conditions of Licenses," in a supplement to the power reactor security requirements proposed rule.³⁷ If the Commission finalizes the rule, applicants for new nuclear power reactors to incorporate into their design additional practical features that would avoid or mitigate the effects of an aircraft impact. This assessment would have applicants and reactor designers to incorporate practical measures at an early stage in the design process.

Specific to this contention, the ability of the proposed Summer reactors to withstand aviation attacks has not been demonstrated in the COLA. Even if the Final Rule is not promulgated, 10 C.F.R. § 51.53 requires that the license renewal applicant consider alternatives to mitigate severe accidents if the staff has not previously evaluated SAMAs for the applicant's plant in an EIS or related supplement or in an environmental assessment. The purpose of this consideration is to ensure that plant

³⁶ Rulemaking Issue Affirmation, October 15, 2008. ADAMS Accession No. ML08105227; Enclosure 1 at ML080420262.

³⁷ 73 F.R. 19443 (April 10, 2008).

changes, i.e., structural fortifications, hardening of vital safe shutdown systems and hardware, procedures and training, with the potential for improving severe-accident safety performance are identified and evaluated. The Summer ER does not provide information that allows the NRC staff to consider reasonable alternatives for avoiding or reducing the environmental impacts of this class of threats and accidents. This is a serious omission in the COLA.

Conclusion. Therefore, the COLA for the proposed Summer reactors cannot be approved without a full assessment of the threats from aviation attacks and a demonstration that the SAMAs required to prevent or mitigate the impacts from those attacks will be implemented. The unpalatable likelihood of an intentional aircraft crash into a nuclear plant has to be considered and accounted for; the proposed Summer reactors are ill-equipped to safely handle this threat.

Contention 3 (Need for Power, Cost of Action and Alternatives).

Contrary to the requirements of the National Environmental Policy Act and 10 C.F.R. § 51.45 the Applicant's Environmental Report (ER) fails to adequately discuss the impacts of the proposed action and alternatives in proportion to their significance; fails to discuss alternatives with sufficient completeness to aid the Commission in developing and exploring "appropriate alternatives to recommended courses of action" in this "proposal which involves unresolved conflicts concerning alternative uses of available resources;" fails to adequately present the environmental impacts of this proposal and the alternatives in comparative form; fails to adequately discuss the

relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity with respect to this proposal and alternatives; fails to adequately discuss irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented; fails to include an adequate analysis that considers and balances the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects; fails to include analyses which, to the fullest extent practicable, quantify the various factors considered or adequately discuss important qualitative considerations or factors that cannot be quantified; and fails to contain sufficient data to aid the Commission in its development of an independent analysis in the following particulars:

A. With respect to Chapter 8 of the ER, "Need for Power," the Applicant completely dismisses the current economic crisis and recent reductions in its sales, and has conducted no sensitivities of its load forecast to try to capture the possible effects of a recession, including the possibility of a long and deep economic downturn.

B. With respect to Chapter 9 of the ER, "Proposed Action Alternatives," the Applicant almost completely ignores demand-side management, undervaluing opportunities for cost-effective energy efficiency and demand response or load management.

C. With respect to Chapter 9 of the ER, "Proposed Action Alternatives," the Applicant ignores the potential contribution of renewables to an overall sustainable and

economic portfolio, and does not take into account significant improvement in unit costs and operations of renewables in recent years and as projected to continue.

D. With respect to Chapter 9 of the ER, "Proposed Action Alternatives," the Applicant fails to properly evaluate the risk of choosing a single technology and two extremely large construction projects in lieu of a more modular approach made up of a greater variety of resource options allowing a greater opportunity to change course during implementation of the plan, in the event that risks, known to be potential and those that are not now foreseeable, develop into real difficulties during implementation, and in the event that other superior opportunities become realistic.

E. With respect to Chapter 10 of the ER, "Proposed Action Consequences," the Applicant underestimates the impact of its proposed construction and operation on vulnerable customers via rate increases.

F. With respect to Chapter 10 of the ER, "Proposed Action Consequences," the Applicant's cost estimate for construction and operation fails to take into account recent rapid increases in the cost of inputs for construction.

G. With respect to Chapter 10 of the ER, "Proposed Action Consequences," the Applicant's cost estimate for construction and operation is based on an unrealistic schedule, and assumes a settled and approved design for its proposed AP1000, which has not yet been established and for which there is no firm date for Commission determination.

Support for Contention. As discussed above, the NRC staff has responsibility under NEPA to prepare an EIS. One of the principal determinations of NEPA is to assess the "alternatives to the proposed action."³⁸ The costs, economic and environmental, as well as the risks for each of the alternatives need to be carefully presented so that the ultimate decision-maker can make an informed decision. "The NEPA process is intended to help public official make decision that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment."³⁹ The NRC staff's review should be conducted in an unbiased and independent manner; it cannot rely on SCE&G or other agencies, such as the South Carolina Public Service Commission, to determine if the proposed Summer reactors should be built.

When a cost-benefit analysis is required, the EIS must

discuss the relationship between that analysis and any analyses of unquantified environmental impacts, values, and amenities. For purposes of complying with [NEPA], the weight of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations. In any event an environmental impact statement should at least indicate those considerations, including factors not related to environmental quality, which are likely to be relevant and important to a decision.⁴⁰

In this case the comparisons can be qualified to a significant degree and the EIS should

³⁸ NEPA, 42 U.S.C. § 4333(C)(iii).

³⁹ 40 C.F.R. § 1500.1(c).

⁴⁰ 40 C.F.R. § 1502.33.

clearly compare the costs and risks for each of the alternatives.

In this licensing proceeding, the cost and benefits of the proposed Summer reactors as compared to the costs and benefits of alternatives must be addressed. *Environmental Law and Policy Center v. NRC*, 470 F.3d 676 (7th Cir. 2006). In the *Environmental Law and Policy Center* case, the Court held that “NEPA requires an agency to ‘exercise a degree of skepticism in dealing with self-serving statements from a prime beneficiary of the project’ and to look at the general goal of the project rather than only those alternatives by which a particular applicant can reach its own specific goals.” *Id.*, citing *Simmons v. U.S. Army Corps of Eng’rs*, 120 F.3d 664 (7th Cir. 1997). The Court held that the NRC properly approved the license, but only after a comprehensive and independent review of a full-fledged study of alternatives in the ER.

In support of this contention Petitioners offer the detailed expert analysis and opinion of utility resource planning expert and former New Hampshire Public Utility Commissioner Nancy Brockway whose Declaration is submitted herewith. Ms. Brockway has over 25 years experience as a utility regulator, utility commission staff, utility resource planning expert and consultant. She has completed a detailed review of the Applicant SCE&G’s COL submissions, including its Environmental Report, the Company’s submission to the South Carolina Public Service Commission in connection with the state permitting and rate approval for the proposed project, as well as a review of independent technical evidence regarding project need, costs and alternatives. Ms. Brockway has presented expert Direct and Surrebuttal testimony before the South Carolina Public Service Commission where she recently appeared and stood cross-examination. She concludes that the Applicant’s ER submissions on the issues

identified in this contention fail to meet Commission regulatory requirements. The Declaration of Nancy Brockway details the supporting bases for the following subparts of this contention in the ER, independent and reliable extrinsic evidence and Ms. Brockway's expert opinion.

A. With respect to Chapter 8 of the ER, "Need for Power," the Applicant completely dismisses the current economic crisis and recent reductions in its sales, and has conducted no sensitivities of its load forecast to try to capture the possible effects of a recession, including the possibility of a long and deep economic downturn.

As the Applicant states, NRC expects states and regions to prepare need-for-power evaluations that can be the bases for NRC evaluation if they are (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty (NRC 1999).

SCE&G's need-for-power evaluation as filed with this Commission is unresponsive in forecasting a major source of uncertainty, that is, the current economic downturn. For this reason alone, it is unreliable and overstates the timing of the need for additional generation of any kind. Declaration of Nancy Brockway.

According to Chapter 8, pp. 8.1-2 to 8.1-3 of the ER, SCE&G bases its load forecasts on the following:

Historical Data – SCE&G maintains a database of historical energy sales and peak demand values and historical data for factors that influence sales and demand, such as:

- *Number and type of customers
- *Total population numbers and characteristics such as per capita income
- * Industrial production indices
- * 15-year weather measurements and calculated heating and cooling degree-days
- * Electricity prices

SCE&G updates this data annually to incorporate the past year's information....

Projections – Where available, SCE&G uses commercially generated projections of factors that influence sales and demand, such as economic and demographic variables

.... SCE&G makes its own projections of other factors, such as weather, for which it has historical data.

Modeling – SCE&G uses econometric modeling to establish the relationships between variables to be explained or forecasted (e.g., energy sales and peak demand) and other factors (e.g., population and economic growth and industrial development)....

Professional Judgment – SCE&G uses in-house and outside expertise to adjust projections and modeling to take into account new or discontinued marketing programs, new industrial loads, contract expiration, economic factors (e.g., recessions), and input from SCE&G's largest industrial

As can be seen from SCE&G's explanation of its load forecast methodology, economic factors are extremely important in the Applicant's forecasts. This is as it should be.

The economics of a service area are the single most important predictor of the electricity requirements of a service area. Even the number of customers in a service area is a function to a great extent of the economics of the service area.

SCE&G defends its assertion that its load forecast meets the requirement that it adequately address uncertainty as follows:

Both SCE&G and Santee Cooper use commercially developed software to perform uncertainty analyses to account for forecasting uncertainty. Each uses econometric modeling that enables them to perform analyses of the sensitivity of results to changes in model inputs and to create high- and low-range forecasts. Uncertainty analysis is also used in establishing planning reserve margins, themselves an acknowledgement of uncertainty.

The load forecasts of SCE&G and Santee Cooper in the Environmental Report are basic straight-line extensions of the experience of recent years, as can be seen by viewing Figures 8.1-3 and 8.2-1.

SCE&G's application to this Commission relies on a load forecast prepared before the events of September 2008. SCE&G application is based on the Company's 2007 Integrated Resource Plan, filed with the South Carolina Public Service Commission on

April 30, 2007. ER Chapter 8, Reference 17. The April 2007 load forecast is out of date and should not be relied on by any utility or regulator to determine likely future needs for power in the SCE&G service area. Declaration of Nancy Brockway.

In May 2008, SCE&G filed a revised IRP with the South Carolina Public Service Commission, with an updated forecast. This forecast was based on projections of future population and economic growth consistent with the April 2007 forecast, and did not take into account the effects of the recent economic crises in the United States. As such, it is also out of date and unreliable. The major reason that SCE&G's load forecasts are unreliable is that they fail to take into account the likely impact of the recent economic downturn in the United States and in South Carolina. Declaration of Nancy Brockway

There is considerable evidence that the United States and South Carolina have entered a period of reduced economic activity:

- In September, 2008, several major financial institutions suffered extreme reversals, as facilities purchased or hedged on margin turned around, and a liquidity crisis ensued.

- The liquidity crisis on Wall Street revealed an underlying crisis in the United States economy, caused to some large degree by the failure of home prices to continue to rise to reflect rising values assigned to mortgage-backed securities, and the inability of many mortgagors to meet increasing payment requirements (as in the situation of a loan with a teaser rate that increased after a trigger event or a period of time).

- In early December, 2007, a committee of economists from the National Bureau of Economic Research announced that, by their calculations, the United States has

been in a recession (2 or more quarters of with no growth) since December 2007.

-On December 5, 2007, the United States Department of Labor announced that the country lost 533,000 jobs in November, the worst job loss in more than 30 years. The depth of the crisis is confirmed by the weak holiday sales, the fact that credit markets have not returned to anything like normal functioning, the near-bankruptcy of the three major United States automobile manufacturers, the drop in sales of all automobile firms, and the reports of expected further widespread job losses in December.

Many economists have noted that the economy is facing the gravest downturn since the Great Depression of the 1930's. While few argue that the downturn will be as long or as deep as that in the 1930's, there have been calls for massive stimulus injections into the economy from both major political parties. It is too early to tell what such stimulus packages will pass Congress, and how quickly and to what extent they will reverse the recent downward trends in the economy.

The parlous state of the South Carolina economy is reflected in dropping tax revenues. On October 8, 2008, the state Board of Economic Advisors reduced its revenue estimate by 6 percent, following a 2 percent reduction in July. According to the BEA, this could be the first time since 1954 that personal income growth has declined in South Carolina. Further, South Carolina was among the first states this year to see a decline in income tax revenues. BEA Chairman John Rainey was quoted in October as saying "As bad as it is for the nation, it is even worse for South Carolina."

On December 5, 2008, the South Carolina Mortgage Bankers Associated released a report stating that almost one in ten South Carolina homeowners was behind on

mortgage payments or in foreclosure at the end of September 2008. The delinquency rates for both prime and subprime adjustable rate mortgages in South Carolina increased during the third quarter, the M.B.A. report said.

According to news reports, in October, the state posted an 8 percent unemployment rate, which was a 25-year high, and according to the South Carolina Employment Security Commission, over 38,000 new unemployment claims were made in October, which represented almost a 50 percent increase over 2007.

A report from the University of South Carolina Moore School of Business accessed November 30, 2008 suggests that while the United States was still forecast to experience 2009 job growth after the first quarter of 2009, South Carolina will experience two periods of further losses in the coming year, after a sharp drop in jobs in the third quarter of 2008.

The worsening economy has already been felt in South Carolina's electricity sales.

- o Both Duke Energy – Carolinas and SCE&G have announced that sales slacked off in the second half of 2008.
- o Even before the current economic crisis, between its 2007 and 2008 Annual Plan (Integrated Resource Plan) filed with the South Carolina PSC, Duke had reduced its load forecasts for the 2016 and 2019 years between 3% and 6% (depending on the forecast year and whether the forecast was for energy or peak demand).
- o Nationally, electricity usage was found by Tudor Pickering Holt to have dropped by 3% in the five weeks leading up to November 25, 2008 (mid October - late November 2008), compared to weather-based models.

SCE&G has refused to consider revising its load forecast to take into account the recent downturn in the state and national economy. In testimony before the South Carolina Public Service Commission, the Company witnesses said they consider the recent events a normal dampening of business activity, they believe load reductions in their service area to be driven by the impact of high oil prices on disposable income, and they see no need to revise their long term forecast.

The SCE&G approach to its long term load forecast is naïve in light of the structural differences between the current economic crisis and ordinary downturns in the business cycle. The prospects for load growth to return in time to require the Company's investment in new generation on its present schedule are uncertain at best. Declaration of Nancy Brockway

Other utilities, such as Duke Energy, have recognized the need to step back and revisit their resource plans (including load forecasts) in light of the recent extreme economic events. Duke recently stated publicly that it has cut back on plans to expand its generation fleet, and has put on hold for up to a year its planned filing with the South Carolina Public Service Commission seeking support for its construction of two nuclear units at the Lee site.

B. With respect to Chapter 9 of the ER, "Proposed Action Alternatives," the Applicant almost completely ignores demand-side management, undervaluing opportunities for cost-effective energy efficiency and demand response or load management.

SCE&G in its ER dismisses the possibility of alternatives to building two new nuclear generating plants, and undervalues the alternatives. Declaration of Nancy Brockway. In

particular, SCE&G does not take demand side management or renewable sources of generation seriously, and overstates the risks associated with such resources, even as it understates the uncertainties associated with its chosen resource plan. As a result, SCE&G's resource plan is flawed and does not support its conclusion that Summer Units 2 and 3 are the least cost most reliable plan to provide resources for its customers. With respect to demand side management, SCE&G utterly dismisses the potential for DSM to produce resource benefits for customers and reduce the need or push off the timing of desirable generation additions. Declaration of Nancy Brockway.

In its Environmental Report, SCE&G's discussion of demand side management is limited to a few paragraphs, in which the Applicant names what it calls conservation programs and load management programs, whereas the conservation programs are not well-designed and will not achieve significant efficiency as currently designed (regardless of budget) and the load management programs are limited to voluntary reductions by large customers, and ignore the potential for load reduction and shifting from residential and small commercial air conditioning loads. Declaration of Nancy Brockway.

In the ER, the Company justifies its lack of projected energy efficiency and load management gains by citing the argument that "The relatively low cost of electricity in South Carolina works counter to the incentives provided in the available demand side management programs for reducing demand. Thus, given the customer growth and the low cost of electricity, the available energy savings from demand side management will not be sufficient to offset a significant portion of future demand." E.R. Para. 9.2.1.3.3. This analysis is insufficient. Declaration of Nancy Brockway.

SCE&G in testimony filed with the South Carolina PSC in Docket 2008-196-E similarly

rejected the idea that it could achieve considerable DSM energy benefits or peak load reductions using demand side management.

SCE&G's demand response initiatives appear to be largely directed towards large customers, such as industrial loads.

There is much greater potential for economic energy efficiency and peak load reduction in South Carolina than reflected in SCE&G's Environmental Report. Declaration of Nancy Brockway.

A number of technical potential studies of the United States economy have found that the United States could reduce energy usage by 25% on average through cost-effective efficiency.

Having enjoyed relatively low energy prices, South Carolina has so far lagged behind the nation in its energy efficiency activities (South Carolina ranks 30th in the nation to date in commitment to energy efficiency), and thus, contrary to SCE&G's analysis, the Applicant is likely to have greater than average opportunities to reduce energy usage while maintaining end-use benefits such as cooling, light, and motor power.

Other utilities in the Southeastern region of the United States have had great success involving residential customers in direct load control programs, whereby participating customers' air conditioning load is cycled off during peak days, contributing significantly to peak load reductions while not inconveniencing such customers unduly (participants receive benefits for participating).

The potential for greater demand response among residential customers has recently been recognized by the South Carolina Public Service Commission.

The South Carolina Climate, Energy and Commerce Committee (CECAC), established

by the Governor of South Carolina, and comprising representatives of all key energy-using and energy-producing sectors in the state, agreed in a report issued in July 2008 that 5% of the state's energy needs could be met with energy efficiency resources by 2020, at a savings of almost \$600 million, net present value.

The CECAC agreed that a 1% annual target of improvement in energy use efficiency was reasonable and achievable in the near term.

CECAC adopted a policy goal of 5% energy efficiency by 2020, for recommendation to the legislature.

The CECAC produced a supply curve of low- and no-carbon resources in South Carolina, which shows that energy efficiency could eliminate up to 8 percent of net GHG in 2020, at a net cost *savings* relative to the generation alternative.

By 2020, under the Company's load forecast filed in this docket, the Company's sales are projected to be 30,599 gigawatthours. A 5% reduction in sales made possible by efficiency would lower that forecast by 1530 gWh, or a significant portion of the roughly 9600 gWh⁴¹ that SCE&G claims it will receive from its share of the proposed two units at the Summer Station.

SCE&G participated fully in the CECAC deliberations, and did not publicly disagree with its recommendations (although it sent a letter to the CECAC chair disavowing its support of the July 2008 Final Report).

Duke Energy has forecast that it could produce energy resources using efficiency amounting to 1% per year of its load in the Carolinas.

⁴¹ The SCE&G share of the output of Summer Units 2 and 3 is calculated by multiplying 1.218 gW (SCE&G's share of the plants) by 90% (SCE&G's forecast capacity factor) by 8760 hours in a year.

Xcel Energy in Colorado has recently agreed to achieve savings of 1.4% by 2013.

According to data from 2006 filed with the Energy Information Administration, a number of large utilities have achieved efficiency savings of 1% or more annually.

Massachusetts Electric achieved a reduction of just under 2% in 2006. Since 2006, utilities and others have developed innovative designs for energy efficiency programs that can capture efficiency opportunities not previously available to utilities.

The National Action Plan for Energy Efficiency (NAPEE), a joint effort of the United States Environmental Protection Agency and the United States Department of Energy, along with state regulators and the electricity and gas industry, recites that well-designed energy efficiency programs "are delivering annual energy savings on the order of 1% of electricity and natural gas sales." The NAPEE can be downloaded from

<http://www.epa.gov/cleanrgy/documents/>.

The Applicant appears to argue that incremental demand side management above amounts reflected in its forecasts need not be considered as an alternative to the proposed plants unless by itself it can replace the resources represented by proposed plants. This approach would not constitute sound resource planning. Rather, all possible alternatives must be identified, and alternate scenarios, consisting of various mixes of resources and timing of resources, must be modeled to examine their net present value, given a variety of input assumptions. There is no evidence that the Company has used this basic method of resource planning. If it has, it has not presented the results to this Commission in its Environmental Report, nor explained its methodology in detail and identified the specific inputs to its modeling of various scenarios.

C. With respect to Chapter 9 of the ER, "Proposed Action Alternatives," the Applicant ignores the potential contribution of renewables to an overall sustainable and economic portfolio, and does not take into account significant improvement in unit costs and operations of renewables in recent years and as projected to continue.

SCE&G dismisses the potential of renewable sources of power, such as solar, wind, biomass to contribute substantially to meeting its future need for resources.

The Applicant at ER p. 9.2-7 states that it applies the following criteria to each alternative technology studied:

- The alternative energy conversion technology is developed, proven, and available in the relevant region within the life of the proposed project.
- The alternative energy source provides baseload generating capacity equivalent to the capacity needed, and to the same level as the proposed

Units 2 and 3

- The alternative energy source does not result in environmental impacts in excess of a nuclear plant, and the costs of an alternative energy.

The Applicant uses these criteria to determine if the "if the alternative technology represents a reasonable alternative to the proposed action and satisfies the intent and requirements of 10 CFR 52 regarding a COL application."

As to wind generation, SCE&G states that it is not a reasonable alternative "because wind energy, because of its intermittent nature, cannot be relied upon for baseload power. Furthermore, there are insufficient onshore wind resources in the relevant service area to offer a comparable generating capacity and offshore wind energy systems have considerable technical challenges, wind energy generating costs exceed nuclear power, and wind energy offers a distinct environmental disadvantage, relative to nuclear energy

because of its large land use impacts.” E.R. at p. 9.2-9. There are several flaws in this argument.

While on-shore sources of wind power may not be significant, South Carolina has abundant sources of off-shore wind. Declaration of Nancy Brockway.

The CECAC, described above, recommended that 500 mW of offshore wind power be added in South Carolina by 2015, and an additional 500 mW of offshore wind power be added by 2017.

This 1000 of offshore wind would replace a significant portion of the power forecast to be obtained from the proposed Summer Units 2 & 3.

Offshore wind is by now a proven source of generation. Approximately 1000 mW of offshore wind generation is operating today around the world, and another 2000 mW are in the planning or construction stages.

The aesthetic and operational objections cited by the Applicant have not deterred other jurisdictions from planning to rely heavily on offshore wind. Delaware, New Jersey and Rhode Island have recently announced plans to move ahead with offshore wind as key resources in their states' energy portfolios. The Governor of New Jersey has just announced plans for that state to develop 3000 mW off the Jersey shore by 2020.

While wind power is intermittent and therefore its capacity cannot substitute mW for mW with baseload thermal generation, this is not a reason to ignore wind, nor a reason to exclude wind from scenarios of possible future resource plans.

As to solar power, the Applicant similarly dismisses any contribution from this resource, arguing at p. 9.2-11 that:

SCE&G has concluded that, because of the high cost, low capacity factors,

lack of sufficient incident solar radiation, and the substantial amount of land needed to produce the desired output, solar energy is not practical as a utility-scale baseload power generation option.

Solar alternatives are rapidly evolving. Since the Applicant compiled its Environmental Report, the costs of solar technologies have come down considerably.

The U.S. Department of Energy Solar Energies Technologies Program recently projected that per-kW installed costs of solar will be reduced to half of 2008 prices by 2015. This trend would suggest that solar power will be competitive with conventionally-generated power by 2010.

Duke Energy is making a significant investment in solar generation in North Carolina, SCE&G's neighbor.

The Applicant acknowledges that South Carolina is suitable for distributed solar behind the customer's meter, yet makes no serious attempt to model this resource as part of its resource planning.

As to renewables generally, state policy in South Carolina recognizes their value. The CECAC, described above, set out a recommended goal for South Carolina to obtain 5% of its energy from such alternatives by 2020. The CECAC report suggests that meeting 5% of the state's energy needs from renewables will reduce greenhouse gas emissions at less than half the cost per ton of new nuclear power.

As to renewables generally, the Applicant stresses all uncertainties associated with their design and operation, while assuming (incorrectly, as will be discussed below) that the AP1000 plants it proposes to construct have no design or operational uncertainties.

This disparate treatment reflects an unwillingness to take renewable alternatives

seriously. Declaration of Nancy Brockway.

D. With respect to Chapter 9 of the ER, "Proposed Action Alternatives," the Applicant fails to properly evaluate the risk of choosing a single technology and two extremely large construction projects in lieu of a more modular approach made up of a greater variety of resource options allowing a greater opportunity to change course during implementation of the plan, in the event that risks, known to be potential and those that are not now foreseeable, develop into real difficulties during implementation, and in the event that other superior opportunities become realistic.

E. With respect to Chapter 10 of the ER, "Proposed Action Consequences," the Applicant underestimates the impact of its proposed construction and operation on vulnerable customers via rate increases.

F. With respect to Chapter 10 of the ER, "Proposed Action Consequences," the Applicant's cost estimate for construction and operation fails to take into account recent rapid increases in the cost of inputs for construction.

G. With respect to Chapter 10 of the ER, "Proposed Action Consequences," the Applicant's cost estimate for construction and operation is based on an unrealistic schedule, and assumes a settled and approved design for its proposed AP1000, which has not yet been established and for which there is no firm date for Commission determination.

SCE&G's Environmental Report skews its conclusions about its nuclear units' superiority to alternatives in part by significantly understating the costs of its proposed nuclear plants, and underestimating the time it may take to begin, and complete, construction. Declaration of Nancy Brockway. At p. 10.4-5 of its Environmental Report, the Applicant projects overnight construction costs for each unit to be \$2,000 per kW in 2003 dollars, or just under \$2300 per kW in 2007 dollars. If one assumes that the all-in costs can be estimated by adding 50% or 100% to the overnight costs, the Applicant's filed estimate would produce an all-in cost estimate of somewhere between \$3,450 and \$4,600 per kW. [Note - 2007 dollars are used in this calculation, so as to provide the Commission with an apples-to-apples comparison of the busbar costs of the proposed

plants to estimates of AP1000 costs prepared by others, below]. These estimates are out of date and seriously underestimate the likely costs of its AP1000 plants.

Declaration of Nancy Brockway.

Since the Company filed its Application, it has itself revised its estimated cost for its construction of an AP1000 unit. It now estimates that the two units it proposes to build will cost \$9.8 billion.

Estimates of the cost of construction of new nuclear plants have been increasing at a very fast rate in the years since the SCE&G estimate was first developed. The costs of inputs to such plants has skyrocketed, as a result of world-wide economic development and competition in demand for such inputs. Further inflation in such costs is likely not to be as rapid. However, the SCE&G estimates underestimate the impact of the enormous inflation in such costs over the last few years. Declaration of Nancy Brockway.

The Massachusetts Institute of Technology study prepared in 2003 estimated the overnight cost of an AP1000 in 2007 dollars at \$3,882 per kW, or \$7,664 in all-in costs, escalating the MIT figure using the CERA PCCI.

Florida Power & Light in its October 2007 application estimated busbar costs at between \$3,643 and \$4,587 per kW in 2007 dollars, or roughly the equivalent of between \$5500 and \$8,100 all-in.

Duke Energy this fall revised its projected costs for two AP1000 units to \$11 billion in overnight costs alone.

When the DOE announced the applications for Loan Guarantees for nuclear plant construction, in October, it estimated that construction of 21 reactors would cost \$188 billion, or approximately \$9 billion per unit, all-in.

The Applicant in its E.R. projected that “reasonably high and levelized” busbar costs of the output, in 2003 dollars, would be 6.5 cents/kWh. Inflating 6.5 cents per kWh to 2008 dollars, this would be the equivalent of 7.6 cents per kWh in 2008 dollars. At the hearings at the South Carolina PSC, the Applicant stated that its estimate of the costs of the output from the two plants was 10 cents per kWh. The Applicant would not provide any maximum cost per kWh that it could commit to for the output of the plant.

The Applicant estimates that it will have to raise its rates by just under 40% by the time the plants are completed, to cover the costs of construction. This level of rate increase will cause shock to SCE&G customers, and will produce hardship for many, especially those of lower incomes and marginal profitability. Declaration of Nancy Brockway.

A major factor contributing to escalating nuclear plant costs in the 1970s and 1980s was the need for plants in the design or construction phase to be redesigned or retrofitted to accommodate changes in regulatory requirements. The COL process and standardization of new nuclear power designs are intended to avoid these delays in construction and escalations in cost.

The COL and design process for the AP1000 has not yet produced an established, standard design. Before the Commission could decide on Revision 16 filed by the proponents, the proponents filed Revision 17. The changes to the previously-approved design represented by Revisions 16 and 17 remain under consideration by the Commission. Presently there is no scheduled date for determination of these Revisions to the AP1000 design.

Until the Commission completes its review of the AP1000 design, it will not be possible to make any reasonable estimate of the cost of construction, for use in comparisons with

alternatives.

This Commission faces a difficult challenge, because the care it must take to ensure a well-designed plant itself extends the time for initiation of construction, thus subjecting the plants to inflation.

Nonetheless, greater delay and cost escalation would ensue if the Commission repeated the approach that led to enormous delays and cost overruns in the last round of plant development. It is important for the Commission to complete the design review process before authorizing the construction and operation of any new nuclear plant, lest there be a need for many later revisions, which would undermine the entire objective of standardization as a cost-minimization effort for new nuclear plants. It is likely that this process cannot realistically be completed without one or more demonstration plants being built. SCE&G is not a good candidate to build a demonstration plant, because it has the lowest market value and asset base compared to the cost of construction of any new nuclear plant proponent. Declaration of Nancy Brockway.

Given the current level of uncertainties surrounding cost estimates for new power plant construction, Moody's in late 2007 stated that its estimate of \$5000 to \$6000 for all-in costs of a new nuclear plant were "only marginally better than a guess." Moody's also said that utilities "may decide not to proceed with financing and construction unless and until they have satisfied themselves (and, where necessary, their boards and regulators) that the investment is justified and that the plant can produce electricity and recover costs at a price that will not be overly burdensome to consumers."

For SCE&G the decision to build these plants amounts to "betting the company" because the amounts needed for construction, over \$5 billion apiece without financing

costs or inflation, are more than the value of the company, whose total capitalization is only \$4.9 billion. Declaration of Nancy Brockway.

Until a construction budget can be developed based on a settled, final and approved design for the AP1000, it is not possible to compare the Applicant's proposed construction of two such plants to the combinations of alternative resources that might prove superior.

Conclusion.

The Applicant's planning process has not been systematic, thorough or comprehensive in that the Applicant overestimates the risks of alternatives and understates their potential, whereas it underestimates the risks of its proposed nuclear alternative and overstates its potential.

The Applicant completely dismisses the current economic crisis and recent reductions in its sales, and has conducted no sensitivities of its load forecast to try to capture the possible effects of a recession, including the possibility of a long and deep economic downturn..

The Applicant almost completely ignores demand-side management, undervaluing opportunities for cost-effective energy efficiency and demand response or load management.

The Applicant ignores the potential contribution of renewables to an overall sustainable and economic portfolio, and does not take into account significant improvement in unit costs and operations of renewables in recent years and as projected to continue.

The Applicant fails to properly evaluate the risk of choosing a single technology and two extremely large construction projects in lieu of a more modular approach made up of a

greater variety of resource options allowing a greater opportunity to change course during implementation of the plan, in the event that risks, known to be potential and those that are not now foreseeable, develop into real difficulties during implementation, and in the event that other superior opportunities become realistic.

The Applicant underestimates the impact of its proposed construction on vulnerable customers via rate increases.

The Applicant's cost estimate for construction fails to take into account recent rapid increases in the cost of inputs for construction.

The Applicant's cost estimate for construction is based on an unrealistic schedule, and assumes a settled and approved design for its proposed AP1000, which has not yet been established and for which there is no firm date for Commission determination.

As the Brockway Declaration and cited supporting evidence makes clear the proposal described by South Carolina Electric & Gas in its ER does not meet the NEPA standards. Until the costs and risks of the proposed Summer reactors and the alternatives are fairly and completely presented, the NRC staff will not be able to complete its EIS. The Petitioners' contention should be admitted.

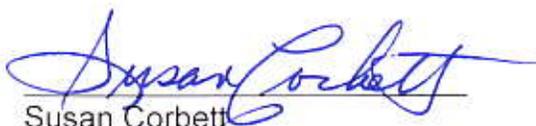
CONCLUSION

The Petitioners Sierra Club and Friends of the Earth request that their petition to intervene and request for hearing be granted. The foregoing contentions should be admitted because they clearly satisfy all of the Commission's requirements in 10 C.F.R. § 2.309.

Respectfully submitted this the 8th day of December 2008.



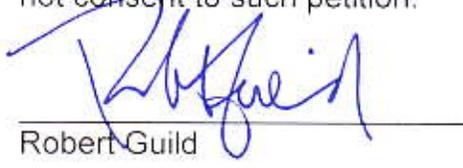
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Susan Corbett
Chapter Chair
South Carolina Chapter
Sierra Club

CERTIFICATE OF COUNSEL

Pursuant to 10 C.F.R. 2.323(b), I certify that on December 8], 2008, I contacted counsel for NRC, Michael Spencer [301-415-4073], and counsel for SCE&G, Randolph R. Mahan, 803-217-9538, to inform them that the Sierra Club and Friends of the Earth were filing this intervention petition and requested that they support this petition. Mr. Spencer responded that the Commission Rules of Practice did not require such consultation with regard to this intervention petition. Mr. Mahan stated SCE&G could not consent to such petition.



Robert Guild

CERTIFICATE OF SERVICE

I hereby certify that copies of this PETITION FOR INTERVENTION AND REQUEST FOR HEARING BY THE SOUTH CAROLINA CHAPTER OF THE SIERRA CLUB was served on the following via email and via the EIE system:

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This is the 9th day of December 2008.



Robert Guild