

December 9, 2008

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

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In the Matter of	)	
	)	
SOUTH CAROLINA ELECTRIC AND	)	
GAS COMPANY	)	Docket Nos. 52-027 COL
	)	52-028 COL
(Virgil C. Summer Nuclear Station	)	
Units 2 & 3)	)	
_____	)	

DECLARATION OF NANCY BROCKWAY  
IN SUPPORT OF PETITION FOR INTERVENTION AND REQUEST FOR HEARING  
BY THE SIERRA CLUB AND FRIENDS OF THE EARTH

I, Nancy Brockway, under the pains and penalties of perjury, state the following:

1. My name is Nancy Brockway. I am the principal and sole proprietor of NBrockway & Associates, a consulting firm located at 10 Allen Street, Boston, Massachusetts.
2. I submit this declaration in support of the petition for intervention and request for intervention filed by the South Carolina Chapter of the Sierra Club.
3. My declaration provides evidence to support your petitioner's contentions that the Applicant, South Carolina Electric & Gas Company (SCE&G or the Company) has failed in its Environmental Report (ER) to satisfy the requirements of law and regulation, in that the Company has (a) not discussed impacts of its proposal and alternatives in proportion to their significance (overstating the adverse impacts of the alternatives and understating the adverse impacts of its proposal); (b) failed to pursue appropriate alternatives to its favored course of action; (c) inaccurately portrayed the relationship between local short-term uses of man's environment in pursuit of its favored proposal and the maintenance and enhancement of long-term productivity through development of sustainable alternatives; and (d) inadequately assessed the impact on such alternatives of its proposed irretrievable commitment of resources to pursue the proposed action should it be implemented.

4. The Company's Environmental Report is flawed because it is not (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty, as discussed below.
5. In particular, the Company fails adequately to assess the costs of the proposed facility, particularly as compared to the alternatives of meeting the likely need for power through a modular plan including demand and energy reduction through demand-side management, and the construction of distributed renewable energy facilities including offshore wind, solar, landfill gas and biomass. The enormous size of the proposed investment, especially relative to the size of the Company, will effectively prevent the Company from pursuing any sustainable and renewable options. The Company has systematically exaggerated the risks of alternatives, and underestimated the potential contribution of such alternatives to meeting resource needs. The Company has not assessed all reasonable options in a comprehensive fashion. The Company's proposal is not subject to confirmation because it represents new and as-yet untried technology whose design is not yet complete. The Company completely ignores the great uncertainty as to its future need for power caused by the recent economic downturn.

#### **QUALIFICATIONS OF DECLARANT**

6. I am qualified to provide facts and opinions on the matters in the declaration on the basis of my extensive experience as an expert in electric utility resource planning, demand side management, and regulation, as described below and in my attached resume. Since 1983, my professional focus has been the energy and utility industries, with particular attention to the role of regulation in the protection of consumers and the environment, energy efficiency, and the balance between the interests of the utility and those of other stakeholders. I have extensive experience in issues of utility resource planning, including the role of nuclear power, renewables, non-utility generation and demand-side management, among others, in developing a sound resource portfolio. My experience can be summarized as follows:
  - a. I was a member of the staff of the Maine Public Utilities Commission from 1983 to 1986. I joined the Massachusetts Department of Public Utilities in 1986 as a staff attorney and hearing officer. I became Assistant General Counsel, and in 1989 I was appointed General Counsel, a position I held until 1991. From 1998 to 2003, I was a member of the New Hampshire Public Utilities Commission. While on the New Hampshire Commission, I was a member of several NARUC committees, including the Committee on Energy Resources and the Environment, and the Committee on Competition in the Electric Industry. I was Vice-Chair of the Committee on Consumer Affairs. I was a member of the ISO-NE Advisory Committee, and the NEPOOL Appeals Board Advisory Committee.
  - b. Before and after my service with these three State public utilities regulatory commissions, I have provide consulting and legal services on energy and utility matters. From 1991 until 1998, I was a consultant and expert witness for consumers with the National Consumer Law Center. I had primary responsibility for analyzing

- proposals for restructuring the electric industry, and making recommendations to consumer advocates about these matters. During this period, I served as a member of the Massachusetts Energy Facility Siting Council. Since leaving the New Hampshire Commission in 2003, I have provided representation and consulting services to the Kansas, Ohio, Delaware, Hawaii and Vermont commissions, and the Utility and Review Board of Nova Scotia, as well as a number of consumer advocate offices and others. In 2007 and 2008, I served as Chief and then Director of Multi-Utility Research and Analysis, on a contract and staff basis respectively, for the National Regulatory Research Institute. From 2004 to 2008, I served as Chair of the Board of PAYS America, Inc., a non-profit organization devoted to disseminating information about Pay As You Save®, an innovative on-the-bill-financing method to expand markets for energy efficiency. A resume and list of my previous testimonies is attached to this declaration as Exhibit NB-1
- c. I have participated in numerous regulatory proceedings involving electricity resource planning, including nuclear power, at various times since 1983. When I was hired by then-Commission Chair Peter A. Bradford to serve as a staff advocate and advisor at the Maine Public Utilities Commission, one of my first responsibilities was to develop and present staff's position on the prudence of and cost recovery for the Seabrook II nuclear generation station, which had recently been cancelled. At the Maine Commission, I also was lead advocate for the staff in its assessment of the merits of completing Seabrook I, when that plant's support by Wall Street was withdrawn. I also was staff attorney on the team that subsequently negotiated a settlement concerning rates and cost recovery for Seabrook I with Central Maine Power Company, the Maine Joint Owner of the plant.
  - d. I was a staff advocate assigned to what were among the first Conservation and Load Management dockets in the United States, in which the fundamental regulatory elements of demand side management were developed. I also had responsibility for staff advocacy on non-utility generation dockets under the Public Utilities Regulatory Policies Act of 1978 and state law. I was staff advocate in a number of time-of-use rate design proceedings, involving the theory and practice of this form of demand management. All these proceedings necessarily involved consideration of resource planning, including review of production cost modeling, forecasting and resource selection.
  - e. While at the Massachusetts Department of Public Utilities, beginning in 1986, I was the hearing officer and key advisor to the Commission on a number of cases involving generation planning, including nuclear plants. The Massachusetts Commission during this period dealt with ratemaking treatment for Seabrook I costs for Joint Owners in the Commonwealth, and ratemaking treatment for Pilgrim nuclear generating station in Plymouth, Massachusetts. I presided over the dockets in which the Commission addressed a projected near-term inability to meet objective capacity requirements under the New England Power Pool Agreement, the development of Conservation and Load Management initiatives by Massachusetts utilities, and the PURPA and state law effort to encourage development of independent power production. These proceedings required the a thorough understanding of the resource planning process, alternative resource options, and the treatment of risk in the plant development process.

- f. During my work with the National Consumer Law Center, I continued my work in the area of conservation and load management. I also devoted myself to the study of industry structures, and provided advice to consumer advocates in the ongoing debate about restructuring the electric industry to introduce competition in the generation function.
- g. When I was appointed to the New Hampshire Public Utilities Commission in 1998, the state was in the midst of making a difficult transition to the competitive model for electric supply. Properly valuing assets of the New Hampshire utilities, including their ownership shares in or contract rights to nuclear generation in New England, was an important task of the Commission. The Commission specifically had to evaluate the proposal for Public Service Company of New Hampshire and other Joint Owners to sell Seabrook Station, a transaction we approved (despite my misgivings) in 2001.
- h. While at the New Hampshire Commission, I played a key role in promoting innovative forms of demand-side management, with a view towards expanding the range of cost-effective efficiency investments made in the state.
- i. After leaving the New Hampshire Commission, I participated in various demand side management proceedings. I published a major study on the impact of Advanced Metering Infrastructure on residential customers in early 2008.
- j. In 2008, I researched risk allocation and pre-approval issues for the National Regulatory Research Institute, where I was the Director of Multi-Utility Research and Analysis.
- k. On October 17 and November 14, 2008, I filed testimony on behalf of Friends of the Earth in South Carolina Public Service Commission Docket 2008-196-E, the consideration by the South Carolina regulatory commission of a request by the Applicant in the instant proceeding, South Carolina Electric and Gas, for approval of its proposed Summer Units 2 & 3 under the South Carolina Base Load Review Act.

### **ORGANIZATION OF DECLARATION**

7. In preparation of this declaration, I have reviewed the SCE&G COL Application, Part 1, and Part 3, Environmental Report, in particular Chapters 8 through 10.
8. This declaration is organized as follows:
  - a) Part One - Load Forecast, discusses SCE&G's statement of the need for Units 2 & 3, particularly in light of recent economic circumstances, and the Company's resultant failure to address uncertainties affecting its need for the proposed units.
  - b) Part Two – Alternatives - DSM, discusses the demand side alternatives to the construction of the two subject units, and the Applicant's failure to assess these alternatives in a balanced, systematic and comprehensive manner.
  - c) Part Three – Alternatives – Renewables, discusses the renewable generation alternatives to the construction of the two subject units, and the Applicant's failure to assess these alternatives in a balanced, systematic and comprehensive manner.
  - d) Part Four - Costs, discusses the factors that have increased unit costs and factors that will likely further delay and raise costs for the units, thus rendering the Applicant's cost-benefit analysis of the proposal and its alternatives unreliable..

- e) Part Five - Conclusions, provides my conclusions on the matters under discussion in this declaration.

## PART ONE - LOAD FORECAST

9. 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).
10. 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.
11. 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 customers.
12. 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.
13. 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.

14. 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.
15. 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.
16. 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.
17. 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.
18. 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.
19. 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). The economy stalled in a liquidity trap.
20. 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.

21. 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 major monetary interventions to date, and 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.
22. The delicate 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."
23. 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.
24. 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.
25. 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.
26. The worsening economy has already been felt in South Carolina's electricity sales.
27. Both Duke Energy – Carolinas and SCE&G have announced that sales slacked off in the second half of 2008.
28. 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).

29. 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.
30. SCE&G has refused to consider revising its load forecast to take into account the recent downturn in the state and national economy.
31. 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.
32. 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.
33. 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.

## **PART TWO: ALTERNATIVES TO SUMMER UNITS 2 and 3 - DSM**

34. SCE&G in its ER dismisses the possibility of alternatives to building two new nuclear generating plants, and undervalues the alternatives. 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 represent the least cost and most reliable plan to provide resources for its customers.
35. 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.
36. 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).



37. The Company forecasts no additional load reductions from efficiency or load response programs after 2012. Its 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. Its load management forecasts significantly understate the technical and economic potential for load management in its service area.
38. 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 incorrect and insufficient.
39. 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.
40. SCE&G’s demand response initiatives appear to be largely directed towards large customers, such as industrial loads.
41. There is much greater potential for economic energy efficiency and peak load reduction in South Carolina than reflected in SCE&G’s Environmental Report.
42. 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.
43. Having enjoyed relatively low energy prices, South Carolina has so far lagged behind the nation in its energy efficiency activities (South Carolina ranks 30<sup>th</sup> 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.
44. 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).
45. The potential for greater demand response among residential customers has recently been recognized by the South Carolina Public Service Commission.

46. 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.
47. The CECAC agreed that a 1% annual target of improvement in energy use efficiency was reasonable and achievable in the near term.
48. CECAC adopted a policy goal of 5% energy efficiency savings by 2020, for recommendation to the legislature.
49. 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.
50. 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 gWh<sup>1</sup> that SCE&G claims it will receive from its share of the proposed two units at the Summer Station.
51. 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).
52. Duke Energy has forecast that it could produce energy resources using efficiency amounting to 1% per year of its load in the Carolinas.
53. Xcel Energy in Colorado has recently agreed to achieve savings of 1.4% by 2013.
54. 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.
55. 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

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<sup>1</sup> 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.

1% of electricity and natural gas sales.” The NAPEE can be downloaded from <http://www.epa.gov/cleanrgy/documents/>.

56. 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.

### **PART THREE – ALTERNATIVES – RENEWABLES AND POWER PURCHASES**

57. SCE&G dismisses the potential of renewable sources of power, such as solar, wind, biomass and the like to contribute substantially to meeting its future need for resources. SCE&G likewise dismisses the potential for supplementing its own generation with resources bought from others in its reliability area.
58. The Applicant at 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.
59. The Applicant states that it 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.”.
60. The Applicant’s use of these criteria is flawed, in that it is not comprehensive (excluding certain forms of resource), not systematic (exaggerates the potential problems with renewables while disregarding the potential problems with its preferred alternative) and does not adequately deal with uncertainty (by giving greater weight to uncertainties about renewable potential and costs than is warranted by the facts).
61. 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.

62. While on-shore sources of wind power may not be significant in the SCE&G service area, South Carolina has abundant sources of off-shore wind.
63. 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.
64. This 1000 mW of offshore wind would replace a significant portion of the power forecast to be obtained from the proposed Summer Units 2 & 3.
65. 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.
66. 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.
67. 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.
68. 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.
69. Solar alternatives are rapidly evolving, and their prices were coming down while the price of thermal generation such as the proposed units has escalated rapidly. MIT has just this week announced a doubling of the electricity obtainable from the same amount of solar surface in tests it is conducting.
70. Since the Applicant compiled its Environmental Report, the costs of solar technologies have come down considerably.

71. 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.
72. Duke Energy is making a significant investment in solar generation in North Carolina, SCE&G's neighbor.
73. 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.
74. 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.
75. 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.
76. As to off-system purchases, SCE&G has modeled 400 mW or more of such purchases up to the year before it forecasts the on-line date of its proposed Unit 2, but drops them from its resource plan thereafter without sufficient justification. Further, SCE&G ignores the likelihood that other utilities, such as Duke Energy (which has been courting potential wholesale customers) would have capacity and energy for sale, which could substitute for all or part of the new generation the Applicant seeks to obtain from its proposed units.

#### **PART FOUR: COST AND SCHEDULE OF PROPOSED GENERATING UNITS**

77. 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.
78. 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, in 2007 dollars.

79. The Applicant's filed estimates are out of date and seriously underestimate the likely costs of its AP1000 plants.
80. 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 including financing and escalation.
81. 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.
82. 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.
83. Florida Power & Light in its October 2007 application estimated overnight 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.
84. Duke Energy this fall revised its projected costs for two AP1000 units to \$11 billion in overnight costs alone, or \$6.5 billion in overnight costs per unit, much greater than the Applicant's most current estimate of \$6.3 billion *including* financing and escalation.
85. 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.
86. 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.
87. 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. It will also tend to suppress load growth and thus delay the need for the units, a factor not taken into account by the Company in its forecasts.

88. 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.
89. 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.
90. 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.
91. 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.
92. 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.
93. SCE&G is not a good candidate to build one of the first AP1000s, because it has the lowest market value and asset base compared to the cost of construction of any new nuclear plant proponent, and it owns only one other nuclear unit.
94. 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."
95. 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.

96. 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.

#### PART FIVE – CONCLUSIONS

97. The Applicant has failed in its Environmental Report (ER) to satisfy the requirements of law and regulation, in that the Company has (a) not discussed impacts of its proposal and alternatives in proportion to their significance (overstating the adverse impacts of the alternatives and understating the adverse impacts of its proposal); (b) failed to pursue appropriate alternatives to its favored course of action; (c) inaccurately portrayed the relationship between local short-term uses of man's environment in pursuit of its favored proposal and the maintenance and enhancement of long-term productivity through development of sustainable alternatives; and (d) inadequately assessed the impact on such alternatives of its proposed irretrievable commitment of resources to pursue the proposed action should it be implemented.
98. The Company's Environmental Report is flawed because it is (1) not systematic, (2) not comprehensive, (3) not subject to confirmation, and (4) not responsive to forecasting uncertainty, as discussed above.
99. I conclude that the proposal filed by South Carolina Electric & Gas in this docket does not meet the NEPA standards.

I declare under penalty of perjury that the foregoing facts are true and correct and that any expressions of opinion are based on my best judgment.

December 8, 2008  
Date

Nancy Brockway  
Nancy Brockway