EXHIBIT A

DESCRIPTION OF THE WESTINGHOUSE AP1000 AND THE FACILITY

Combined Application of South Carolina Electric & Gas Company for a Certificate of Environmental Compatibility and Public Convenience and Necessity and for a Base Load Review Order
Public Service Commission Docket No. 2008-196-E

1. INTRODUCTION

This Exhibit A provides information concerning the location and selection of the location for the proposed Virgil C. Summer Nuclear Station (VCSNS) Units 2 & 3 and a description of the Units SCE&G proposes to build.

2. SITE LOCATION AND FACILITY DESCRIPTION

The proposed AP1000 Advanced Passive Safety Power Plants (AP1000), referred to as VCSNS Units 2 & 3, are to be located approximately one mile south-southwest from VCSNS Unit 1. VCSNS Unit 1 is located at the southern end of the Monticello Reservoir in Fairfield County, South Carolina; approximately 15 miles west of Winnsboro and 26 miles northwest of Columbia, as shown on Figure 3. The site has a 44 year history of nuclear power generation. The Parr Experimental Nuclear Plant, which was the first commercial nuclear generation station in the Southeast, went into commercial operation on part of the site in May of 1964. This plant has since been retired and is in the final stages of decommissioning.

VCSNS Unit 1, which went into commercial operation on January 1, 1984, is a Westinghouse pressurized water reactor plant licensed by the Nuclear Regulatory Commission (NRC) in 1982 and has been in commercial operation since 1984. The site is in a sparsely populated rural area. The nearest community is Jenkinsville, South Carolina, located approximately three miles southeast of the site. The Broad River is located approximately one mile west of the site and flows in a southerly direction, as shown on Figure 4. The north-south oriented Monticello Reservoir has an area of approximately 6,800 acres (6 miles long and 2.5 miles across). The 6,800 acres includes the 300 acre Monticello sub-impoundment recreation lake. The power plant footprints of Units 2 and 3 consist of an area of approximately 47 acres, as shown on Figure 5.

The proposed AP1000 units and support facilities for the VCSNS site are designed around the Westinghouse standardized unit approach. Each AP1000 unit consists of five principle generation structures—the nuclear island, turbine building, annex building, diesel generator building, and a radwaste building, as shown on Figure 6. Structures that make up the nuclear island include the containment, shield building, and auxiliary building. The containment is a freestanding steel containment vessel with elliptical upper and lower heads. It is surrounded by the shield building. The shield building is a reinforced concrete structure that, in conjunction with the internal structures of the containment, provides the required shielding for the reactor coolant system and other radioactive systems and components housed in the containment. The
shield building roof is a reinforced concrete conical structure. The auxiliary building is a reinforced concrete structure and shares a common base mat with the containment building and the shield building. The auxiliary building wraps around approximately 70% of the circumference of the shield building and provides protection and separation for the safety-related mechanical and electrical equipment located outside the containment.

The turbine building is a rectangular metal-sided building with its long axis oriented radially from the containment. The turbine building houses the turbine, generator, and associated mechanical and electrical systems. The annex building is a combination reinforced concrete structure and steel framed structure with insulated metal siding. The annex building provides the main personnel entrance to the power block. The building also contains the control support area, a machine shop, the ancillary diesel generators, other electrical equipment and various heating, ventilation, and air conditioning systems. The plant includes non-safety related diesel generators and a diesel generator building is a single-story steel-framed structure with insulated metal siding. The building houses two diesel generators to provide backup power in the event of disruption of the normal power source. The radwaste building is a steel-framed structure that houses low-level liquid radwaste holdup tanks and processing system.

The circulating water system for each unit consists of two mechanical draft cooling towers and a circulating water pump intake structure. The circulating water system cooling towers are located south of the proposed new units. Each cooling tower has a concrete shell with fan stacks on top rising to a height of approximately 70 feet. Internal construction materials include fiberglass-reinforced plastic or polyvinyl chloride for piping laterals, polypropylene for spray nozzles, and polyvinyl chloride for fill material. Mechanical draft towers use mechanical fans to generate air flow across sprayed water to reject heat to the atmosphere. The four cooling towers occupy an area of approximately 38 acres.

In addition to the circulating water system cooling tower footprint, VCSNS Units 2 & 3 require space for service water system cooling towers (one per unit). These mechanical draft cooling towers require an area of approximately 0.5 acre per unit and are located near the turbine building. The proposed new units share common intake structures, discharge structure, and certain support structures such as office buildings, water treatment, and waste handling facilities.

The Monticello Reservoir is used as makeup water for the circulating water and service water cooling systems. The plant discharge is to the Parr Reservoir. The new intake structure for the circulating water system makeup is located approximately 1,250 feet west of the VCSNS Unit 1 intake facilities. An additional intake structure for the remaining plant water (service water cooling makeup, potable water, fire water, demineralized water supply) is located approximately 5500 feet east of the VCSNS Unit 1 intake facilities. Modifications to existing infrastructure will be made to integrate VCSNS Units 2 and 3 with the existing unit; however, none of the existing unit's structures or facilities that directly support power generation are shared. A new security perimeter will be installed to encompass the new units. The existing Nuclear Learning Center will be expanded to support the training needs for the new units. Existing administrative buildings, warehouses, and other support facilities will be used, expanded, or replaced based on prudent economic and operational considerations.
After the completion of new unit construction, areas used for construction support are to be graded, landscaped, and planted to enhance the overall site appearance. Previously forested areas cleared for temporary construction facilities are to be revegetated, and harsh topographical features created during construction are to be contoured to match the surrounding areas. These areas include equipment laydown yards, module fabrication areas, concrete batch plant, areas around completed structures, and construction parking.

VCSNS Unit 1 interconnects with the regional power grid via 10 existing 230kV transmission lines. To connect the additional generation to the electric grid, SCE&G will construct six new 230kV transmission lines: three for VCSNS Unit 2 and three for VCSNS Unit 3. A new 230kV switchyard will be constructed approximately 1,000 feet northwest of VCSNS Units 2 and 3, and 4,000 feet west south west of the existing Unit 1 site. This new switchyard will be air-insulated and consist of ten bays in a breaker-and-a-half arrangement. It will be located within an area approximately 2,000 feet long, 600 feet wide and occupy about 28 acres.

**A Description of the Westinghouse AP1000**

**Design Overview** – The AP1000 design is derived directly from the AP600, a two-loop, 600 MWe Pressurized Water Reactor (PWR). In December 1999, the AP600 was granted design certification from the Nuclear Regulatory Commission (NRC). The AP600 was the first nuclear reactor design using passive safety technology licensed in the West or in Asia. However, Westinghouse determined that a 600 MWe unit was not cost competitive in US markets. Therefore, Westinghouse embarked on the development of the AP1000 design, which applies economies of scale to the AP600 design to reduce the cost per kW while maintaining the passive safety advantages established by the AP600. At present, approximately eight to twelve AP1000 units are proposed to be built in the United States, most of which are planned to be located in the Southeastern United States.

Like the AP600, the AP1000 utilizes passive safety features that, once actuated, depend on natural forces, such as gravity, condensation and natural circulation, to perform required safety functions. These passive safety systems result in increased plant safety and have also significantly simplified plant systems, equipment and plant operation and maintenance. In both the AP600 and AP1000 designs, there are 60 percent fewer valves, 75 percent less piping, 80 percent less control cable, 35 percent fewer pumps, and 50 percent less seismic building volume than in a conventional reactor. This greatly simplified design complies with all of the NRC regulatory and safety requirements and EPRI Advanced Light Water Reactor Utility Requirements Document. These features make this design easier and less expensive to build, operate, and maintain.

The AP1000 was design certified by the NRC under 10 CFR 52, Appendix D in 2004. It was also found to meet the U.S. NRC deterministic-safety and probabilistic-risk criteria with large margins. The results of the Probabilistic Risk Assessment (PRA) for the AP1000 design show a very low core damage frequency, i.e., the probability of an accident that would result in core damage. The Nuclear Regulatory Commission requires that plants be designed such that the risk of core damage resulting from an emergency will occur 1 time or less in a 10,000 year period. The AP1000 is designed to have a core damage probability of 1 or less in every 2,500,000 years.
With the AP600 design certified by the NRC as a starting point, a minimum number of changes were made to realize a significant increase in power in AP1000. The reactor vessel for the AP1000 is the same diameter as for the AP600, but the number of fuel assemblies is only minimally increased from 145 to 157 and the height of the core was increased from 12 feet to 14 feet. In addition, to increase the output of the reactor, reactor coolant pumps and steam generators have been increased in size. The design of these larger reactor components are based on components that are used in operating PWRs or have been developed and tested for new PWRs. In order to maintain adequate safety margins, the capacity of the passive safety features have been selectively increased based on insights from the AP600 test and analysis results. As a result, more than 90 percent of the design for the plant had already been completed and more than 80 percent of the AP600 Safety Analysis Report remained unchanged for the AP1000. A pre-certification review phase was completed in March 2002 and was successful in establishing the applicability of the AP600 test program and AP600 safety analysis codes to the AP1000 design certification.

**Electrical and Thermal Output** – The AP1000 has a net electric output based a current engineering capabilities of 1,117MWe, reactor power (thermal) of 3,400 MWe. Its Fuel Type is 4.95% enriched UO2. Major components include a single reactor pressure vessel, two steam generators, and four reactor coolant pumps for converting reactor thermal energy into steam. A single high-pressure turbine and three low-pressure turbines drive a single electric generator.

**Detailed Description of the Components and Operations of the Unit** – The AP1000 reactor is connected to two steam generators via two primary hot leg pipes and four primary cold leg pipes. A reactor coolant pump is located in each primary cold leg pipe to circulate pressurized reactor coolant water through the reactor core. The reactor coolant pumps circulate reactor coolant through the reactor core making contact with the fuel rods which contain the enriched uranium dioxide fuel. As the reactor coolant passes through the reactor core, heat from the nuclear fission process is removed from the reactor. This heat is transported to the steam generators by the circulating reactor coolant and passes through the tubes of the steam generators to heat the feedwater from the secondary system. The reactor coolant is then returned to the reactor by the reactor coolant pumps, where it is reheated to start the heat transfer cycle over again. Inside the steam generators, the reactor heat from the primary system is transferred through the walls of the tubes to convert the incoming feedwater from the secondary system into steam. The steam is transported from the steam generators by main steam piping to drive the high-pressure and low-pressure turbines connected to an electric generator to produce electricity. The turbine is an 1,800-rpm, tandem-compound, six-flow, reheat unit. The high-pressure turbine element includes one double-flow, high-pressure turbine. The low-pressure turbine elements include three double-flow, low-pressure turbines. The turbine generator system will be manufactured by Toshiba. After passing through the high and low pressure turbines, the steam is condensed back to water by cooled water circulated inside the titanium tubes located in the three condensers. The condensate is then preheated and pumped back to the steam generators as feedwater to repeat the steam cycle. The condenser is a three-shell, single-pass, multi-pressure unit. The unit thermal efficiency of the complete cycle is approximately 35%.

The AP1000 pressurized water reactor works on the simple concept that, in the event of a design-basis accident (such as a coolant pipe break), the plant is designed to achieve and maintain safe shutdown condition without any operator action and without the need for AC
power or pumps. The AP1000 passive safety systems require no operator actions to mitigate
design-basis accidents. These systems use natural forces such as gravity, natural circulation,
evaporation, condensation and compressed gas to achieve their safety function. No pumps, fans,
diesels, chillers, or other active machinery are used, except for a few simple valves that
automatically align and actuate the passive safety systems. To provide high reliability, these
valves are designed to move to their safeguard positions upon loss of power or upon receipt of a
safeguards actuation signal. Only a single move is required for each valve, which is powered by
multiple, reliable Class 1E DC power batteries. The passive safety systems do not require the
large network of active safety support systems (ac power, diesels, HVAC, pumped cooling
water) that are needed in typical nuclear plants. As a result, in the case of the AP1000, active
support systems no longer are considered to be “safety related”, and they are either simplified or
eliminated. With less safety-related equipment, the seismic Category 1 building volumes needed
to house safety-related equipment are greatly reduced. In fact, most of the safety equipment can
now be located within containment, resulting in fewer containment penetrations.

Many active components are included in the AP1000, but are designated as non safety-
related. Multiple levels of defense for accident mitigation are provided, resulting in extremely
low core-damage probabilities while minimizing occurrences of containment flooding,
pressurization and heat-up.

3. SITE SELECTION

SCE&G conducted the site selection study for one or more possible new nuclear units in
2005. In that study, SCE&G reviewed the evaluations that had already been performed on a
number of potential power plant sites in its service territory. Those evaluations included the
evaluation conducted in originally selecting the location of the VCSNS Unit 1, the evaluation for
possible sites for a second unit, and several subsequent site evaluation studies related to the
possible siting of additional fossil-fueled plants.

SCE&G added one additional site, the Savannah River Site (SRS), to this list of previously
studied sites for evaluation in 2005. SRS was identified as a potential site since it was within
SCE&G service territory and had been evaluated as a potential nuclear site in recent industry
studies by third parties (including a study conducted by NuStart Energy Development, LLC
(“NuStart”) an association of utilities considering constructing nuclear construction.

A siting study conducted by Dames & Moore in 1974 had evaluated 18 potential nuclear
power plant sites located across the SCE&G service territory as possible sites for a second
nuclear power plant in addition to VCSNS Unit 1. The findings of that study indicated that
several potential locations within SCE&G’s service territory were suitable for such a unit. In
2005, SCE&G reevaluated these sites based on the results of the earlier study. Based on the 2005
evaluation, SCE&G determined that none of these 18 sites were “obviously superior” to VCSNS
as sites for a new nuclear plant, especially considering:

- VCSNS’ status as an existing nuclear power plant site, the extensive nuclear-related
  infrastructure and personnel already present on the site, as well as SCE&G’s 25 years of
  experience in nuclear operations at that location;
• The availability on the VCSNS site of adequate land and water for construction of new units;
• The availability of existing transportation and transmission infrastructure on the VCSNS site; and
• The VCSNS site’s favorable location with respect to SCE&G loads.

SCE&G had commissioned additional site selection studies in the 1980s (Dames & Moore 1982, 1988) to identify sites for potential future fossil-fueled power plants. Not all criteria used for fossil plant siting studies are directly applicable to nuclear plants. Nonetheless, these studies consistently identified sites at VCSNS as being among the most preferable of the sites they evaluated for the construction of a new, base load generating unit to serve SCE&G’s system.

Based on the conclusion that no previously evaluated sites were “obviously superior” to VCSNS, the 2005 siting study focused on comparing VCSNS to the previously unevaluated SRS site. This aspect of the evaluation was conducted in accordance with the overall process outlined in the Electric Power Research Institute (EPRI) Technical Report TR-1006878, Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application (Siting Guide), March 2002. The technical evaluation for this study was conducted by Dr. Kyle Turner (McCallum-Turner) who was also the principal investigator for development of the EPRI Siting Guide. This process, as adapted for the SCE&G site selection study, is depicted in Figure 1 below.

Screening-level criteria developed from the EPRI Existing Site Criteria were applied to the evaluation of the two sites. Once these initial screening-level evaluations were developed, reconnaissance-level on-site visits were conducted to support the site selection analysis.

Using all available data (including reconnaissance data) and criteria developed based on the EPRI general site criteria, detailed site suitability evaluations of the two alternative sites were conducted and overall composite site suitability ratings were developed.

The VCSNS site was found to rate higher in the railroad access, transmission access, and seismic criteria; the two sites were rated essentially equal in the remaining criteria (Ref. Table 1). Overall, based on the screening-level composite evaluation, VCSNS was found to be a superior location for the SCE&G COL application (Ref. Figure 2). Environmental and geological information concerning the site is summarized on Exhibit P to this Application.
Figure 1: Site Selection Process Overview

Review previous siting studies and update using existing & publicly available information

Adequate basis for identifying alternative sites?

Yes

Apply screening-level (EPRI existing site) criteria

Conduct site reconnaissance

Collect/analyze additional data (as required) and conduct detailed site evaluations

Identify preferred site

Prepare site selection report

No

Define and apply additional information and analyses required.
Table 1: Screening Evaluation Ratings

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Weight Factor

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| SRS                 | 3.5 | 5   | 4   | 4   | 4   | 4.79| 1.00| 2   | 4.5 | 246.6|
| VCSNS               | 4   | 5   | 4   | 4   | 4.96| 4.94| 3   | 5   |     | 294.7|

Screening Criteria

Criteria presented in Table 1, were derived from the existing site criteria listed in Section 4.2 of the EPRI Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application (Siting Guide), March 2002. They were intended to provide insights into the overall site suitability trade-offs between the two sites and to take advantage of data available during the site selection process.

Criterion Ratings – Each site was assigned a rating of 1 to 5 (1 = least suitable, 5 = most suitable) for each of the potential site evaluation criteria. Information sources for these evaluations included publicly available data, information available from SCE&G files and personnel, site visits, and large scale satellite photographs.

Weight Factors – Weight factors reflecting the relative importance of these criteria were synthesized from those developed for previous nuclear power plant siting studies. The weight factors were originally derived using methodology consistent with the modified Delphi process specified in the Siting Guide. Weight factors used (1 = least important, 10 = most important) are listed in the table above.

Composite Suitability Ratings – Ratings reflecting the overall suitability of each site were developed by multiplying criterion ratings by the criterion weight factors and summing over all criteria for each site.
Figure 2: Screening Evaluation Composite Site Suitability Ratings

Site Rating Summary

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Figure 3: 50 mile radius
Figure 4: 6 mile radius
Figure 5: Site Layout
Figure 6: AP1000 Standard Plant Layout