THE OFFICE OF REGULATORY STAFF

DIRECT TESTIMONY

OF

NICHOLAS PHILLIPS, JR.

MARCH 20, 2008

2007-440-E

APPLICATION OF DUKE ENERGY CAROLINAS, LLC FOR APPROVAL OF DECISION TO INCUR PRECONSTRUCTION COSTS FOR THE LEE NUCLEAR STATION IN CHEROKEE COUNTY

DIRECT TESTIMONY OF NICHOLAS PHILLIPS, JR.

FOR

THE OFFICE OF REGULATORY STAFF

DOCKET NO. 2007-440-E

IN RE: APPLICATION OF DUKE ENERGY CAROLINAS, LLC FOR APPROVAL OF DECISION TO INCUR PRECONSTRUCTION COSTS FOR THE LEE NUCLEAR STATION IN CHEROKEE COUNTY

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND OCCUPATION.

A. My name is Nicholas Phillips, Jr. My business address is 1215 Fern Ridge Parkway, Suite 208, St. Louis, Missouri 63141. I am a consultant in the field of public utility regulation and am a principal with the firm of Brubaker & Associates, Inc. ("BAI"), energy, economic and regulatory consultants.

Q. PLEASE STATE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A. I graduated from Lawrence Institute of Technology in 1968 with a Bachelor of Science Degree in Electrical Engineering. I received a Masters of Business Administration Degree from Wayne State University in 1972. Since that time I have taken many Masters and Ph.D. level courses in the field of Economics at Wayne State University and the University of Missouri.

I was employed by The Detroit Edison Company in June of 1968 in its Professional Development Program. My initial assignments were in the engineering and operations divisions where my responsibilities included the overhead and underground design, construction, operation and specifications for transmission and distribution equipment; budgeting and cost control for operations and capital expenditures; equipment performance under field and laboratory conditions; and emergency service restoration. I also worked in various districts, planning system expansion and construction based on increased and changing loads.

Since 1973, I have been engaged in the preparation of studies involving revenue requirements based on the cost to serve electric, steam, water and other portions of utility operations.

Other responsibilities have included power plant studies; profitability of various segments of utility operations; administration and recovery of fuel and purchased power costs; sale of utility plant; rate investigations; depreciation accrual rates; economic investigations; the determination of rate base, operating income, rate of return; contract analysis; rate design and revenue requirements in general.

I have held various positions including Supervisor of Cost of Service, Supervisor of Economic studies and Depreciation, Assistant Director of Load Research, and was designated as Manager of various rate cases before the Michigan Public Service Commission and the Federal Energy Regulatory Commission. I was acting as Director of Revenue Requirements when I left Detroit Edison to accept a position at Drazen-Brubaker & Associates, Inc. ("DBA"), in May of 1979.

The firm of Drazen-Brubaker & Associates, Inc. was incorporated in 1972 and has assumed the utility rate and economic consulting activities of Drazen

Associates, Inc., active since 1937. In April 1995 the firm of Brubaker & Associates was formed. It includes most of the former DBA principals and staff.

Our firm has prepared many studies involving original cost and annual depreciation accrual rates relating to electric, steam, gas and water properties, as well as cost of service studies in connection with rate cases and negotiation of contracts for substantial quantities of gas and electricity for industrial use. In these cases, it was necessary to analyze property records, depreciation accrual rates and reserves, rate base determinations, operating revenues, operating expenses, cost of capital and all other elements relating to cost of service.

Our firm and its predecessor firms have been in this field since 1937 and have participated in more than 1,000 proceedings in 40 states and in various provinces in Canada. We have experience with more than 350 utilities, including many electric utilities, gas pipelines and local distribution companies (LDCs). I have testified in many utility proceedings before this and other regulatory commissions on virtually all aspects of ratemaking.

In general, we are engaged in valuation and depreciation studies, rate work, feasibility, economic and cost of service studies and the design of rates for utility services. In addition to our main office in St. Louis, the firm also has branch offices in Phoenix, Arizona and Corpus Christi, Texas.

Q. WHAT ADDITIONAL EDUCATIONAL, PROFESSIONAL EXPERIENCE AND AFFILIATIONS HAVE YOU HAD?

A. I have completed various courses and attended many seminars concerned with rate design, load research, capital recovery, depreciation, and financial evaluation. I have served as an instructor of mathematics of finance at the Detroit College of Business located in Dearborn, Michigan. I have also lectured on rate and revenue requirement topics.

Q. HAVE YOU PREVIOUSLY APPEARED BEFORE A REGULATORY COMMISSION?

A. Yes. I have appeared before the New Jersey Board of Public Utilities, the Public Service Commissions of Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Missouri, Montana, New York, North Carolina, Ohio, Pennsylvania, South Carolina, South Dakota, Virginia, West Virginia, and Wisconsin, the Lansing Board of Water and Light, and the Council of the City of New Orleans in numerous proceedings concerning cost of service, rate base, unit costs, pro forma operating income, appropriate class rates of return, adjustments to the income statement, revenue requirements, rate design, integrated resource planning, power plant operations, fuel cost recovery, regulatory issues, rate-making issues, environmental compliance, avoided costs, cogeneration, cost recovery, economic dispatch, rate of return, demand-side management, regulatory accounting and various other items.

Q. HAVE YOU BEEN INVOLVED WITH PRIOR PROCEEDINGS BEFORE THE SOUTH CAROLINA PUBLIC SERVICE COMMISSION?

A. Yes. I have been involved in prior proceedings before this Commission and presented testimony in many of those proceedings. I have been involved with Duke Energy matters before this Commission and the North Carolina Utilities Commission for the last 25 years.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. My testimony is directed toward the request of Duke Energy Carolinas, LLC ("Duke" or "Duke Energy") for approval of its decision to keep the nuclear generation option available for the provision of electric service to customers in the Carolinas. Duke is seeking approval of its decision to preserve the option of constructing the William States Lee, III Nuclear Station in Cherokee County, South Carolina (Lee Nuclear Station) to provide capacity and energy to customers in the 2018 timeframe. Duke states that it has selected the Westinghouse AP1000 reactor technology and projects the annual capacity factor to exceed 90% based on current nuclear fleet performance. Duke filed a Combined Construction and Operating License Application with the Nuclear Regulatory Commission on December 13, 2007 for the Lee Nuclear Station.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am appearing on behalf of the South Carolina Office of Regulatory Staff.

Q. WOULD YOU BRIEFLY SUMMARIZE YOUR RECOMMENDATIONS IN THIS PROCEEDING?

A. Yes. A summary of my position and recommendations is listed below:

1. Duke has a need for additional capacity due to load growth and scheduled retirements of existing capacity.

2. The types of capacity available to serve increased load include coal-fired generation, gas-fired generation, nuclear generation, and renewable generation.

3. Duke is currently planning to add a coal generating unit and two combined cycle natural gas generating units. Duke is also planning to add renewable energy sources to its generation mix.

4. The cost of capacity and cost of fuel required to produce energy are factors considered within Duke's Integrated Resource Plan.

5. The need for diversity of fuel sources, the uncertainty regarding future fuel costs, the prospect of changes in requirements associated with new laws and other factors not yet known are considerations which require that Duke maintain a variety of options for providing electric service to customers.

6. Utility-owned dispatchable generation has advantages over other forms of generation or load reductions in meeting customer load requirements in a reliable and efficient manner.

7. It is reasonable and prudent for Duke to keep the nuclear option available to serve customer load in a reliable and efficient manner.

8. There is a continuing need to monitor and evaluate all relevant factors that impact the integrated resource plan and that process should continue.

Q. WHAT MATERIAL HAVE YOU EXAMINED INVOLVING THIS MATTER?

A. I have reviewed Duke's application, Duke's filed testimony, Duke's 2007 Integrated Resource Plan (IRP), and other information for this case. I have reviewed previous IRP's prepared by Duke and was involved in the evaluation of Duke's application to construct new coal-fired base load generation at the Cliffside facility in North Carolina. I have been involved in a variety of Duke regulatory matters over a number of years and have examined Duke information in those matters.

Q. WHAT IS INTEGRATED RESOURCE PLANNING?

A. Integrated resource planning recognizes that customer needs can be met by expansion of supply-side resources, by reductions in the amount of utility services required to achieve a given service level or level of production, or by a combination of the two.

From a supply-side perspective, forecasted customer requirements can be met by adding new production and delivery capability (generating stations, transmission lines and distribution equipment for electric utilities). Generation facilities for an electric utility may include combustion turbine peaking units, combined-cycle units, coal-fired plants, nuclear plants, renewable resources, etc.

From a demand-side perspective, customer requirements can be reduced or modified using a variety of techniques. These include more efficient appliances, control of appliance operating times, enhanced building codes, etc. If demand-side actions can be demonstrated to have a level of reliability and a lifetime equivalent to supply-side resources, then demand-side management ("DSM") options can serve as a substitute for supply-side expansion.

In integrated resource planning, both supply-side and demand-side resources may be considered as alternatives, so long as appropriate adjustments are made for any pertinent differences in characteristics. Supply-side and demand-side resources should be evaluated and compared to each other using a consistent set of economic assumptions. Renewable resources must consider cost, capacity factor, reliability, dispatchability, etc.

Q. WHAT IS YOUR POSITION CONCERNING THE OBJECTIVE OF AN IRP?

A. The basic objective of an IRP is to provide utility services at the lowest overall reasonable cost, consistent with service that is safe, reliable and in accord with all regulatory guidelines and the law. The IRP should attempt to do this by selecting the most reasonable combination of demand-side and supply-side resources, giving due consideration to the differences in characteristics between demand-side and supply-side resources.

Q. HOW SHOULD AN INTEGRATED RESOURCE PLAN BE JUDGED IN TERMS OF ITS ABILITY TO ACHIEVE THE STATED OBJECTIVE?

A. In discussing this issue, the important question is "least-cost to whom"? Since utility planning is done by the utility for the benefit of utility customers, an integrated resource plan should be evaluated primarily on the basis of whether or not it is designed to achieve the lowest reasonable cost to utility customers.

A critical aspect in evaluating the viability of integrated resource planning is an assessment of whether, and how, all viable options are considered and analyzed. The initial step is to develop a forecast of future requirements that considers uncertainty; i.e., the plausible range of the load forecast.

Q. DO YOU HAVE CONCERNS WITH RESPECT TO THE LOAD FORECAST PRESENTED BY DUKE IN ITS IRP?

A. I have no specific concerns in this regard. Duke has presented reasonable load forecasts which are continuously reviewed, modified, and improved over time. It is important to recognize that the peak load forecast is an essential ingredient to the determination of the amount of capacity required. Adequate capacity is required to meet the forecast level of peak demand (plus a reserve margin), not average demand or average sales.

Q. HOW IS THE PEAK LOAD FORECAST USED?

A. The load forecast is compared to Duke's available resources, and combined with supply-side options and a planning criterion (such as reserve margin, loss of load probability, or similar measurement) in order to determine the required adjustments to supply-side resources. Then, all plausible supply-side resources should be considered and the revenue requirements associated with each determined. Further analysis of the sensitivity of the result to changes in major economic parameters, such as fuel costs, inflation rates and construction costs, should be conducted. A plan is then developed to provide the projected requirements at the lowest total reasonable cost giving due consideration to safety, reliability, and other important factors.

Q. WHAT IS DEMAND-SIDE MANAGEMENT?

A. Demand-side management generally refers to actions taken on the customer's side of the electric meter. It involves reducing or modifying customer requirements using a variety of techniques, such as more efficient appliances, control of appliance operating times, and more efficient lighting and motors. DSM actions can be undertaken directly and unilaterally by the customer, or can be facilitated by the intervention of the utility. It is important to recognize that many customers have already undertaken substantial conservation and demand management measures in their plant operations or homes at their own expense and initiative in order to remain competitive or to conserve energy.

Q. IS DSM A NEW CONCEPT?

A. Conservation and load management have existed for quite some time and are now often classified as DSM. Utilities generally prefer load management tools that offer direct control over load shape (such as a reduction in peak demand). It is desirable to manage load and use energy in the most efficient manner possible.

Q. HOW DOES DSM FIT INTO UTILITY PLANNING?

A. As previously explained, DSM is one aspect of utility planning. The planning approach recognizes that customer needs can be met by the addition of supply-side resources, by reductions in the amount (or shifts in the time of use) of utility services required to achieve a given comfort level (DSM), or by a combination of the two.

The basic planning objective should be to provide safe and reliable utility services at the lowest overall reasonable cost, consistent with all regulatory guidelines and laws. The planning process should attempt to accomplish this result by selecting the most reasonable combination of demand-side and supply-side resources, giving due consideration to the differences in characteristics between them.

Q. WHAT ARE THE FUNDAMENTAL DIFFERENCES BETWEEN DEMAND-SIDE AND SUPPLY-SIDE RESOURCES?

A. The most fundamental difference is the identification of the resource value. For example, the output from a nuclear generating unit (a supply-side resource) can be definitely measured. At all times the utility knows the number of megawatts being used to serve load, as well as the additional megawatts that are available if needed. Also, over any particular period of time, the utility knows the number of kilowatt hours produced. In contrast, demand-side management programs or devices do not produce an output but rather effect a reduction in consumption or a change in the timing of the use. Accordingly, there is no output which can be measured. The resource contribution of a demand-side resource must be determined by resorting to a combination of engineering estimates, pre-installation/post-installation bill or load analysis, surveys, or some combination of these. Furthermore, not even these procedures provide a "real-time" indication of the resource contribution by a DSM measure. Therefore, it is difficult for a utility to be completely certain about the resource value of DSM.

A second fundamental difference between demand-side and supply-side resource lies in the degree of confidence which can be attached to a prediction of their performance. For the most part, supply-side technologies are relatively well established, and there is considerable historical record of performance which can be used to define expected characteristics such as availability. (This stems, in part, from the ability to measure the output of supply-side resources.) The performance of demand-side resources is more difficult to predict, not only because of limited historical information, but because the performance of these resources is, in substantial part, dependent upon customer behavior. For example, even though a utility may have assisted in funding the purchase of a high efficiency heating unit, the customer may reset the thermostat, with the result that electricity consumption after the installation of the high efficiency unit is not reduced as much as would have been expected absent this change in customer behavior; or electricity consumption may even increase, if the customer would otherwise have opted for a different energy source to meet his heating need.

Also, for example, customers may not use high efficiency light bulbs at the times, for the number of hours, or in the manner predicted. They also may not be willing to spend their own money to replace the subsidized initial lighting equipment when the bulbs burn out.

Another difference of significance is dispatchability. Utilities generally have control over the output of supply-side resources, and can increase or decrease output manually or automatically. This is not the case with most demand-side resources, where the customer is in control.

As a result of these fundamental differences in measurability, ability to predict performance, and dispatchability, it is much more difficult to determine both the short-term and long-term impact of DSM resources than it is of supply-side resources.

Q. HOW CAN THE COMMISSION DETERMINE IF DUKE IS EMPLOYING AND DEVELOPING ADEQUATE DSM?

A. As previously explained, the IRP process, properly implemented, considers both supply-side and demand-side options to provide reliable utility service at the lowest reasonable cost to ratepayers, consistent with regulatory guidelines and the law. There should be no predetermined amount of supply- or demand-side levels. The IRP process will consider both options and determine the least cost solution. To my knowledge, Duke Energy has not constructed any base load plants since 1986, so there is no reason to believe that any bias exists in that regard.

Q. DOES DUKE'S DATA SHOW A NEED FOR ADDITIONAL CAPACITY?

A. Yes. Duke data indicates the need for significant amounts of new capacity over the next twenty years, which is the relevant planning horizon. Duke data shows the need for 4,030 MW of additional capacity by 2013, additional capacity of 7,020 MW by 2018 and 10,280 MW of additional capacity by 2026. The capacity requirement is substantial and will require a number of additional generating facilities. Duke is planning to utilize a number of different types of facilities, including nuclear, with diverse fuel sources to provide service to customers. This approach appears sound and reasonable given current conditions.

Q. WHAT FACTORS ARE ASSOCIATED WITH DUKE'S STATED NEED FOR CAPACITY?

A. Duke data indicates that there has been an addition of approximately 50,000 new residential customers and 13,000 new commercial customers to its service area in the Carolinas on average each year for the last five years. Duke's load has grown and is projected to continue to grow. Duke, like many utilities, has not constructed new base load generation for many years. Duke's existing generation is aging and a certain amount of existing capacity is scheduled to be retired. For example, Duke is scheduled to construct a new 800 MW coal fired generating station at Cliffside, but is also scheduled to retire approximately 1,000 MW of existing coal fired generation in the future.

Duke requires additional capacity to meet customer demands and to replace existing capacity that must be retired.

Q. WHAT TYPES OF CAPACITY IS DUKE CURRENTLY ADDING TO ITS ELECTRIC GENERATING SYSTEM?

A. Duke is currently in the process of constructing an advanced 800 MW clean coal facility identified as Cliffside Unit 6. Duke has also filed applications to construct two combined cycle natural gas facilities with a combined capacity of approximately 1,240 MW (620 MW each). It is apparent that Duke is currently utilizing both coal and gas as capacity options to meet the expected capacity requirements of its customers.

Q. ARE THERE UNCERTAINTIES ASSOCIATED WITH COAL AND GAS FIRED GENERATION?

A. Yes. There is an uncertainty associated with carbon emissions and the imposition of a carbon tax which impacts the cost of coal fired generation. There are also uncertainties associated with the availability and price of natural gas. Each form of generation has capital cost and operating cost considerations. Recent indications are that coal prices are being influenced by the global demand for coal. Coal is being exported from the United States to foreign markets which places upward pressure of coal prices. Natural gas has historically been influenced by the price of oil. The recent unprecedented run-up in oil prices could increase future natural gas costs.

Q. WHAT IS TYPICALLY CONSIDERED AS A BASE LOAD FACILITY?

A. A base load facility generally has relatively high capital cost and relatively low fuel cost. A base load facility is a unit that is expected to run at a high capacity factor. Obviously, nuclear plants are considered base load facilities. Older coal plants and combined cycle natural gas plants are generally considered as intermediate facilities which run at a lower capacity factor than base load plants, but with a higher capacity factor than peaking plants. Peaking facilities are characterized as high fuel cost generating facilities which operate for a limited number of hours and generally only operate during peak periods.

As previously stated, Duke has not constructed a base load facility since 1986.

Q. DOES THE OPERATION OF A BASE LOAD FACILITY AT A HIGH CAPACITY FACTOR GENERALLY LOWER OVERALL SYSTEM FUEL COSTS?

A. Yes. Duke's current portfolio of nuclear units generally operates at an extremely high capacity factor and tends to lower overall electric system average fuel costs. Duke often has the lowest overall system average fuel costs compared to other major electric utilities in the Southeastern United States. Duke's system fuel costs are among the lowest because its nuclear facilities produce large amounts of electricity using low cost nuclear fuel as a source, instead of more expensive fossil fuels, such as coal, oil or natural gas.

Q. DOES AN IRP CONSIDER THE COST CHARACTERISTICS ASSOCIATED WITH VARIOUS TYPES OF CAPACITY?

A. Yes. The IRP considers the various types of capacity and associated cost characteristics. In addition to a strict economic evaluation, utilities must consider other factors such as likely law changes, the benefits of a diversified approach and must also use sound judgment. Duke's IRP as presented by witness Hager appears reasonable.

Q. DOES DUKE'S PLAN SHOW AN OFFSET TO EXPECTED LOAD GROWTH FOR DEMAND SIDE MANAGEMENT (DSM) AND ENERGY EFFICIENCY MEASURES?

A. Yes. Duke's plan accounts for load reductions for DSM and energy efficiency measures. However, it is important to understand that these measures attempt to decrease the rate of growth, but do not eliminate growth.

Q. TO YOUR KNOWLEDGE, DOES DUKE'S PLAN INCORPORATE RENEWABLE GENERATION FACILITIES?

A. Yes. It is my understanding that Duke is obligated by North Carolina law to utilize renewable facilities, and Duke is planning to meet that obligation through a variety of ways. Renewable generation is also included in the IRP.

Q. DOES DUKE HAVE EXPERIENCE WITH NUCLEAR FACILITIES?

A. Yes. Duke is regarded as a leader in the construction and operation of nuclear facilities. Duke's Oconee Nuclear Station, located in Oconee County, South Carolina, has been in operation since 1973. The McGuire Nuclear Station located in North Carolina has been in operation since 1981. The Catawba Nuclear Station, jointly owned by Duke and others, is located in York County, South Carolina and is operated by Duke.

Q. BASED ON YOUR ANALYSIS AND REVIEW OF THE DUKE APPLICATION AND AVAILABLE INFORMATION, IS THE DECISION TO KEEP THE NUCLEAR OPTION AVAILABLE, REASONABLE AND PRUDENT?

A. Yes. Based on an analysis of the available information, knowledge of the Duke system, and a review of information regarding the options available, it is reasonable and prudent for Duke to preserve nuclear as a resource option.

I would add that Duke should continue to monitor and evaluate relevant factors associated with serving customers' electricity needs in a reliable and efficient manner as new data becomes available.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes it does.

BEFORE

THE PUBLIC SERVICE COMMISSION

OF SOUTH CAROLINA

DOCKET NO. 2007-440-E

IN RE:

Application of Duke Energy Carolinas, LLC for Approval of Decision to Incur Nuclear Generation Pre-Construction Costs for the Lee Nuclear Station in Cherokee County	))))	**CERTIFICATE OF SERVICE**

This is to certify that I, Pamela J. McMullan, have this date served one (1) copy of the **DIRECT TESTIMONY OF NICHOLAS PHILLIPS, JR.** in the above-referenced matter to the person(s) named below by causing said copy to be deposited in the United States Postal Service, first class postage prepaid and affixed thereto, and addressed as shown below:

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March 20, 2008
Columbia, South Carolina