BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-7, SUB 790

In the Matter of	)	
	)	
Application of Duke Power Company LLC d/b/a Duke Energy Carolinas, LLC, for Approval for an Electric Generation Certificate of Public Convenience and Necessity to Construct Two 800 MW State of the Art Coal Units for Cliffside Project	)	Direct Testimony of William R. McCollum, Jr. for Duke Energy Carolinas

Q. PLEASE STATE YOUR NAME, ADDRESS, AND POSITION WITH DUKE ENERGY.

A. My name is William R. McCollum, Jr., and my business address is 526 South Church Street, Charlotte, North Carolina. I am Group Vice President of Regulated Fossil/Hydro Generation for Duke Energy Corporation and am responsible for leading all of the regulated fossil and hydroelectric generation operations for Duke Energy.

Q. PLEASE STATE BRIEFLY YOUR EDUCATION, BACKGROUND AND PROFESSIONAL AFFILIATIONS.

A. I am a graduate of the Georgia Institute of Technology with a Bachelor of Science in Electrical Engineering and a Master of Science in Nuclear Engineering. I also have a Master of Business Administration degree from the University of North Carolina at Charlotte. I am a registered professional engineer in North Carolina and South Carolina.

Q. PLEASE DESCRIBE YOUR BUSINESS BACKGROUND AND EXPERIENCE.

A. I joined Duke Power in 1974 as a junior engineer at Oconee Nuclear Station. After a series of promotions, I was named manager of performance at Catawba Nuclear Station in 1981, supporting initial startup and operation. At Catawba, I then became superintendent of

integrated scheduling in 1985; superintendent of station services in 1988; and superintendent of maintenance in 1989. I was named Catawba Station Manager in 1990 and Vice President of Catawba Nuclear Station in 1994. In 1997, I was named Vice President of Oconee Nuclear Station. I was named Senior Vice President of Nuclear Support in September 2002, and Vice President of Nuclear Support in March 2004. I became Vice President of Strategy and Business Development for Duke Power in March 2005. I assumed my current position in April 2006.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to describe the state-of-the-art supercritical pulverized coal technology and advanced environmental controls selected for the new Cliffside units, which I will refer to as the "Cliffside Project." I will also discuss Duke Energy Carolinas' process to select the generation technology and the site for the Cliffside Project. In addition, I will discuss the schedule and costs for the Cliffside Project and provide the status of the various related permits.

Q. PLEASE GENERALLY DESCRIBE THE CLIFFSIDE PROJECT.

A. The Company's existing Cliffside Steam Station is located on the Broad River and straddles the Cleveland and Rutherford County border. The existing station has five coal-fired generating units: Units 1 and 2 are 38 MW units that began operation in 1940; Units 3 and 4 are 61 MW units that began operation in 1948; and Unit 5 is a 562 MW unit that began operation in 1972. The Cliffside Project will consist of two new nominal 800 MW net baseload supercritical pulverized coal electric generating units and related transmission facilities. These new units will be highly efficient and feature state of the art emission controls. We plan to retire Units 1-4 as part of the Cliffside Project. The Cliffside Project

will be located adjacent to existing Unit 5 and within the existing rail loop served by CSX Railroad. In addition, as part of the Cliffside Project, Duke Energy Carolinas is evaluating the possible construction of an additional rail line to Norfolk Southern Railroad ("NS") to increase access to coal supplies and provide better reliability.

Q. I SHOW YOU WHAT HAS BEEN MARKED AS MCCOLLUM EXHIBIT 1. WOULD YOU PLEASE TELL US WHAT IT IS?

A. Yes. McCollum Exhibit 1 is an updated version of the detailed Rule R8-61(a) preliminary Cliffside Project application information that Duke Energy Carolinas filed with the Commission on May 11, 2005. Appendix A included in McCollum Exhibit 1 provides additional detailed equipment and process information about the Cliffside Project.

Q. WOULD YOU SUMMARIZE THE SUPERCRITICAL PULVERIZED COAL TECHNOLOGY DETAILED IN MCCOLLUM EXHIBIT 1?

A. Supercritical pulverized coal technology involves using a coal burning furnace to heat water to a temperature and pressure that exceeds its critical point. Above the critical point, distinct liquid and vapor (gas) phases no longer exist, and the state of the water is that of a supercritical fluid. Therefore, a steam drum, which separates water vapor from liquid water, is not required in a supercritical steam generating facility. Supercritical steam generators achieve higher temperatures and pressures, which increase the energy content of the fluid delivered to the turbines. Efficiency is elevated by increasing the energy, or enthalpy drop, across the turbines.

The net result of this technology is that the greater plant efficiency means less fuel is burned per unit of electrical output. In addition, air emissions per unit of electrical output will also decrease by an amount proportional to efficiency gains that are made as compared

to a conventional subcritical steam generator. Solid wastes and wastewater production per unit of electrical output decrease as well.

Q. FROM A TECHNOLOGY STANDPOINT, HOW DID DUKE ENERGY CAROLINAS EVALUATE POTENTIAL BASELOAD OPTIONS?

A. Duke Energy gathered data from a variety of sources including the Electric Power Research Institute (EPRI), industry conferences and equipment suppliers, power generation engineering, procurement and construction (EPC) companies, as well as Duke Energy Carolinas' own experience with design, construction and operation of baseload generating plants. Using the industry-standard EPRI Technical Assessment Guide (TAG®) – Power Generation and Storage Technologies, Duke Energy Carolinas performed an initial screening of the available baseload generation options: supercritical pulverized coal; subcritical pulverized coal; circulating fluidized bed combustion (CFB) and integrated gasification combined cycle (IGCC). The TAG® cost inputs were then confirmed through additional discussions with equipment vendors and EPC contractors. We then developed an analysis of the cost, commercial availability and viability of the alternative baseload technologies. Janice Hager, in her testimony, discusses the additional integrated resource planning analysis performed during the Annual Plan process.

Q. BASED UPON DUKE ENERGY CAROLINAS' TECHNOLOGY EVALUATION, WHY DID DUKE SELECT A SUPERCRITICAL PULVERIZED COAL PLANT?

A. Our analysis demonstrated that supercritical pulverized coal technology is the most cost-effective, commercially available and viable option for Duke Energy Carolinas' needs. The chosen technology also met the following additional evaluation criteria: adequate fuel flexibility (capable of using a variety of high and low sulfur fuels); operational reliability

(high capacity factor); operating flexibility (ramp rate, turn down and ability to meet emission rates at various loads); proven technology/availability (substantial operating experience with this technology); and environmental flexibility (ability to meet potential future regulatory requirements). The supercritical pulverized coal technology is more advanced and efficient than conventional coal-combustion technologies currently in operation, and is more cost-effective than IGCC for Duke Energy Carolinas' 2011 needs.

Q. COULD YOU ELABORATE ON WHY DUKE ENERGY CAROLINAS DID NOT SELECT IGCC TECHNOLOGY FOR THE CLIFFSIDE PROJECT?

A. IGCC is a promising, but still developing technology. From the standpoint of technology, there currently are no IGCC plants larger than 300 MW operating or under construction. There are two IGCC plants currently operating in the United States: Tampa Electric Company's Polk Station, a 250 MW Department of Energy (DOE) demonstration project brought on line in September 1996 and Duke Energy Indiana's Wabash River 262 MW DOE demonstration IGCC plant in Indiana, which was completed in 1995. A number of larger commercial IGCC projects are under development, including Duke Energy Indiana's proposal with GE Energy and Bechtel to evaluate the possible construction of a new 600 MW IGCC plant in Indiana, but no firm commitments have been made. Additional issues such as the higher initial costs, the limitations on load following and cycling capability, and the lack of suitable geologic formations to support CO2 emission sequestration in Duke Energy Carolinas' service territory, all made IGCC less suitable for Duke Energy Carolinas' 2011 baseload needs than pulverized coal.

Q. YOU MENTIONED EARLIER THAT THE CLIFFSIDE PROJECT INCLUDES RELATED TRANSMISSION FACILITIES. WHAT TRANSMISSION CHANGES ARE NEEDED AS A RESULT OF THE CLIFFSIDE PROJECT?

A. The Cliffside Project will connect to the transmission grid at 500 kV. To accommodate this interconnection, a new 500 kV switchyard will be constructed on land already owned by Duke Energy Carolinas. An existing 500 kV transmission line currently runs along the Duke Energy Carolinas' Cliffside property and this line will be connected to the new substation. The line will require a right of way corridor approximately 380 to 400 feet in width and approximately 0.5 miles in length. This corridor will be located on land owned by Duke Energy Carolinas and on land owned by one other party. Other transmission system improvements will be necessary to effectively distribute the additional generation capacity. These improvements include upgrading one 230 kV double circuit line, one 100 kV double circuit line, and one 44 kV single circuit line. Additional transformer capacity will be required in the existing 230 kV switch yard which serves Cliffside Unit 5. The 230 kV switch yard and the proposed 500 kV switch yard will be tied together by installing two transformer banks in the 500 kV switchyard and constructing a new double circuit 230 kV transmission line on a right of way corridor within the boundaries of Duke Energy Carolinas' property. This new transmission line is estimated to be approximately one mile in total length.

Q. PLEASE DESCRIBE THE FUEL HANDLING FACILITIES FOR THE CLIFFSIDE PROJECT.

A. Coal will be received via rail car and unloaded at a new coal unloading facility, which will be designed to empty rail cars; weigh, sample and prepare coal; and then convey the coal

directly into the coal pile and then into the power plant.

Q. WHAT TYPE OF FUEL WILL THE CLIFFISDE PROJECT USE?

A. It is expected that coal will be sourced through a combination of Central Appalachia (eastern Kentucky, southern West Virginia and southwestern Virginia), Northern Appalachia (southwestern Pennsylvania), Illinois Basin, Powder River Basin (Wyoming) and imported coal. The facility will also be designed to utilize up to twenty percent petroleum coke, a byproduct of petroleum refining. The combination of the plant design and use of a scrubber will allow Duke Energy Carolinas to burn a wide variety of coal, which should have a positive effect on cost and supply reliability. There is an adequate supply from these sources to meet the quantities and qualities anticipated, although prices will fluctuate over time. As I mentioned earlier, we are also evaluating construction of a new railroad line to connect the Cliffside plant site to the NS rail system. By adding service from NS to the existing CSX rail service, we would expect to increase the available sources of coal, increase reliability of coal supply and reduce fuel costs for the Cliffside plant.

Q. PLEASE DESCRIBE THE MATERIAL HANDLING FACILITIES FOR THE CLIFFSIDE PROJECT.

A. Coal combustion will produce ash, including bottom ash, economizer ash and fly ash. Duke Energy Carolinas will collect and, to the extent practicable, reuse and recycle these coal combustion byproducts. Collection devices and handling equipment for coal combustion byproducts will include various hoppers, conveyors and pneumatic systems.

Limestone will be used in the FGD system to remove SO_2 from the flue gas. Limestone will be received by rail car and unloaded using either a rotary unloading dumper or rapid discharge. Limestone will be transferred by conveyor to the limestone storage pile

and then to the limestone preparation building, where the limestone will be mixed with water and ground to make a slurry that will be injected into the wet FGD system for SO_2 control.

Calcium sulfate (gypsum) will be generated by the power plant as a by-product of each unit's wet FGD system. Gypsum will be loaded into trucks or railcars for shipment offsite to potential customers for sheet rock manufacturing or for disposal in the on-site landfill.

Q. PLEASE DESCRIBE THE EMISSION CONTROLS DESIGNED FOR THE CLIFFSIDE PROJECT.

A. The Cliffside Project features state of the art emission controls to reduce sulfur dioxide (SO_2), nitrogen oxide (NOx), particulate matter (PM), sulfuric acid mist (H_2SO_4) and mercury (Hg). The boiler design will include low NOx burners and overfire air to minimize the formation of NOx, and a selective catalytic reduction (SCR) system to reduce NOx and to oxidize mercury. Following the boiler and SCR will be a dry electrostatic precipitator (ESP) to remove PM including mercury adsorbed onto flyash. Next comes the wet flue gas desulfurization (WFGD or "scrubber") system to reduce SO_2, other acid gases and oxidized mercury. Finally the wet ESP follows the WFGD and will remove aerosols and fine particulates including sulfuric acid mist**.**

Q. HOW WILL THE ADDITION OF THE CLIFFSIDE PROJECT AFFECT DUKE ENERGY CAROLINAS' COMPLIANCE WITH NORTH CAROLINA'S CLEAN SMOKESTACKS LAW?

A. Duke Energy Carolinas will continue to comply with the Clean Smokestacks law. We plan to retire the existing 1940s Cliffside units 1-4 as part of the construction of the new units and, if needed, will achieve any additional emission reductions required by the Clean

Smokestacks law through operational changes, the installation of additional environmental controls and/or the retirement of additional existing generation. The Cliffside Project emission control equipment is capable of removing approximately 96 percent of the SO_2 emissions and approximately 87 percent of the NOx from the flue gas, thereby producing very low emissions. After adding the new Cliffside units, adding a scrubber to Cliffside Unit 5 and retiring the older Cliffside units, the Company will increase net capacity by approximately 1,402 MWs, yet actually decrease SO_2 emissions at Cliffside by more than half if the new units are operated at their maximum limit requested in the air permit application. If the entire Cliffside facility operated at the maximum NOx emission limits requested in the air permit application, and operated at 100% capacity factors, it would result in an increase in site NOx emissions as a result of the Cliffside Project. As a practical matter, however, plants do not operate 100% of the time, so the expected normal operation of the units will likely result in no net increase in NOx emissions at the Cliffside site compared with current operations. Nevertheless, any increase in Cliffside NOx emissions will be offset by reductions across the Duke Energy Carolinas system and ensure continued compliance within the Clean Smokestacks specifications.

Q. WHAT IS THE STATUS OF ANY AIR PERMITS RELATED TO THE CLIFFSIDE PROJECT?

A. Operation of the proposed coal-fired boilers will result in the emission of certain pollutants that are regulated by the U.S. Environmental Protection Agency and the State of North Carolina. Operating impacts from these pollutants will be addressed through the North Carolina Division of Air Quality ("DAQ") air-quality permit application process. Duke Energy submitted a complete permit application to the DAQ on December 16, 2005. This

application includes a request for review under the Prevention of Significant Deterioration (PSD) program for applicable pollutants. The DAQ must issue a PSD construction permit before any construction may begin. Duke Energy Carolinas has requested that the DAQ complete its review and issue a draft permit for public comment by August 2006 and a final permit by the end of 2006. All air quality modeling requirements associated with the project have been completed and submitted to the DAQ as part of the PSD air permit application. As part of the permitting process, the DAQ must request comments from the USEPA and the Federal Land Manager to assure consistency with federal requirements and to address any impacts on air quality in federal Class I areas.

Q. WHAT IS THE EXPECTED ENVIRONMENTAL IMPACT TO THE BROAD RIVER AS A RESULT OF THE CLIFFSIDE PROJECT?

A. The proposed facility will employ cooling towers similar to Cliffside Unit 5. Use of cooling tower technology will minimize both the intake and discharge impacts to the Broad River. The older Cliffside Units 1-4 use once-through cooling water systems. By retiring these units and using cooling towers for the Cliffside Project, there will be a dramatically reduced flow requirement that will allow continued use of the existing intake and therefore require no new intake structure. Cooling tower blowdown will be routed to the station's existing ash basin for additional cooling and treatment. Cooling tower discharge through the station's ash basin will result in no increase in thermal loading to the Broad River.

Under typical river flows, withdrawal of water is not expected to have a measurable impact on Broad River water quality. Under unusually low flow conditions, however, further reduced river flows could lead to a slightly magnified impact of wastewater constituent contributions to downstream concentrations in the river. The site has a National Pollutant

Discharge Elimination System (NPDES) permit. Preliminary operating plans are to continue using the existing site ash basin for non-ash discharges, which will require a modification of the existing NPDES permit. The NPDES permit modification and Erosion and Sediment Control Plan will determine evaluation programs needed to meet North Carolina-approved limits.

Q. WHAT IS THE STATUS OF ANY ADDITIONAL ENVIRONMENTAL PERMITS REQUIRED FOR THE CLIFFSIDE PROJECT?

A. The NPDES permit modification is expected to be submitted to DENR in the summer of 2006. Upon approval of the NPDES permit modification, an Authorization to Construct required wastewater treatment systems will be submitted to DENR for approval. Applications for permitting the construction and operation of the project's ash and gypsum landfills will be developed. An application for landfill construction is expected to be submitted to the Division of Solid Waste Management of NCDENR by early 2008. In addition, prior to the start of plant construction, an erosion control plan will be submitted to DENR for its approval and for issuance of the NPDES stormwater permit.

Q. PLEASE SUMMARIZE THE PROJECT SCHEDULE AND ESTIMATED COSTS.

A. The projected capital costs and operating expenses are confidential and proprietary and have been filed under separate cover. Duke Energy Carolinas evaluated proposals from four leading power engineering, procurement, and construction (EPC) contractors. While the proposals varied somewhat in detailed scope and estimate structure, the indicative pricing was reasonably consistent among contractors and consistent with EPRI data. Based on these proposals, Duke Energy Carolinas selected one contractor to proceed with joint development of firm scope, schedule, terms and pricing for the Cliffside Project. This joint process

includes bidding and selecting major equipment and open book pricing of all other materials, equipment and services. The schedule and estimate will continue to be refined until time to release the contractor to start detailed design and to place purchase orders.

Construction of the project may begin as early as first quarter of 2007, assuming receipt of the necessary environmental permits and approval of this CPCN application by the Commission. Commercial operation of the first unit may begin as early as 2011.

Q. PLEASE DESCRIBE THE PROCESS DUKE ENERGY CAROLINAS USED TO DETERMINE WHERE TO SITE THE NEW GENERATION UNITS.

A. Duke Energy Carolinas used a comprehensive three-phase siting study to determine the optimum siting locations for new fossil-fired generation. Generally, Phase I of the siting study used coarse screening criteria to identify locations worthy of further investigation in or near the Duke Energy Carolinas service area. In Phase II, 12 baseload pulverized coal sites were examined in greater detail, with emphasis on initial and annual cost differentials, as well as environmental and site-related impacts. In Phase III, five sites were selected for further investigation of key siting criteria, including fuel transportation, electric transmission and environmental issues.

Q. PLEASE ELABORATE ON PHASE I OF THE SITING STUDY.

A. In Phase I, we gathered the data on the following criteria: water supply; railroads; Duke Energy Carolinas' transmission system; major roads; restricted airspace; EPA Class 1 Air and Non-Attainment Areas; National and State Parks, Forests, Scenic Rivers and Wildlife Refuges; Duke Energy property; and population density. This information was modeled in a Geographic Information System (GIS), and weights were assigned to reflect the degree of opportunity or constraint afforded by each. From these models, opportunities were

developed and potential sites were identified. Twelve prospective baseload pulverized coal sites within the opportunity areas were selected for further evaluation.

Q. PLEASE DESCRIBE PHASE II OF THE SITING STUDY.

A. Information about natural and cultural resources, property lines and wetlands was gathered and mapped over aerial photography and United States Geological Survey (USGS) 7.5' Quadrangle mapping. Field studies were conducted and preliminary site plans prepared. This information was used to evaluate impacts to natural and cultural resources, water resources, and the surrounding community. Duke Energy Carolinas performed load studies to determine how a generating facility at a particular location might impact the transmission system and modeled air quality for representative sites. Permitting and related impacts, capital costs and annual costs (including transportation impacts and brownfield savings) were also considered.

Q. PLEASE DESCRIBE PHASE III OF THE SITING STUDY.

A. The study considered the potential for 800 MW, 1200 MW, and 1600 MW baseload coal-fired plants at the Phase III sites in greater detail. Mapping was refined and expanded to include supporting infrastructure. Key areas of focus in Phase III were the following: Access to both NS and CSX rail carrier; environmental issues; air permitting, water supply, impacts to wetlands and on-site streams, cultural resources and Natural Heritage sites; infrastructure; transmission; public impacts; flexibility; and cost.

Q. WHAT WERE THE RESULTS OF THE STUDY?

A. As a result of the Phase III evaluations, Duke Energy Carolinas identified two recommended sites for a 1600 MW two-unit coal facility. In addition to the Cliffside Project site, an alternative South Carolina site received detailed evaluation and was also recommended.

Q. WHY DID DUKE ENERGY CAROLINAS SELECT CLIFFSIDE AS THE PREFERRED SITE?

A. The Cliffside site received the best combined ranking in the siting study. As an existing generating station, the critical infrastructure is already in place, which keeps construction and operating costs low and minimizes the environmental impacts. Cliffside has ready transmission access and offers the opportunity to receive benefits from dual rail service. Duke Energy Carolinas has a long-established presence in the community, and we have received strong support for the Cliffside Project from both Rutherford and Cleveland County.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.