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Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Subject: Duke Energy Carolinas, LLC
William States Lee III Nuclear Station -- Docket Nos. 52-018 and 52-019
AP1000 Combined License Application for the William States Lee III Nuclear Station Units 1 and 2
FSAR Section 9.2.8, "Turbine Building Closed Cooling Water System"

Reference: Dolan to Document Control Desk, *Application for Combined License for William States Lee III Nuclear Station Units 1 and 2*, dated December 12, 2007.

In the referenced letter, Duke Energy Carolinas, LLC (Duke) submitted an application for a combined construction and operating license (COL) for William States Lee III Nuclear Station (Lee Nuclear) Units 1 and 2, located in Cherokee County, South Carolina.

The purpose of this letter is to transmit Section 9.2.8 of the Final Safety Analysis Report (FSAR), Part 2 of the referenced application. The conceptual design information provided in AP1000 Design Control Document (DCD) Section 9.2.8, "Turbine Building Closed Cooling Water System," identifies, as bracketed information, the circulating water system as the cooling water source for the turbine building closed cooling water system (TCS). This information is being added for consistency with FSAR Section 10.4.5.1.2, which identifies both the circulating water system and the raw water system as sources of cooling water for the TCS.

Enclosure 1 provides the proposed change that will be included as FSAR Section 9.2.8. This change incorporates DCD Section 9.2.8 and includes the bracketed text in a manner that is consistent with FSAR 10.4.5.1.2. While FSAR 9.2.8 is not considered standard text it is generic in nature and the text offered in Enclosure 1 is identical to that offered in the R-COLA. This incorporation and a corresponding change to the Table of Contents will be reflected in the next revision of the Lee Nuclear COL application.

D079

NRO

If you have any questions or need any additional information, please contact Peter Hastings, Nuclear Plant Development, Licensing Manager, at (980) 373-7820.

Bryan J. Dolan
Vice President
Nuclear Plant Development

Enclosure:
1. Proposed change to incorporate FSAR Section 9.2.8, *Turbine Building Closed Cooling Water System*

xc (w/out enclosure):
William Borchardt, Director, Office of New Reactors
Gary Holahan, Deputy Director, Office of New Reactors
David Matthews, Director, Division of New Reactor Licensing
James Lyons, Director, Site and Environmental Reviews
Glenn Tracy, Director, Division of Construction Inspection and Operational Programs
Victor McCree, Acting Regional Administrator, Region II
Loren Plisco, Deputy Regional Administrator, Region II
Thomas Bergman, Deputy Division Director, DNRL
Stephanie Coffin, Branch Chief, DNRL
Brian Hughes, Senior Project Manager, DNRL

AFFIDAVIT OF BRYAN J. DOLAN

Bryan J. Dolan, being duly sworn, states that he is Vice President, New Plant Development, Duke Energy Carolinas, LLC, that he is authorized on the part of said Company to sign and file with the U. S. Nuclear Regulatory Commission this supplement to the combined license application for the William States Lee III Nuclear Station and that all the matter and facts set forth herein are true and correct to the best of his knowledge.

Bryan J. Dolan

Subscribed and sworn to me: April 15, 2008
Date

Notary Public

My Commission Expires: June 26, 2011

SEAL

Subsection 9.2.8 is modified using full text incorporation to provide site-specific information to replace the DCD conceptual design information (CDI).

9.2.8 TURBINE BUILDING CLOSED COOLING WATER SYSTEM

WLS CDI

The turbine building closed cooling water system (TCS) provides chemically treated, demineralized cooling water for the removal of heat from nonsafety-related heat exchangers in the turbine building and rejects the heat to either the circulating water system or the raw water system.

9.2.8.1 Design Basis

9.2.8.1.1 Safety Design Basis

DCD

The turbine building closed cooling water system has no safety-related function and therefore has no nuclear safety design basis.

9.2.8.1.2 Power Generation Design Basis

The turbine building closed cooling water system provides corrosion-inhibited, demineralized cooling water to the equipment shown in DCD Table 9.2.8-1 during normal plant operation.

WLS CDI

During power operation, the turbine building closed cooling water system provides a continuous supply of cooling water to turbine building equipment at a temperature of 105°F or less assuming a circulating water or raw water temperature of 100°F or less.

DCD

The cooling water is treated with a corrosion inhibitor and uses demineralized water for makeup. The system is equipped with a chemical addition tank to add chemicals to the system.

WLS CDI

The heat sink for the turbine building closed cooling water system is the circulating water system or raw water system. The heat is transferred to the circulating water or raw water through plate type heat exchangers which are components of the turbine building closed cooling water system.

DCD

A surge tank is sized to accommodate thermal expansion and contraction of the fluid due to temperature changes in the system.

One of the turbine building closed cooling system pumps or heat exchangers may be unavailable for operation or isolated for maintenance without impairing the function of the system.

The turbine closed cooling water pumps are provided ac power from the 6900V switchgear bus. The pumps are not required during a loss of normal ac power.

9.2.8.2 System Description

9.2.8.2.1 General Description

WLS CDI

Classification of equipment and components is given in Section 3.2. The system consists of two 100-percent capacity pumps, three 50-percent capacity heat exchangers (connected in parallel), one surge tank, one chemical addition tank, and associated piping, valves, controls, and instrumentation. Heat is removed from the turbine building closed cooling water system by the circulating water system via the heat exchangers. If the circulating water is not in the operation, the TCS can be aligned to reject heat to the raw water system.

DCD

The pumps take suction from a single return header. Either of the two pumps can operate in conjunction with any two of the three heat exchangers. Discharge flows from the heat exchangers combine into a single supply header. Branch lines then distribute the cooling water to the various coolers in the turbine building. The flow rates to the individual coolers are controller either by flow restricting orifices or by control valves, according to the requirements of the cooled systems. Individual coolers can be locally isolated; where required, to permit maintenance of the cooler while supplying the remaining components with cooling water. A bypass line with a manual valve is provided around the turbine building closed cooling water system heat exchangers to help avoid overcooling of components during startup/low-load conditions or cold weather operation.

The system is kept full of demineralized water by a surge tank which is located at the highest point in the system. The surge tank connects to the system return header upstream of the pumps. The surge tank accommodates thermal expansion and contraction of cooling water resulting from temperature changes in the system. it also accommodates a minor leakage into or out of the system. Water makeup to the surge tank, for initial system filling or to accommodate leakage from the system, is provided by the demineralized water transfer and storage system. The surge tank is vented to the atmosphere.

A line from the pump discharge header bank to the pump suction header contains valves and a chemical addition tank to facilitate mixing chemicals into the closed loop system to inhibit corrosion in piping and components.

A turbine building closed cooling water sample is periodically taken and analyzed to verify that water quality is maintained.

9.2.8.2.2 Component Description

Surge Tank

A surge tank accommodates changes in the cooling water volume due to changes in operating temperature. The tank also temporarily accommodates leakage into or out of the system. The tank is constructed of carbon steel.

Chemical Addition Tank

The chemical addition tank is constructed of carbon steel. The tank is normally isolated from the system and is provided with a hinged closure for addition of chemicals.

Pumps

Two pumps are provided. Either pump provides the pumping capacity for circulation of cooling water throughout the system. The pumps are single stage, horizontal, centrifugal pumps, are constructed of carbon steel, and have flanged suction and discharge nozzles. Each pump is driven by an ac powered induction motor.

Heat Exchangers

Three heat exchangers are arranged in a parallel configuration. Two of the heat exchangers are in use during normal power operation and turbine building closed cooling water flow divides between them.

WLS CDI

The heat exchangers are plate type heat exchangers. Turbine building closed cooling water circulates through one side of the heat exchangers while circulating water or raw water flows through the other side. During system operation, the turbine building closed cooling water in the heat exchangers is maintained at a higher pressure than the circulating water or raw water so leakage of circulating water or raw water into the closed cooling water system does not occur. The heat exchangers are constructed of titanium plates with a carbon steel frame.

Valves

DCD

Manual isolation valves are provided upstream and downstream of each pump. The pump isolation valves are normally open but may be closed to isolate the non-operating pump and allow maintenance during system operation. Manual isolation valves are provided upstream and downstream of each turbine building closed cooling water heat exchanger. One heat exchanger is isolated from system flow during normal power operation. A manual bypass valve can be opened to bypass flow around the turbine building closed cooling water heat exchanger when necessary to avoid low cooling water supply temperatures.

Flow control valves are provided to restrict or shut off cooling water flow to those cooled components whose function could be impaired by overcooling. The flow control valves are air operated and fail open upon loss of control air or electrical power. An air operated valve is provided to control demineralized makeup water to the surge tank for system filling and for accommodating leakage from the system. The makeup valve fails closed upon loss of control air or electrical power.

A TCS heat exchanger can be taken out of service by closing the inlet isolation valve. Water chemistry in the isolated heat exchanger train is maintained by a continuous flow of circulating water through a small bypass valve around the inlet isolation valve.

Backwashable strainers are provided upstream of each TCS heat exchanger. They are actuated by a timer and have a backup starting sequence initiated by a high differential pressure across each individual strainer. The backwash can be manually activated.

Piping

System piping is made of carbon steel. Piping joints and connections are welded, except where flanged connections are used for accessibility and maintenance of components. Nonmetallic piping may be used in accordance with ASME B31.1 and as demonstrated by evaluation.

9.2.8.2.3 System Operation

The turbine building closed cooling water system operates during normal power operation. The system does not operate with a loss of normal ac power.

Startup

WLS CDI

The turbine building closed cooling water system is placed in operation during the plant startup sequence prior to the operation of systems that require turbine building closed cooling water flow. The system is filled by the demineralized water transfer and storage system through a fill line to the surge tank. The system is placed in operation by starting one of the pumps.

DCD

Normal Operation

During normal operation, one turbine building closed cooling water system pump and two heat exchangers provide cooling to the components listed in DCD Table 9.2.8-1. The other pump is on standby and aligned to start automatically upon low discharge header pressure.

During normal operation, leakage from the system will be replaced by makeup from the demineralized water transfer and storage system through the automatic

makeup valve. Makeup can be controlled either manually or automatically upon reaching low level in the surge tank.

Shutdown

The system is taken out of service during plant shutdown when no longer needed by the components being cooled. The standby pump is taken out of automatic control, and the operating pump is stopped.

9.2.8.3 Safety Evaluation

The turbine building closed cooling water system has no safety-related function and therefore requires no nuclear safety evaluation.

9.2.8.4 Tests and Inspections

Pre-operational testing is described in DCD Chapter 14. The performance, structural, and leaktight integrity of system components is demonstrated by operation of the system.

9.2.8.5 Instrument Applications

Parameters important to system operation are monitored in the main control room. Flow indication is provided for individual cooled components as well as for the total system flow.

Temperature indication is provided for locations upstream and downstream of the turbine building closed cooling water system heat exchangers. High temperature of the cooling water supply alarms in the main control room. Temperature test points are provided at locations to facilitate thermal performance testing.

Pressure indication is provided for the pump suction and discharge headers. Low pressure at the discharge header automatically starts the standby pump.

Level instrumentation on the surge tank provides level indication and both low- and high-level alarms in the main control room. On low tank level, a vale in the makeup water line automatically actuates to provide makeup flow from the demineralized water transfer and storage system.