LeeRAIsPEm Resource

From: Tanya Simms
Sent: Wednesday, January 28, 2009 1:55 PM
To: LeeRAIsPEm Resource
Subject: Request for Additional Information Letter No. 064 Related to SRP Section 9.2.1 for the William States Lee III Units 1 and 2 Combined License Application
Attachments: LEE-RAI-LTR-064.doc

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Subject: Request for Additional Information Letter No. 064 Related to SRP Section 9.2.1 for the William States Lee III Units 1 and 2 Combined License Application
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January 28, 2009

Mr. Peter S. Hastings, P.E.
Licensing Manager, Nuclear Plant Development
Duke Energy
526 South Church Street
Charlotte, NC 28201-1006

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 064 RELATED TO SRP SECTION 09.02.01 FOR THE WILLIAM STATES LEE III UNITS 1 AND 2 COMBINED LICENSE APPLICATION

Dear Mr. Hastings:

By letter dated December 12, 2007, as supplemented by letters dated January 28, 2008, February 6, 2008 and February 8, 2008, Duke Energy submitted its application to the U. S. Nuclear Regulatory Commission (NRC) for a combined license (COL) for two AP1000 advance passive pressurized water reactors pursuant to 10 CFR Part 52. The NRC staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed application.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter.

To support the review schedule, you are requested to respond within 30 days of the date of this letter. If changes are needed to the final safety analysis report, the staff requests that the RAI response include the proposed wording changes.

If you have any questions or comments concerning this matter, you may contact me at 301-415-1387 or you may contact Brian Hughes, the lead project manager for the William States Lee III combined license at 301-415-6582.

Sincerely,

/**RA**/

Tanya Simms, Project Manager
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-018
52-019

Enclosure:
Request for Additional Information

CC: see next page

If you have any questions or comments concerning this matter, you may contact me at 301-415-1387 or you may contact Brian Hughes, the lead project manager for the William States Lee III combined license at 301-415-6582.

Sincerely,

/**RA**/

Tanya Simms, Project Manager
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-018
52-019

eRAI Tracking No. 1922
Enclosure:
Request for Additional Information

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*Approval captured electronically in the electronic RAI system.

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Request for Additional Information No. 1922 Revision 0
William States Lee III, Units 1 and 2
Duke Energy Carolinas, LLC
Docket No. 52-018 and 52-019
SRP Section: 09.02.01 - Station Service Water System
Application Section: 9.2.11 Raw Water System

QUESTIONS from Balance of Plant Branch 1 (SBPA)

09.02.01-5

In accordance with 10 CFR 50, Appendix A, General Design Criterion (GDC) 2, “Design Basis for Protection Against Natural Phenomena,” GDC 4, "Environmental and Dynamic Effects Design Bases," and NRC policy considerations for passive plant designs, the staff confirms that raw water system (RWS) failures are not expected to adversely affect structures, systems, and components (SSCs) that are safety-related or designated for Regulatory Treatment of Non-Safety Systems (RTNSS), impact the control room, or result in excessive releases of radioactivity to the environment.

Although Final Safety Analysis Report (FSAR) Section 9.2.11.1.1, “Safety Design Basis,” states that failures of the RWS will not affect the ability of safety-related systems to perform their intended functions, more detailed information is needed to adequately describe the consequences of RWS failures and to explain why safety-related SSCs are not affected. Likewise, additional information is needed to explain why a failure of the RWS will not adversely affect RTNSS systems and components or impact the control room, or result in an unacceptable release of radioactive material to the environment. Because the applicant did not adequately address these considerations, the staff is unable to confirm compliance with GDC 2, GDC 4, and NRC policy considerations that apply to passive plant designs. Therefore, FSAR Section 9.2.11 needs to be revised to address the impact of RWS failures accordingly, including development of plant-specific inspections, tests, analyses, and acceptance criteria; test program provisions; Technical Specifications; and availability controls as appropriate.

09.02.01-6

The raw water system (RWS) is relied upon for achieving and maintaining cold shutdown conditions which is necessary for satisfying Technical Specification requirements. In accordance with NRC policy considerations for passive plant designs, non-safety related active systems that are relied upon for achieving and maintaining cold shutdown conditions (i.e., transitioning from Mode 4 to Mode 5) should be highly reliable and able to accommodate single active failures without a loss of the cooldown capability that is needed. The staff found that Section 9.2.11 of the Final Safety Analysis Report (FSAR) does not provide a clearly defined design basis with respect to the RWS cooldown function, and the reliability and capability of the RWS to perform this function for the most limiting situations were not adequately described and addressed. For example, the minimum RWS flow rate, water inventory, temperature limitations, and corresponding bases for providing SWS makeup for the two Lee units were not described. Also, the suitability of RWS materials for the plant-specific application and measures being implemented to resolve vulnerabilities and degradation mechanisms to assure RWS functionality over time were not addressed. Consequently, Section 9.2.11 of the FSAR needs to

be revised to properly describe and address the RWS design bases in this regard and to include design specifications that are necessary to ensure the reliability and capability of the RWS to perform its cooldown function. The following guidance is generally applicable and should be considered as appropriate when revising the FSAR in response to this question:

a. The design bases should specifically recognize and describe cold shutdown functions that are credited, and applicable design considerations that pertain to these functions should be specified, such as reliability, redundancy, backup power, etc. Other parts of the DCD should not be referred to in lieu of providing a complete description of the design-bases in FSAR Section 9.2.11.

b. The system description should explain how the applicable design-bases considerations referred to in (a) are satisfied. For example:

- The minimum required system functional capability and the bases for this determination should be described (note that a minimum of seven days worth of on-site water inventory should be available for reactor decay heat removal and spent fuel cooling);
- The description should explain how design-bases considerations are satisfied;
- The guidance in SRP Sections 9.2.1 and 9.2.5 that are relevant for ensuring the capability and reliability of the RWS to perform its design-bases functions should be considered and addressed as appropriate (materials considerations, net positive suction head, waterhammer, etc.);
- Operating experience considerations that pertain to the capability and reliability of the system to perform its design-bases functions needs to be addressed (note that the relevance of operating experience is independent of safety classification considerations);
- In order to demonstrate adequate reliability, the system design should include (among other things) the capability of all necessary components (pumps, valves, strainers, instrumentation and controls, etc.) to function during a loss of off-site power and redundancy for single active failure vulnerabilities;
- Dual-unit considerations need to be addressed.

c. Major components and features that are important to ensure the capability and reliability of the system to perform its cooldown function should be described. Applicable industry codes and quality group designations that are commensurate with plant-specific RWS reliability considerations should be specified and reflected in Chapter 3, “Design of Structures, Components, Equipment, and Systems.” Note that this may be different from what is specified for the standard plant design since it was based solely on regulatory treatment of non-safety systems considerations and did not include consideration of the cooldown function.

d. System design parameters that are important for performing the cold shutdown function should be specified, such as water inventory, flow rate, nominal pipe sizes, limiting flow velocities, and design temperatures and pressures.

e. The RWS operating modes for performing its cold shutdown function should be described, such as interlocks, protective features, and automatic actuation.

f. Limitations on the capability of the RWS to perform its cold shutdown function should be described, such as minimum required water inventory and temperature restrictions that apply.

g. Instrumentation (e.g., indication, controls, interlocks and alarms) that are relied upon by plant operators in the main control room and at the remote shutdown panels for performing cooldown functions should be described.

h. System diagrams should show division designations, flow paths, major components and features, nominal pipe sizes, and instrumentation that is relied upon to ensure

proper operation of the system by operators in the main control room and at the remote shutdown panels.

i. The more important periodic inspections that will be completed and specified frequencies for ensuring the capability and reliability of the system should be described. For example, design provisions and actions that will be implemented to periodically assess the condition of buried or otherwise inaccessible piping and components should be described.

j. The more important periodic tests that will be completed and specified frequencies for ensuring the capability and reliability of the system should be described. For example, periodic testing of pumps, valves, self-cleaning strainers, and vacuum breakers should be described.

k. Based on the FSAR description, plant-specific ITAAC should be established that are appropriate and sufficient for verifying that the RWS is constructed as designed.

l. The initial test program should test all modes of RWS operation that are credited for performing its cooldown function and confirm acceptable performance for the most limiting assumptions. For example, confirmation that net positive suction head requirements are satisfied for minimum pump suction head and maximum water temperature conditions with all pumps running at full flow, and that waterhammer will not occur during situations when voiding is most likely to occur should be specified. It should be clear from the information provided in Section 9.2.11 of the FSAR what constitutes acceptable performance.

09.02.01-7

The staff notes that while the service water system (SWS) is designated for regulatory treatment of non-safety systems (RTNSS) during reduced reactor inventory conditions, the raw water system (RWS) is evidently not needed to support the SWS cooling function during this condition, because RWS is not designated for RTNSS treatment. However, there is no explanation in Section 9.2.11 of the applicant's Final Safety Analysis Report (FSAR) as to why this is the case. Also, because the SWS cooling tower basins are limited in their capacity, it isn't clear why RWS makeup is not required for this situation. Consequently, Section 9.2.11 of the FSAR needs to be revised to explain why RWS makeup is not needed during reduced reactor inventory conditions and in particular, to describe controls that will be implemented to ensure that SWS makeup assumptions are valid for this situation