

PMVogleCOLPEm Resource

From: Tanya Simms
Sent: Thursday, January 15, 2009 2:03 PM
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Cc: Christian Araguas; PMVogleCOLPEm Resource
Subject: Draft RAIs 1931 Related SRP Section 9.2.1 for Vogtle Units 3 and 4
Attachments: RAI 1931 draft.pdf

To All,

Attached is Draft RAI 1931 related to SRP Sections 9.2.1 for Vogtle Units 3 and 4. Please contact me if you desire a phone conference regarding these RAIs. If no response is heard by close of business January 22, 2009, the final RAI will be issued.

Thank you,
Tanya

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Request for Additional Information No. 1931 Revision 0
Vogle
Southern Nuclear Operating Co.
Docket No. 52-0025 and 52-0026
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-***

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 application does 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-***

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 Vogtle 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-basis 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-basis 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-basis 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-basis functions need 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 is 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 Tier 2 description, plant-specific ITAAC that are appropriate and sufficient for certifying the design of the RWS should be established.
- 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-***

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.