

PMComanchePeakPEm Resource

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Sent: Friday, October 02, 2009 1:20 PM
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Cc: Ward, William; ComanchePeakCOL Resource
Subject: Comanche Peak RCOLA, Section 9.2.1 - RAI # 109
Attachments: RAI 3698 (RAI 109).doc

The NRC staff has identified that additional information is needed to continue its review of the combined license application. The NRC staff's request for additional information (RAI) is contained in the attachment. Luminant is requested to inform the NRC staff if a conference call is needed.

The response to this RAI is due within 35 calendar days of October 2, 2009

Note: If changes are needed to the safety analysis report, the NRC staff requests that the RAI response include the proposed changes.

thanks,

Stephen Monarque
U. S. Nuclear Regulatory Commission
NRO/DNRL/NMIP
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Request for Additional Information (RAI) No. 3698

RAI # 109

10/2/2009

Comanche Peak Units 3 and 4
Luminant Generation Company, LLC.
Docket No. 52-034 and 52-035
SRP Section: 09.02.01 - Station Service Water System
Application Section: 9.2.1

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

09.02.01-1

This Request for Additional Information (RAI) is necessary for the staff to determine if the application meets the requirements of General Design Criteria (GDC) 44.

The essential service water system (ESWS) must be capable of removing heat from systems, structures and components (SSCs) important to safety during normal operating and accident conditions over the life of the plant in accordance with General Design Criteria (GDC) 44 requirements. Standard Review Plan (SRP) Section 9.2.1, "Station Service Water System," Sections II and III provide guidance on the specific information that should be included in the application for evaluation by the staff.

US-APWR Design Control Document (DCD) COL 9.2 (1) requires the COL Applicant to provide the evaluation of the ESWS pump(s) at the lowest probable water level in the ultimate heat sink (UHS). DCD COL 9.2 (6) specifies that the COL Applicant should provide the ESWS design details including required total dynamic head and net positive suction head (NPSH) available. The ESWS pumps are important components used in part for heat transfer to satisfy GDC 44, and adequate ESWS pump performance including required NPSH for the ESWS pumps needs to be considered as part of the system design. For the above reasons, the NRC staff requests the applicant to provide the following information related to GDC 44 and NPSH consideration:

A. COL 9.2(1)

- Discuss pump vortex formation as part of the NPSH evaluation.
- Provide drawings indicating the elevation of the ESWS pump impellers..
- Include in the FSAR the low water level in the UHS to support adequate NPSH.
- Include in the FSAR the NPSH instrumentation for minimum water level to assure ESWS operability.
- Add the minimum water level to the Technical Specifications (TS), Section 3.7.9, "Ultimate Heat Sink," Surveillance Requirements. The TS currently addresses the total volume of 10.7 million liters (2,850,000 gallons) and approximate level of 12.2 meters (40 feet).

B. COL 9.2(6)

- Provide a clarification to the following FSAR sections related to basin level to support NPSH. FSAR Section 9.2.1.2.2.1, "ESWPS" describes the available NPSH with the lowest expected water level (after 30 days of accident mitigation) in the basin to be approximately 12.2 meters (40 feet). However the UHS basin level is described as 8.8 meters (29 feet) deep in FSAR Section 9.2.5.3, "Safety Evaluation".
- Provide in the FSAR the bases for the ESWS pump total dynamic head (TDH) of 67.1 meters (220 and describe the margins available for the pump as related to system losses. Include in the FSAR a discussion related to TDH and flow to the fire protection system.

09.02.01-2

This Request for Additional Information (RAI) is necessary for the staff to determine if the application meets the requirements of General Design Criteria (GDC) 44.

The essential service water system (ESWS) must be capable of removing heat from systems, structures and components (SSCs) important to safety during normal operating and accident conditions over the life of the plant in accordance with General Design Criteria (GDC) 44 requirements. SRP Section 9.2.1, "Station Service Water System," Sections II and III provide guidance on the specific information that should be included in the application for evaluation by the staff.

US-APWR Design Control Document (DCD) COL 9.2(2) specifies that the COL Applicant should provide the protection against adverse environmental, operating, and accident conditions that can occur, such as freezing and thermal over pressurization. System freezing and thermal over pressurization are important considerations that can affect heat transfer to satisfy GDC 44. For this reason, the staff requests the following information as related to GDC 44:

- A. FSAR Section 9.2.1.3, "Safety Evaluation," outlines measures for protection against adverse environmental conditions. Discuss in the FSAR the freeze protection procedures used to prevent freezing of the ESWS. For example, UHS transfer pumps or heat tracing would be placed into service during applicable cold weather months.
- B. The concept of maintaining locked open valves (which are also shown on FSAR Figure 9.2.1-1R, "Essential Service Water System Piping and Instrumentation Diagram") adequately addresses the possibility of over pressurization. However, when these valves are closed for heat exchanger backflush, over pressurization was not adequately addressed by the applicant. Provide a discussion in the FSAR for the over pressurization protection when the locked open valves are closed for heat exchanger flushing.

09.02.01-3

This Request for Additional Information (RAI) is necessary for the staff to determine if the application meets the requirements of General Design Criteria (GDC) 4.

The essential service water system (ESWS) must be designed to the requirements of GDC 4 which includes the effects of missiles inside and outside containment, effects of pipe whip, jets, environmental conditions from high- and moderate-energy line-breaks, and dynamic effects of flow instabilities and attendant loads (e.g., water-hammer) during normal plant operation as well as upset or accident conditions.

US-APWR Design Control Document (DCD) COL 9.2(7) specifies that the COL Applicant should provide the piping, valves and other design of the ESWS related to the site specific conditions, including the safety evaluation. The acceptance for water hammer effects is based in part on vent design, consideration for voiding, and operating/maintenance procedures. The addition of the blowdown system introduces a new draindown path that has a potential for system voiding that has not been discussed in the application.

Provide a discussion in the Final Safety Analysis Report (FSAR) related to compliance to GDC 4 and how water hammer effects are addressed. Since the control valves remain open while in ESWS standby, describe how the control valves are maintained in system standby to avoid system draindown and voiding.

09.02.01-4

This Request for Additional Information (RAI) is necessary for the staff to determine if the application meets the requirements discussed in Regulatory Guide 1.206 as they will appear in section II.E.3 of the appendix to 10 CFR Part 52 which specifies the approved design this application references, once the design is approved.

Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear Power Plants," Section C.III.4, "Combined License Action or Information Items," states in part that Appendices A–D to 10 CFR Part 52 set forth the design certification rules that specify the NRC's requirements for the certified reactor designs. An applicant may depart from or omit these items, provided that the departure or omission is identified and justified in the FSAR.

US-APWR Design Certification Document (DCD) COL item 9.2(7) specifies that the COL applicant should provide the piping, valves and other design of the Essential Service Water System (ESWS) related to the site specific conditions, including the safety evaluation. In Section 9.2.1.5.4, "ESWS Motor Essential Service Water Flow," the applicant removed the piping system and main control room flow rate indication and alarm of the ESW pump motor. This is inconsistent with the DCD Tier 2 Section 9.2.1.5.4 which requires that flow rate be indicated in the main control room (MCR) and a low flow alarm transmitted to the MCR. In addition, the staff understands that the COL has deleted the motor cooling function from the ESWS; however, the NRC staff considers this removed function to be a departure from the US-APWR standard plant design described in the DCD. The applicant did not identify this removed function as a departure and did not provide the evaluation of this departure using the 10CFR Part 52 criteria.

- Provide a revision to the COL FSAR identifying the removal of the flow rate indication and low flow alarm and the removal of the cooling water system to the ESWS pump motor as the departures.
- Provide an evaluation of the above departures using the applicable criteria of 10 CFR Part 52.

09.02.01-5

This Request for Additional Information (RAI) is necessary for the staff to determine if the application meets the requirements discussed in Regulatory Guide 1.206 as they will appear in section II.E.3 of the appendix to 10 CFR Part 52 which specifies the approved design this application references, once the design is approved.

Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear Power Plants," Section C.III.4, "Combined License Action or Information Items," states in part that Appendices A–D to 10 CFR Part 52 set forth the design certification rules that specify the NRC's requirements for the certified reactor designs. An applicant may depart from or omit these items, provided that the departure or omission is identified and justified in the FSAR.

US-APWR Design Certification Document (DCD) COL 9.5(2) specifies that the COL applicant should address the design and fire protection aspects of the facilities, buildings and equipments, such as cooling towers and a fire protection water supply system, which are site specific and/or are not a standard feature of the US-APWR. FSAR Section 9.2.1.3, "Safety Evaluation," provides a new paragraph to replace DCD Section 9.2.1.3 that describes the ESWS as a backup source of water for fire protection service system (FSS) hoses stations in the RB and ESWP house. This is considered a new function of the ESWS that is a change from the DCD design for all four trains of ESWS. The NRC staff considers this new function to be a departure from the US-APWR standard plant design described in the DCD. The applicant is requested to identify this additional function as a departure and provide the evaluation of this departure using the 10 CFR Part 52 criteria.

- Provide a revision to the COL FSAR identifying the cooling water system has been modified to accommodate FSS to the RB and to the ESWS pump house as a departure and provide an evaluation using the applicable criteria of 10 CFR Part 52.
- FSAR Figure 9.2.1-1R, "Essential Service Water System Piping and Instrumentation Diagram," does not graphically show that these normally locked closed (LC) valves are connected to FSS hose stations. Revise FSAR to correctly show a hose or flange connection downstream of the LC valves.