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November 29, 2012

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555
ATTN: David B. Matthews, Director
Division of New Reactor Licensing

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4
DOCKET NUMBERS 52-034 AND 52-035
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 6884
(SECTION 08.02)

Dear Sir:

Luminant Generation Company LLC (Luminant) submits herein the response to Request for Additional Information (RAI) No. 6884 (CP RAI #263) for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. The RAI addresses NRC Bulletin 2012-01, "Design Vulnerability in Electric Power System."

Should you have any questions regarding this response, please contact Don Woodlan (254-897-6887, Donald.Woodlan@luminant.com) or me.

There are no commitments in this letter.

I state under penalty of perjury that the foregoing is true and correct.

Executed on November 29, 2012.

Sincerely,

Luminant Generation Company LLC

Donald R. Woodlan for

Rafael Flores

Attachment: Response to Request for Additional Information No. 6884 (CP RAI #263)

IE76
D090
NRO

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6884 (CP RAI #263)

SRP SECTION: 08.02 - Offsite Power System

QUESTIONS for Electrical Engineering Branch (EEB)

DATE OF RAI ISSUE: 10/16/2012

QUESTION NO.: 08.02-31

On July 27, 2012, the NRC issued Bulletin 2012-01, "Design Vulnerability in Electric Power System," (Agencywide Documents Access and Management System (ADAMS) Accession Number ML12074A115) to all holders of operating licenses and combined licenses for nuclear power reactors requesting information about the facilities' electric power system designs. This Bulletin was issued in light of the recent operating experience that involved the loss of one of the three phases of the offsite power circuit (single-phase open circuit condition) at Byron Station, Unit 2 to verify compliance with applicable regulations and to determine if further regulatory action is warranted.

In order to verify that the applicant for a new reactor combined license has addressed the design vulnerability identified at Byron in accordance with the requirements specified in General Design Criterion (GDC) 17, "Electric Power Systems," in 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," and the design criteria for protection systems under 10 CFR 50.55a(h)(3), please provide the following information:

- Describe the protection scheme design for important to safety buses (non-safety or safety-related) to detect and automatically respond to a single-phase open circuit condition or high impedance ground fault condition on credited offsite power circuits.

- If the important to safety buses are not powered by offsite power sources during at power condition, explain how the surveillance tests are performed to verify that a single-phase open circuit condition or high impedance ground fault condition on an off-site power circuit is detected.

- Describe how the plant operating procedures, including off-normal operating procedures, specifically call for verification of the voltages on all three phases of the ESF buses.

ANSWER:

Protection Scheme Design

Consistent with the current licensing basis and GDC 17, electrical protective devices will detect design basis conditions, such as an undervoltage (UV) (loss of voltage or a degraded voltage) condition. However, the electrical protective devices are not designed to detect a single-phase open-circuit or high impedance ground fault condition. Luminant is monitoring the actions and responses being developed by power plant licensees and other COL applicants. Luminant, Mitsubishi Nuclear Energy Systems, Inc. and Mitsubishi Heavy Industries, Ltd (MHI) are pursuing design alternatives. The current status of the US-APWR UV protection design scheme is provided below.

The US-APWR design consists of four Class 1E power system trains. The medium voltage (MV) bus of each train has a protection scheme that protects against operating in a UV condition. The primary side of each of three instrument potential transformers (PTs) is connected phase-to-phase in a "delta" configuration. A UV relay is connected to the secondary side of each PT. Two-out-of-three logic automatically initiates transferring the Class 1E buses from the normal offsite power circuit to the alternate offsite power circuit. If the alternate offsite power circuit is not available, a bus transfer to a Class 1E gas turbine generator will be initiated.

The design of the US-APWR electrical system does not provide quantitative information for detecting a single phase open circuit for each plant operating condition. A qualitative assessment during a heavy loading condition of the reserve auxiliary transformers (RATs) that normally supply the Class 1E buses shows that a single phase open circuit on an offsite power circuit may be detected by UV protection using two-out-of-three logic. The qualitative assessment during heavy loading conditions of the unit auxiliary transformers (UATs) that alternatively supply the Class 1E buses in a back-feeding condition from the grid shows that a single phase open circuit on an offsite power circuit may be detected. Conditions for normal plant operations are such that the main generator supplies power to the non-safety (and not important to safety) MV buses via the UATs. If a single phase open circuit condition occurs, the main generator will be tripped by generator protection. Also, during normal plant operations, the RATs serve only safety-related loads resulting in light loading of the RATs. This condition may result in insufficient UV for an open circuit condition to be detected by UV protection.

MHI is considering a design solution that will provide detection of a single phase open circuit condition by monitoring the negative phase sequence current or current differential between each phase. Further communication on this subject will occur between MHI and the NRC staff during 2013. Luminant will monitor the status of these communications.

A high impedance fault to ground on one phase may be considered as an additional load on that one phase. Due to the high impedance nature of such a fault, the current diverted to ground may be insignificant; therefore, the amount of voltage imbalance would be insignificant, especially under normal to no load conditions. The magnitude of the current through the neutral with the high impedance fault to ground may not be sufficient to be detected by the grounding protection relay and may not have an effect on plant operation. If a ground fault on an offsite power circuit is such that it affects plant operation, the protective relays will isolate the ground automatically. If such a condition occurs in the normal preferred power supply circuit, it will be isolated from Class 1E MV buses and the Class 1E power system will be supplied from the alternate offsite power supply system. Therefore, the Class 1E ac power system will still be functional because it will continue to be powered by offsite power while in this condition.

Important to Safety Buses

As described in DCD Subsection 8.1.2.2, the US-APWR ESF buses are powered by offsite power sources via the RATs; therefore, surveillance tests to detect single phase faults are not required.

Operating Procedures

The plant operating procedures, including off-normal operating procedures, will be provided in accordance with FSAR Chapter 13. Comanche Peak Unit 3 and 4 operating procedures are expected to require that each phase voltage at Class 1E MV buses and the switchyard will be verified each week, similar to the current Comanche Peak Unit 1 and 2 operating procedures.

Discussions are ongoing between the nuclear industry and the NRC staff to address an open circuit or a high impedance ground fault on a single phase of offsite power. Luminant expects that the final design will provide alarms, monitoring, procedures and automatic actions to detect and mitigate a single phase open circuit condition in a manner similar to the rest of the nuclear industry

Impact on R-COLA

None.

Impact on S-COLA

This response is standard.

Impact on DCD

None.