

PMComanchePeakPEm Resource

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Sent: Wednesday, July 29, 2009 3:48 PM
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Subject: Comanche Peak RCOLA, Section 8.2 - RAI 24
Attachments: RAI 2577(24).doc

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

The response to this RAI is due within 42 **calendar days** of **July 29, 2009**.

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

thank you,

Stephen Monarque
U. S. Nuclear Regulatory Commission
NRO/DNRL/NMIP
301-415-1544

Hearing Identifier: ComanchePeak_COL_Public
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Request for Additional Information (RAI) No. 2577

RAI No. 24

7/29/2009

Comanche Peak Units 3 and 4
Luminant Generation Company, LLC.
Docket No. 52-034 and 52-035
SRP Section: 08.02 - Offsite Power System
Application Section: 8.2

QUESTIONS for Electrical Engineering Branch (EEB)

08.02-1

RAI 08.02-01

NUREG-0800, Standard Review Plan, Chapter 8.2, "Offsite Power System," (Rev. 4) (March 2007) (NUREG-0800) and Regulatory Guide 1.206, Combined License Applications for Nuclear Power Plants (LWR Edition), "Offsite Power" (June 2007) (RG 1.206), C.I.8-2, establish criteria that the NRC staff intends to use to evaluate whether an applicant meets the NRC's regulations.

FSAR Section 8.2.1.1, Transmission System, discusses the rights-of-way for the transmission lines and states that the width of the rights-of-way is adequate for the transmission lines. NUREG-0800 requires the NRC staff to review the location of rights-of-way and transmission lines and towers, and RG 1.206 requires the staff to determine whether the FSAR contains sufficient information on the location of rights-of-way, Explain in further detail what is meant by "adequate width" of the rights-of-way, and the basis for your conclusion that the width is adequate.

08.02-2

RAI 08.02-02

NUREG-0800 establishes criteria that the NRC staff intends to use to evaluate whether an applicant meets the NRC's regulations.

In FSAR Section 8.2.1.2.3, Communication with the Electric Reliability Council of Texas (ERCOT) and/or the Oncor Electric Delivery Company, LLC, (Oncor), the applicant discusses the communication agreement among ERCOT, Oncor and Comanche Peak Nuclear Power Plant, Units 3 and 4 (CPNPP), and indicates that such agreement specifies the responsibilities and communication methods among the three entities "which have the responsibilities for the operation, maintenance, and engineering of transmission systems." Provide details of the agreement and the split of responsibilities among the three entities regarding operation, maintenance and engineering pertaining to the transmission system, including the control of the 345 kV circuit breakers located at the unit switchyards.

08.02-3

RAI 08.02-03

NUREG-0800 establishes criteria that the NRC staff intends to use to evaluate whether an applicant meets the NRC's regulations.

In FSAR Section 8.2.1.2.3, Communication with ERCOT/Oncor, the applicant discusses the instrumentation available in the main control room and states: "the instrumentation for monitoring and indicating the status such as breaker positions, bus and line voltages, frequency, watts and vars, etc. of the preferred power system..." Clarify whether this statement refers to components and monitoring devices located in the switchyard or on-site, and whether the components and monitoring devices are downstream of the transformers.

08.02-4

RAI 08.02-04

NUREG-0800 establishes criteria that the NRC staff intends to use to evaluate whether an applicant meets the NRC's regulations.

FSAR Subsection 8.2.1.2.1.1, Plant Switching Station, discusses the switchyard control stations and states: "The control and protection circuit cables that are routed in the yard and associates with two different control houses are physically separated to avoid a common cause failure of the two control houses and the availability of the associated offsite power circuits." Clarify what "common cause failure of the two control houses" means and explain how the proposed routing of control and protection circuits will prevent such common cause failure.

08.02-5

RAI 08.02-05

NUREG-0800 establishes criteria that the NRC staff intends to use to evaluate whether an applicant meets the NRC's regulations.

FSAR Subsection 8.2.1.2.1.1, Plant Switching Station, discusses the design of the switchyard and states that the switching station main buses are constructed of six-inch aluminum tubes. Discuss the continuous ampere rating of the main buses and their short circuit rating, both symmetrical and asymmetrical. Additionally, provide details about the maximum anticipated loads on each bus and the calculated short circuit current available to demonstrate the current carrying capability of the buses.

08.02-6

RAI 08.02-06

The regulatory basis for this question is discussed in Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants," C.I.8.2, "Offsite Power System," and NUREG-0800, Standard Review Plan, Chapter 8.2 Offsite Power System.

FSAR Subsection 8.2.1.2.1.1, Plant Switching Station, discusses the "fly-over" of existing circuit. Provide a physical layout of the installation showing the double dead-ending of these circuits.

08.02-7

RAI 08.02-07

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2 "Offsite Power System."

FSAR Subsection 8.2.1.2.1.2, Unit Switchyards/Transformer Yards, discusses the fire barriers between transformers and states that there is a minimum one-hour rated fire barrier between all transformers. Discuss the fire protection provided for the transformers and indicate the basis for the one-hour fire barrier and whether such barrier is sufficient to prevent propagation of a fire from one transformer to the other.

08.02-8

RAI 08.02-08

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2 "Offsite Power System."

FSAR Subsection 8.2.1.2.1.2, Unit Switchyards/Transformer Yards, discusses the isolated phase bus duct. Specify the rating of each bus duct section and confirm the capability of each section to carry maximum full load currents.

08.02-9

RAI 08.02-09

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2, "Offsite Power System."

FSAR Subsection 8.2.1.2.1.2, Unit Switchyards/Transformer Yards, discusses the rating of circuit breakers RAT-CB1, RAT-CB2 and MT-CB. Please provide additional information on the rating of all switchyard components, including disconnect switches and circuit breakers and explain why the ratings for circuit breakers and disconnect switches in the switchyard are adequate for the application. In particular, identify the maximum fault available from the system and confirm that the breaker interrupting ratings, both symmetrical and asymmetrical, are consistent with the available fault. Provide the results of the short circuit analysis.

08.02-10

RAI 08.02-10

The regulatory basis for this question is described in NUREG-0800, Standard Review Plan, Chapter 8.2, "Offsite Power System."

FSAR Subsection 8.2.1.2.2, Plant Switching Station and Transmission Line Testing and Inspection, references an agreement between Luminant and Oncor for inspection, maintenance, calibration, and testing of transmission lines, and plant switching station, which provides the procedure, policy and organization to carry out inspection, maintenance, calibration, and testing of transmission lines and plant switching station. This agreement defines the interfaces and working relationship between Luminant and Oncor. The FSAR further provides that, as a service to Luminant, Oncor performs inspection, maintenance, calibration, and testing of Luminant transformer and circuit breaker assets at CPNPP. List and describe Luminant's and Oncor's responsibilities for inspection, maintenance, calibration, and testing of transformers and circuit breaker assets. Discuss Luminant's approval process and requirements by Luminant Generation for Comanche Peak Nuclear Power Plant.

08.02-11

RAI 08.02-11

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2, "Offsite Power System."

FSAR Subsection 8.2.1.2, Offsite Power System, states that the "cables associated with the normal and alternate [preferred power supply] PPS between unit switchyard and the electrical room, in the [turbine building] T/B, are routed in separate underground duct bank... The underground duct bank for these circuits is sealed to prevent degradation in wetted or submerged condition. Temporary sump pumps are available to remove any leakage that may occur." Describe the monitoring program, including periodic testing, inspections, and corrective actions that will be implemented to avoid or arrest the degradation of cable insulation from the effects of moisture for all underground cables, dc and ac at all voltage levels.

08.02-12

RAI 08.02-12

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2, "Offsite Power System."

FSAR Subsection 8.2.1.2.1.1, Plant Switching Station, states that "[e]ach transmission line is protected by pilot protection using a directional comparison blocking scheme." The logic diagrams of Figures 8.2-9 and 8.2-10 address this feature. Provide additional information, including additional or revised figures, if necessary, to explain and clarify how the pilot protection is used and which circuit breakers it acts upon.

08.02-13

RAI 08.02-13

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2, "Offsite Power System."

FSAR Subsection 8.2.1.2.1.1, Plant Switching Station, states that the "[t]he relay protection schemes for independent transmission lines are designed so that any single failure or incident, such as control house fire or cable dig-in, will not cause loss of two independent transmission lines." Clarify specifically what "cable dig-in" means.

08.02-14

RAI 08.02-14

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2 "Offsite Power System."

FSAR Subsection 8.2.1.2.1.2 indicates that surge arresters are provided both at the transformer side and at the transmission tie line side to protect the equipment from damage due to lightning and switching surges. Identify the Basic Insulation Level (BIL) levels specified for the 345 kV transmission lines, the switchyards, and substations listed in this section, and provide a comparison with the BIL levels that are utilized by other transmission lines in the general area for existing and proposed 345 kV transmission lines. Also, describe design features such as surge protection devices, grounding, and lightning protection provided for the switchyard and transmission lines and indicate how these systems will be periodically maintained and tested to assure their functionality.

08.02-15

RAI 08.02-15

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2, "Offsite Power System."

FSAR Subsection 8.2.1.2.1.1, Plant Switching Station, states that: "To reduce the cable lengths of the dc supplies in one control building to panels in the other control building, a set of fused cables are brought from the dc source in each control building to the dc box in the relay panel room of the other control building." Describe the control sources in this subsection and the location of the control and protection equipment in subsection 8.2.1.2, and explain how the protection scheme for each line is physically wired. Please also explain whether the failure of one control house, for any reason, will assure that either the primary or the backup protection system will operate to isolate a fault. Clarify the physical design and provide a wiring diagram of the two breakers associated with the same transmission line showing physical location of components.

08.02-16

RAI 08.02-16

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2, Offsite Power System.

FSAR Subsection 8.2.1.2.1.2, Units Switchyards/Transformer Yards, states that each unit switchyard has two sets of 125V dc batteries and two separate dc power distribution systems. Clarify the physical location of these batteries, and specify whether they are located in control houses #1 and #2, described in subsection 8.2.1.2, or in another location. Additionally, address the periodic surveillance and maintenance tests that will be performed on all the batteries and the criteria that are established for battery replacement.

08.02-17

RAI 08.02-17

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2, "Offsite Power System."

FSAR Subsection 8.2.1.2.1.2, Units Switchyards/Transformer Yards, states that primary and a backup relay protection schemes are provided for each of the transmission tie lines to the plant switching station. Describe the physical location of the primary and backup protective relays provided for each transmission tie line to the plant switching station, and explain whether they are located in control houses #1 and #2, as described in subsection 8.2.1.2, or in another location. The applicant should ensure that the physical location of all equipment is clearly identified.

08.02-18

RAI 08.02-18

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2, Offsite Power System.

FSAR Subsection 8.2.1.2.1.2, Units Switchyards/Transformer Yards, states that, "The normal PPS and the alternate PPS unit switchyards, the normal PPS and the alternate PPS transmission tie lines to the plant switching station, the low-voltage dc and ac power systems in the unit switchyards, are physically separated and do not share any common equipment. Hence, no [failure modes and effects analysis] FMEA is warranted for the equipment and circuits associated with the unit switchyards." Please clarify whether protective relays for primary and backup protection are also physically separate. If this is not the case, provide an FMEA or justify why such analysis is not warranted. Clarify whether or not the protective relays for primary and backup protection are physically separate, and if so, provide the corresponding FMEA.

08.02-19

RAI 08.02-19

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2 "Offsite Power System."

FSAR Subsection 8.2.1.2 describes the transformer protection related to sudden pressure. Indicate whether transformer isolation occurs in conjunction with the other protection features described in the same subsection paragraph of the US-APWR DCD. Additionally, indicate whether protection schemes have addressed lessons learned from the event described in Information Notice 2005-15, "Three-Unit Trip and Loss of Offsite Power at Palo Verde Nuclear Generating Station." Lastly, indicate whether transformers undergo periodic testing and describe the testing plan.

08.02-20

RAI 08.02-20

The regulatory basis for this question is described in 10 CFR 50.65(a)(4), NUREG-0800, Chapter 8.2 "Offsite Power System," and NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," February 1, 2006.

FSAR Subsection 8.2.2.2, Grid Reliability and Stability Analysis, states that, "The study indicates that neither proposed nor existing nearby generators experience transient instability for the selected planning criteria contingencies that have been considered." The subsection also indicates that the study and its conclusions are based on preliminary data. Indicate which reasonably expected contingencies were not evaluated. Additionally, provide the assumptions, results, and conclusions when the study is revised using final data.

08.02-21

RAI 08.02-21

The regulatory basis for this question is described in 10 CFR 50.65(a)(4), NUREG-0800, Chapter 8.2, "Offsite Power System," and NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," February 1, 2006.

FSAR Subsection 8.2.2.2, Grid Reliability and Stability Analysis, states that, "The study was conducted in accordance with the ERCOT Generation Interconnection or Change Request Procedure using a 2015 summer peak case projected from the 2012 ERCOT summer peak base case. The ERCOT dynamics database associated with the 2010 summer peak base case was modified for compatibility with the 2015 base case." Explain why the summer of 2015 was selected as the peak base and state whether maximum winter loads were considered.

08.02-22

RAI 08.02-22

The regulatory basis for this question is described in 10 CFR 50.65(a)(4), NUREG-0800, Chapter 8.2, "Offsite Power System," and NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," February 1, 2006.

FSAR Subsection 8.2.2.2, Grid Reliability and Stability Analysis, indicates that one of the contingencies evaluated is the simultaneous trip of CPNPP, Units 3 and 4. Indicate whether the loss of all four CPNPP units is a reasonable contingency to be evaluated. If not, explain how you reached this conclusion.

08.02-23

RAI 08.02-23

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2 "Offsite Power System."

FSAR Subsection 8.2.2.2, Grid Reliability and Stability Analysis, indicates that the voltage low point is 0.976 pu and that the frequency deviation is 0.24 Hz at the lowest point. Explain how these values were determined.

08.02-24

RAI 08.02-24

The regulatory basis for this question is discussed in NUREG-0800, Standard Review Plan, Chapter 8.2 "Offsite Power System."

FSAR Subsection 8.2.2.2, Grid Reliability and Stability Analysis, states that the transmission system is evaluated "almost same as" Comanche Peak Nuclear Power Plant, Units 1 and 2. Provide the assessment methods, analysis and results used to evaluate the reliability of Units 3 and 4.

08.02-25

RAI 08.02-25

The regulatory basis for this question is described in NUREG-0800, Standard Review Plan, Chapter 8.2, "Offsite Power System."

With respect to FSAR Table 8.2-203, Failure Modes and Effects Analysis for Offsite Power Sources, pertaining to structural failure of a tower, clarify the following items:

- a) The table states that "One or more of these circuits may share transmission circuits with other circuits." Clarify which circuits share the same structure and why the failure of one structure would not constitute a loss of more than one circuit.

b) CPNPP uses the words “under normal conditions” and in other areas “under normal operating conditions”. Clarify what is meant by such statements and why abnormal events or conditions should not be considered in the FMEA.

c) CPNPP states that, “The actual routing of some or all of these four circuits will be subject to the approval of the [Public Utility Commission of Texas] PUCT. Final design of circuits subject to PUCT approval will take place after such the PUCT approval is received.” Provide a revised FMEA if the current analysis is affected by the routing of the circuits after PUCT approval.