PMComanchePeakPEm Resource

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Sent: Friday, August 14, 2009 1:15 PM
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Cc: ComanchePeakCOL Resource; Kallan, Paul
Subject: Comanche Peak RCOL Chapter 19 - RAI 28
Attachments: RAI 3214 (RAI28).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 August 14, 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. 3214

RAI No. 28

8/14/2009

Comanche Peak Units 3 and 4
Luminant Generation Company, LLC.
Docket No. 52-034 and 52-035
SRP Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation
Application Section: Chapter 19.1

QUESTIONS for PRA Licensing, Operations Support and Maintenance Branch 1 (AP1000/EPR Projects) (SPLA)

19-4 QUESTIONS for Probabilistic Risk Assessment (PRA Licensing, Operations Support and Maintenance Branch 1 (AP1000/EPR Projects) (SPLA). The regulatory basis for these questions is 10 CFR 52.47(a) and RG 1.206 which provides guidance regarding the appropriate way to address severe accidents, assess risk and use of the PRA.

On page 19.1-2 of the Comanche Peak Nuclear Power Plant, Units 3 and 4 (Comanche Peak) FSAR, the combined license (COL) application states: "The only site-specific design [feature] that has potential effect on level 1 PRA for operation at power is the site-specific UHS."

(1) Please clarify whether this statement refers to internal events only.

(2) Discuss whether a systematic search for assumptions (explicit or implicit) made in the design certification PRA about site-specific or interface design features, parameters and characteristics is necessary, and whether such assumptions should be re-evaluated for the site. Examples of such assumptions include but are not limited to the frequency of loss of offsite power, offsite power recovery probability and the maximum ambient temperature used in the HVAC design calculations.

Site specific issues are listed in Table 1.8-1 of the Comanche Peak FSAR, which concludes that none of these issues, except for the essential service water system (ESWS) and ultimate heat sink (UHS), are considered as having an impact on the results and insights of the PRA.

(1) Please verify that the assumed values of such parameters in the design certification envelop the actual site-specific and plant-specific values, or re-evaluate the affected assumptions accordingly.

(2) Please provide a discussion to explain how the assumed values envelope the actual site-specific and plant-specific values and to document any re-evaluation of assumptions.

19-5

The site-specific essential service water system (ESWS)/ultimate heat sink (UHS) used at Comanche Peak Units 3&4 introduces many changes in the risk insights and assumptions identified at the design certification Design Control Document (DCD). Even though the numerical impact of the change on the estimated CDF is small, there are important changes in the risk insights and assumptions as a result of the site-specific ESWS/UHS change. Therefore, the Comanche Peak FSAR should include changes to all impacted areas (sections) of the incorporated by reference US-APWR DCD. Examples are: (1) DCD tables, such as Tables 19.1-27 to 19.1-34, include failures of components and human actions that are not part of the site-specific design (e.g., failure to cool the ESWS pumps) and leave out risk important components and human actions that are part of the site-specific design (e.g., failure of the cooling tower fans); (2) DCD table 19.1-115 listing key assumptions and important design features; and (3) results of the PRA-based seismic margins analysis (e.g., HCLPF values of the cooling towers and related structures and any changes in the major seismic contributors identified in the DCD). Please perform a systematic search to identify all sections of the incorporated by reference DCD, including both internal and external events at power and shutdown modes of operation, that are impacted by the site-specific ESWS/UHS, update all such sections and clearly describe the changes in Chapter 19 of the Comanche Peak FSAR.

19-6 The staff needs additional information/clarification, beyond what is provided in the Comanche Peak FSAR (CP COL 19.3(4)), about the design features of the site-specific essential service water system (ESWS) and ultimate heat sink (UHS) proposed for use at Comanche Peak Units 3 & 4,in order to understand how this system was modeled in the PRA.

(a) Please explain the basis for the statement: “Failure of both fans in a single cooling tower (CTW) train is considered a potential failure mode of the ESWS.” Explain how the failure of the CTW fans, including their support systems, is modeled in the PRA. For example, what group size was considered in the common cause failure analysis and what data were used? Are all fans normally running? What failure modes were considered? Also, please explain the basis for the statement: “Failure of both fans in a single CTW train is considered a potential failure mode of the ESWS.”

(b) Explain how the failure of one or more UHS transfer pumps was modeled in the PRA. Also, provide a discussion in Chapter 19 about how the evaporated water in the basins is replenished. List important modeling assumptions as well as assumptions about design and operational features (e.g., testing intervals).

(c) In the brief description of the ESWS/UHS (page 19.1-2), the application states: “….four 33-1/3 percent capacity basins to supply cooling water more than 30 days.” However, in the list of assumptions (page 19.1-3), the application states: “Should the plant trip, the basins can be effective in removing decay heat more than 24 hours assuming nominal conditions but the hottest day of the year. This can be achieved by one fan per tower operating.” Please explain this apparent discrepancy. In addition, explain how decay heat is removed after 24 hours and provide examples of “nominal” conditions that were assumed in the analysis.

(d) The assumptions and important design features listed on page 19.1-3 of the Comanche Peak FSAR should be used to supplement and revise in the Comanche Peak FSAR, as appropriate,

the information provided in related portions of DCD table 19.1-115 (which is incorporated in the FSAR by reference), with similar disposition. For example, the assumption stating that "[t]he transfer line is a high integrity line, regularly tested and inspected for corrosion," should be cross-referenced to appropriate Comanche Peak FSAR sections, or include a new COL holder action, to ensure that this assumption will be verified for the as-built, as-operated plant.

(e) The Comanche Peak FSAR states, at page 19.1-3, that: "Ventilation of the [emergency service water pump] ESWP room is reliable not to significantly degrade the unavailability of ESWP." Please provide the basis for this assumption. Also, if this assumption is based on site-specific factors, provide those factors and explain how the failure of pump room ventilation was modeled in the PRA.

(f) The Comanche Peak FSAR states, at page 19.1-3, that: "The effect of the site-specific ESWS designs on the internal [core damage frequency] CDF is very small." Provide a similar discussion about the effect of the site-specific ESWS designs on the CDF and large release frequency (LRF) from both internal and external events at both power and shutdown operation.

(g) The Comanche Peak FSAR states in Section 19.1.4.2.2 that: "… the contribution of total loss of [component cooling water] CCW initiation event to the large release frequency (LRF) for operations at power is considered insignificant. It has been therefore determined that consideration of the site-specific UHS would have no discernible effect on the level 2 PRA results.

(i) Please explain the basis for your conclusion that there is insignificant or no change in risk associated with the site-specific ESWS design beyond the one due to the total loss of CCW/ESW initiating event (i.e., change in risk due to partial loss of CCW/ESW and to the change in reliability of the ESW system).

(ii) Please discuss the change in risk due to partial loss of CCW/ESW and the reliability of the ESW system.

19-7

Comanche Peak FSAR Section 19.1.5 states: "The first four events are subject to the screening criteria consistent with the guidance of ANSI/ANS-58.21-2007, taking into consideration the features of advanced light water reactors." Please provide the following information:

(a) In principle, an external hazard can be screened out of the analysis if it can be shown that its contribution to the total plant risk is very small (e.g., one percent or less depending on the number of external hazards that are screened out). Accordingly, for the US-APWR design, an event with a CDF contribution of about 5E-8 or less is considered insignificant. Similarly, an event with a frequency of occurrence of 1E-7 per year or less is considered an insignificant contributor to the plant CDF (especially if it is also shown qualitatively that such an event does not lead directly to core damage. Since the features of advanced light water reactors contribute to the lower risk of such reactors, as compared to operating reactors, the screening criteria should be adjusted accordingly. Using the above factors, please clarify and state in the FSAR how "the features of advanced light water reactors" are taken into consideration in the screening criteria.

(b) In addition to the four external hazards listed in Section 19.1.5 of the DCD (i.e., high winds and tornadoes, external flooding, transportation and nearby facility accidents, and aircraft impact), COL applicants that reference this DCD are expected to verify that there are no other site-specific hazards within the site vicinity (e.g., dam breaks, flash floods, external fires and high air temperature) which have the potential to initiate an accident that could lead to core damage. The same criteria used to screen out the four external hazards listed in Section 19.1.5 of the DCD should also be used for any other potential site-specific hazard.

(i) Please identify whether information included in another FSAR chapter (e.g., Chapter 2) can be used to justify not mentioning all potential external events in Chapter 19.

(ii) If this information does not support the conclusion that a certain external event can be screened out without even mentioning it in Chapter 19 (PRA), where its risk is assessed, provide clarification in Chapter 19 that any external event which is not mentioned in Chapter 19 has been determined elsewhere in the FSAR (e.g., in Chapter 2)to have a frequency of occurrence of 1E-7 per year or less. For more frequent site-specific external hazards, such as external fires, provide a discussion of such events in Chapter 19.