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**Date:** 6/19/2007 8:38:08 AM  
**Subject:** Fwd: CPSES OFFSITE CIRCUITS AOT EXTENSION - RAI

Fred/Tim:

The NRC staff has reviewed your application for extension of offsite circuits (TAC Nos. MD4068 and MD4069), and has identified a need for additional information. Early response to the following request for additional information is needed to complete our review in a timely manner. Please advise your schedule for response to this request.

Should you require that this request be formally transmitted, we will do so promptly.

Thanks.

Mohan

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### REQUEST FOR ADDITIONAL INFORMATION

1. A reduced loss of offsite power (LOOP) frequency was applied for the risk analyses when the startup transformer (ST) is unavailable. The staff has additional questions about the use of a reduced frequency.

a. The licensee stated that plant-centered events were removed from the industry data used to develop the Comanche Peak Steam Electric Station (CPSES) loss of offsite power frequency, based on administrative prohibition of work which could effect offsite power, including work in the switchyard. However, the proposed Technical Specification (TS) change is specifically requested to permit extended maintenance activities on equipment in the switchyard (i.e., the ST), which would indicate that switchyard access and activities would be greater than when such maintenance activities are not ongoing. This would indicate that plant-centered events may be more likely, and that their frequency should therefore be greater than the nominal average. The licensee is requested to justify the assumptions regarding plant-centered events and their proposed administrative controls with regards to the assumption of a reduced LOOP frequency.

b. The licensee stated that plant-centered industry events which resulted in a LOOP were excluded in performing the reduced LOOP frequency calculations. The staff is concerned that some plant-centered industry events which have occurred may have involved subtle interactions with offsite power which may not have been fully understood prior to the event occurrence, and that an "after the fact" review of such events in order to exclude them from consideration has the advantage of a detailed evaluation as to the cause of the event. The licensee is requested to provide details regarding the review and disposition of these excluded plant-centered industry events, with regards to their assurance that CPSES administrative controls as proposed in their submittal would in fact have prevented occurrence of a LOOP, given what was reasonably understood regarding the interaction of the plant activities with offsite power.

c. The weather-centered contribution to LOOP frequency was reduced by 70%, effectively assuming that ST maintenance would only occur in the off-peak periods for severe weather. The licensee has only stated (Attachment 1 page 15) that "weather conditions must be conducive to perform planned maintenance on the offsite circuits." The licensee has not identified any commitment to specifically restrict ST maintenance based on the peak period of severe weather which was the basis of the reduced LOOP frequency. The licensee is

requested to propose more specific restrictions on voluntary ST maintenance such that the assumptions of the risk analysis are maintained, including the applicability of such restrictions during unplanned ST maintenance.

d. While the LOOP frequency is reduced for the analysis of the 30-day completion time (CT) period, it is not increased by a corresponding amount during the remainder of the year. Specifically, the frequency of severe weather would be greater in the high risk period of the year compared to an average annual value, and any deferred switchyard and other maintenance activities would be performed in the remainder of the year. Similarly, no testing or maintenance (other than diesel generator monthly operation) is assumed during the CT period, so all other testing and maintenance would occur during the remainder of the year.

The licensee should justify its calculations or re-evaluate the risk impact addressing these issues.

e. Since the normal plant configuration has two STs available for offsite power, the development of the nominal LOOP frequency for CPSES may have screened out industry events which involved failure of a single transformer or offsite source. Such events may have occurred in older plants without a redundant design or requirement, or during plant outages when a single offsite source was all that was available. Similarly, weather events which are spatial in impact (such as lightning strikes or tornadoes) may have been excluded based on the physical separation of the two CPSES STs, assuming that a similar weather event could not disable both STs. During the 30-day CT, the plant configuration is such that these previously excluded events would cause a LOOP. For example, failure of the aligned ST or circuit breakers connecting to the plant busses would now result in a LOOP, or a single lightning strike or tornado could disable the one ST. Further, these plant-centered events would not be immediately recoverable without repairs to the affected equipment. The licensee should discuss how such potential contributions to LOOP during the 30-day CT have been addressed in their risk analysis supporting this request.

f. A sensitivity analysis should be provided based on not reducing the LOOP frequency for plant-centered events in order to determine if there is over-reliance on programmatic activities to compensate for weakness in plant design (Regulatory Guide (RG) 1.177 Section 2.2.1).

2. The calculations of DCDF and DLERF effectively assume a single entry into the extended 30-day CT each year, but no such restrictions have been identified and the licensee specifically states they will use the 30-day CT for corrective maintenance if needed. The licensee has identified the recent maintenance history and its proposed 22-day preventive maintenance. The licensee is requested to justify that the assumption of one 30-day CT per year is conservative, or proposes appropriate restrictions on the use of the extended CT.

3. No common cause failure (CCF) mechanism has been postulated between the two STs, based on difference in design and voltage. However, the submittal also identified that both STs are "forced oil and air (FOA), 58.33 MVA transformers,...". This would seem to indicate that the transformers are the identical except for the specific location of the taps. It is further assumed that similar maintenance practices, procedures, and trained personnel would be applied to both STs. Finally, there may be other components subject to the proposed extended CT which may be subject to CCF, such as electrical breakers. RG 1.177 Section 2.3.3.1 and Appendix A Section A.1.3.2 identifies methods for quantitative evaluation of CCF when evaluating equipment unavailability due to corrective maintenance. The licensee is requested to more specifically identify design differences which justify not considering CCF between the transformers, and to justify that the risk evaluation for preventive maintenance is bounding for corrective maintenance involving other components subject to Limiting Condition for Operation (LCO) 3.8.1. Alternatively, the licensee may provide a revised risk analysis which evaluates corrective maintenance consistent with RG 1.177 Section A.1.3.2.

4. The licensee is requested to provide the failure modes, assumed failure rates, exposure times, and failure probabilities associated with both STs, and the data source(s), including any plant-specific data, and calculation methods used to determine these parameters.

5. The licensee is requested to identify the specific version and date of the probabilistic risk assessment (PRA) model applied for the risk evaluations supporting the proposed change, and identify any plant changes (i.e., modifications, procedure revisions, or other items) not yet incorporated into the PRA model, including justification that such unincorporated changes do not adversely impact the stated risk impact.

6. The licensee stated that the computation of incremental conditional core damage probability (ICCDP) and incremental conditional large early release probability (ICLERP) were per the definitions in RG 1.177, and identified specific equations used to perform the calculations. However, RG 1.177 uses the increase above the nominal baseline risk, including contributions from nominal expected equipment unavailability, while the licensee calculations specify the use of the baseline CDF without test or maintenance contributions included. The licensee is requested to clarify its calculation basis, which appears to be different than the specific RG 1.177 guidance.

7. The cases analyzed assume that ST XST1 is removed from service, but no evaluations are provided for XST2. The licensee is requested to justify that the XST1 out-of-service case bounds the XST2 out-of-service case or to provide the appropriate evaluations of XST2.

8. The licensee's submittal Section 4.2.2 states that the CPSES PRA internal events model does not include contributions from internal floods, and that these events would be qualitatively evaluated. However, no qualitative evaluation of internal flooding events was provided. The licensee is requested to provide an evaluation of internal flooding events as they may relate to the risk impact of the proposed TS changes.

9. The licensee's qualitative evaluation of external events including internal fires specifically considers events which may disable a single ST, but not events which would disable both STs or cause a LOOP. The staff agrees with this approach, provided that the scope of equipment includes not just the STs themselves, but all CPSES components which could be subject to TS 3.8.1 for offsite circuits, specifically cables and breakers which connect the ST output to the CPSES safety busses, as well as any instrumentation and control circuits which may affect the STs and breakers. This is especially important when addressing internal fires and floods which may only impact one plant safety train, but which may be able to cause a trip of the aligned ST. For example, if a fire or internal flood inside the plant can result in an electrical fault which trips the available ST, and if the consequences of such an event were determined acceptable due to the availability of the redundant ST, then such consequences may be greater than assumed when the redundant ST is unavailable under the proposed extended CT. The licensee is requested to provide qualitative analyses which includes these additional components, and to address the internal fires and floods with regards to scenarios which may result in a trip of the aligned ST.

10. The licensee's qualitative analysis of fires stated that the frequency of transformer fires is bounded to be no more than about 5% of the internal events LOOP frequency, and therefore stated that fire risk from transformer fires would not impact the conclusions of the risk analysis supporting the proposed change. However, this neglects the fact that a transformer fire would not be immediately recoverable, and comparison to the LOOP frequency for which the risk impact includes recovery probability may not be adequate to reach this conclusion. The licensee is requested to consider the impact of offsite power recovery capability following a transformer fire to confirm that the conclusions regarding the risk of such events is unchanged.

11. The licensee's qualitative analysis of high winds stated that a LOOP was assumed to occur. This is a conservative assumption for an average risk PRA model, since there may be events (such as tornados) which would impact a single offsite source such as the ST, especially if the two STs and their connecting cables into the plant are physically separated. However,

such events are masked by the conservative assumption of a complete LOOP, and could be significant to the actual risk impact during the extended CT outage. The licensee stated that the frequency of a tornado-induced single ST failure was two orders of magnitude less than the internal events LOOP frequency, and therefore even if such events could occur and only impact one ST, the risk would not impact the conclusions of the risk analysis supporting the proposed change. As noted in RAI 10, this neglects the fact that such events are not immediately recoverable due to damage to the ST. The licensee is requested to consider the potential for high wind events such as tornadoes accounting for the physical separation of the STs and supporting components, as well as the impact of offsite power recovery capability following a high wind event, to confirm that the conclusions regarding the risk of such events is unchanged.

12. The licensee's qualitative evaluations of seismic events, fires, and high winds states properly that these events "do not impact the conclusions of this analysis." However, with regards to external floods and other external events, the concluding statements are not as specific, addressing "contribution to total CDF", "not account for a significant risk contribution in any of the CPSES IPEEE submittals", etc. The licensee is requested to definitively state their conclusions regarding external floods and other external events with regards to their impact on the conclusions of the risk analysis supporting this proposed change.

13. The licensee's submittal did not identify if the risk analyses provided point estimates of the mean or actual means, nor was there any discussion of uncertainty analyses to support the calculations. The licensee is requested to address PRA model uncertainty using the guidance of RG 1.174 Section 2.2.5.

14. Section 4.1 of the licensee's submittal identifies administrative controls which would be applicable to the extended CT. In addition, Section 4.2.3 identifies plant equipment and activities which, if unavailable simultaneous with the CT, would likely result in a high risk configuration. The staff has additional questions regarding these portions of the submittal:

a. The licensee's submittal does not specifically identify whether these statements represent commitments. The staff notes that the licensee's risk analysis assumes no other testing or maintenance activities on other plant equipment (other than monthly Emergency Diesel Generator (EDG) testing) and assumes no activities which would increase the likelihood of a loss of the remaining operable offsite circuit. The licensee is requested to clarify their intent with regards to the RG 1.177 tier two portion of their request.

b. The staff notes that the section 4.1 administrative controls item 2 and 3 are worded subtly different; specifically, "weather conditions must be conducive to perform planned maintenance," and "offsite power supply and switchyard conditions must be conducive to perform maintenance". The licensee is requested to clarify the intent, if any, of the use and omission of the word "planned".

c. Section 4.1 states "switchyard access will be monitored and controlled per procedures". It is not clear that this represents any unique administrative control, since switchyard access should normally be so monitored and controlled using approved plant procedures. Further, the proposed changes specifically deal with repairs to components in the switchyard (the ST), when access to the switchyard may be greater than normal to facilitate the maintenance and repair activities. The licensee is requested to clarify the intent of this administrative control, especially in view of the fact that the risk analysis relies upon prohibition of plant-centered LOOP events due to switchyard maintenance activities.

d. Section 4.2.3 does not explicitly identify that the potential high risk configurations would be prohibited, consistent with the assumptions of the risk analysis, during the extended CT. The licensee is requested to clarify the intent of identifying these configurations.

15. RG 1.177 Section 2.3.7 describes various attributes of contemporaneous configuration control and the CRMP which can support risk-informed decisionmaking. Certain aspects of the licensee's program have not been adequately described to assure that the guidance of RG 1.177 is met. Specifically, the licensee only states that added or emergent activities, or activities which have slipped from the scheduled completion time, are "addressed". RG 1.77 Section 2.3.7.1 requires specific descriptions to be provided, as to their capability to perform contemporaneous assessment of overall plant safety impact of proposed plant configurations, how the tools or other processes are used to ensure risk-significant configurations are not entered, and that appropriate actions will be taken when unforeseen events put the plant in a risk-significant configuration. Further, it identifies four key components of the CRMP, which have not been addressed by the licensee. The licensee is requested to confirm how their CRMP conforms to the RG 1.177 Section 2.3.7 guidance.

16. The licensee has submitted a proposed change to extend the CT for LCO 3.8.1 with regards to one inoperable EDG from 72 hours to 14 days. The staff requests clarification of certain aspects of the proposed EDG change which may impact the proposed changes for the offsite circuits.

a. The licensee has not discussed the alternate AC power source (AACPS) which is an integral part of the proposed EDG CT extension basis. It would seem that the AACPS would provide similar benefits during the offsite circuit extended CT. The licensee is requested to discuss the potential safety benefit of the AACPS with regards to this proposed change, and whether an AACPS should be required whenever the extended CT is in effect.

b. The second CT of LCO 3.8.1 applicable to contiguous application of the actions of the TS 3.8.1 is proposed to be increased from 6 days to 33 days in this amendment request, and from 6 days to 17 days for the EDG request. The licensee is requested to identify the proposed final CT. The staff also notes that TSTF-439-A eliminated this second CT, and the licensee may want to consider implementation of this TSTF along with these amendment requests.

c. Because these two requests are directly related to AC power sources, the staff considers them to be a combined change request as defined by RG 1.174 Sections 2.1.1 and 2.1.2. The licensee is requested to submit the additional information identified in RG 1.174 with regards to the synergistic impacts of the proposed changes.

17. The licensee has not identified whether the CPSES model credits any equipment repairs relevant to the proposed change, i.e., for the ST. The licensee is requested to identify and justify any such credit taken in the risk analyses supporting this change.

18. The CPSES FSAR Section 8.2.1 identifies the availability of a spare ST. Specifically, the FSAR states the following:

The spare startup transformer, XST1/2 with dual primary windings (345-kV and 138-kV), is stored in a dedicated location under the 345-kV line to XST2 (refer to Figure 8.2-1). This transformer can be energized from the 345-kV line by closing a normally open motor-operated air switch, or it can be physically moved and connected to the 138-kV line to XST1 if required. This transformer is provided to prevent an extended interruption of offsite power in case of failure of any startup transformer.

The staff interprets this to mean that prompt energization of the spare ST (via motor-operated switch) is available to backup XST2. Therefore, it is not clear why the spare is not used to replace a permanent transformer during performance of extended preventive maintenance, consistent with the CPSES FSAR. The licensee is requested to discuss the use of the spare ST to avoid the need for an extended CT for preventive maintenance. If the spare ST is not immediately available, the response should discuss the basis for the statement in FSAR Section 8.2.1, and should identify the time required to place the spare ST in service, including swapping from the permanent ST to the spare ST within the existing CT of LCO 3.8.1.

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Security: Standard