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September 22, 2009

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
RESPONSES TO REQUESTS FOR ADDITIONAL INFORMATION NO. 2730, 2737, AND 3287

Dear Sir:

Luminant Generation Company LLC (Luminant) hereby submits the attached responses to Requests for Additional Information No. 2730 (CP RAI #25) , No. 2737 (CP RAI #27), and No. 3287 (CP RAI #26) for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. Should you have any questions regarding these responses, please contact Don Woodlan (254-897-6887, Donald.Woodlan@luminant.com) or me.

The commitments made in this letter are listed on Page 2 of 3.

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

Executed on September 22, 2009.

Sincerely,

Luminant Generation Company LLC

Donald R. Woodlan for

Rafael Flores

Attachments:
1. Response to Request for Additional Information No. 2370 (CP RAI #25)
2. Response to Request for Additional Information No. 2737 (CP RAI #27)
3. Response to Request for Additional Information No. 3287 (CP RAI #26)

DO90
NRO

Regulatory Commitments in this Letter

This communication contains the following new or revised commitments which will be completed or incorporated into the CPNPP licensing basis as noted:

Number	Commitment	Due Date/Event
6431	The plan for the CPNPP Units 3 and 4 seismic qualification program will be provided in MUAP-08015, Revision 1, by the end of October 2009.	October 30, 2009
6451	The PRA for RMTS will be updated to satisfy the PRA technical adequacy described in the NEI guideline and will be available one year prior to fuel load.	One year prior to fuel load

The Commitment Number is used by Luminant for internal tracking.

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Attachment 1

Response to Request for Additional Information No. 2370 (CP RAI #25)

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.: 2370 (CP RAI #25)

SRP Section: 03.10 – Seismic and Dynamic Qualification of Mechanical and Electrical Equipment

QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)

DATE OF RAI ISSUE: 8/11/2009

QUESTION NO.: 03.10-1

Section C.I.3.10.4 of Regulatory Guide (RG) 1.206, 'Combined License Applications for Nuclear Power Plants (LWR Edition)' (June 2007), which establishes the criteria the NRC staff uses to review combined license (COL) applications, provides that the applicant should provide the results of tests and analyses that demonstrate adequate seismic qualification. If the seismic and dynamic qualification testing is incomplete at the time of the COL application, the applicant should include an implementation program, including milestones and completion dates with appropriate information submitted for staff review and approval prior to installation and equipment.

FSAR Section 3.10.4.1 of the Comanche Peak Nuclear Power Plant, Units 3 and 4 (CPNPP) reference COL (RCOL) application [CP COL 3.10(1)], indicates that the plan for the documentation and implementation of the seismic qualification program, including milestones and completion dates with appropriate information submitted with sufficient time for NRC staff review and approval prior to installation of the equipment, would be established by December 2008. However, to date, the NRC staff has not yet received this information. Please provide the implementation plan for the seismic qualification program.

ANSWER:

Technical Report MUAP-08015, "US-APWR Equipment Qualification Program," Revision 0 was submitted to the NRC as part of the US-APWR Design Certification application (ML090540887). Figure 2.1 of the Report establishes the overall framework for implementation of the equipment Environmental Qualification (EQ) Program, including seismic qualification, for all COL applicants that use the US-APWR technology. The plan for the CPNPP Units 3 and 4 seismic qualification program will be provided in MUAP-08015, Revision 1, by the end of October 2009.

The implementation milestone schedule for the CPNPP 3 and 4 EQ Program is provided in FSAR Section 3.11. FSAR Subsection 3.10.4.1 has been updated to specify that the seismic qualification program will be performed as part of the CPNPP 3 and 4 EQ Program.

Impact on R-COLA

Attached FSAR Revision 0, page 3.10-3 mark up is revised to reflect this response.

See attached page 3.10-3. Because of text additions and deletions, the page numbers on the marked-up FSAR pages may not be the same as the page numbers in FSAR Revision 0.

Impact on S-COLA

None.

Impact on DCD

None.

3.10.4.1 Implementation Program and Milestones

CP COL 3.10(1) Replace the second sentence ~~of the first paragraph~~ in DCD Subsection 3.10.4.1 with the following. RCOL2_03.10-01

Technical Report MUAP-08015, "US-APWR Equipment Environmental Qualification Program" describes the EQ Program, as defined in DCD Tier 2 Section 3.11, for all COL applicants using the US-APWR technology. The Technical Report was submitted to the NRC as part of the US-APWR Design Certification application. Figure 2.1 of MUAP-08015 established the overall framework for implementing the EQ Program including seismic qualification. The seismic qualification program implementation schedule is part of the EQ Program implementation milestone schedule provided in FSAR Section 3.11. The seismic qualification program is implemented during the design, procurement, construction and preoperational testing phases of the project as described in MUAP-08015. The project-specific implementation milestone for the seismic qualification program is consistent with the EQ Program implementation milestone identified in FSAR Table 13.4-201. Project-specific implementation of the US-APWR EQ Program provides for the turnover of all EQ Program records to CPNPP. The EQ Program is the basis for the seismic qualification program applicable to replacement parts and components during plant operation. ~~The plan for the documentation and implementation of the CPNPP Units 3 and 4 equipment seismic qualification program, including milestones and completion dates with appropriate information for review and approval prior to installation of equipment, will be established by December 2008.~~ RCOL2_03.10-01

3.10.5 Combined License Information

Replace the content of DCD Subsection 3.10.5 with the following.

CP COL 3.10(1) ***3.10(1)*** *Equipment seismic qualification program plan*

This COL item is addressed in Subsection 3.10.4.1.

3.10(2) *Deleted from the DCD.*

STD COL 3.10(3) ***3.10(3)*** *Maintenance of equipment qualification files, including EQSDSs*

This COL item is addressed in Section 3.10.

3.10(4) *Deleted from the DCD.*

CP COL 3.10(5) ***3.10(5)*** *Previously tested components*

This COL item is addressed in Subsection 3.10.2.

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.: 2370 (CP RAI #25)

SRP Section: 03.10 – Seismic and Dynamic Qualification of Mechanical and Electrical Equipment

QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)

DATE OF RAI ISSUE: 8/11/2009

QUESTION NO.: 03.10-02

FSAR Section 3.10 of the CPNPP reference combined license (RCOL) application [STD COL 3.10(3)], states that, ". . . an equipment qualification file will be developed six months prior to procurement of equipment that contains . . . equipment qualification summary data sheets (EQSDSs) . . .[.]"

(1) Clarify whether test results will be included in the EQSDSs;

(2) Additionally, inform the NRC staff when the EQSDSs file is complete and available for the NRC staff's review.

(a) If the EQSDS file will be available prior to the Commission's decision on whether to issue a COL, the applicant should provide the NRC staff with enough time to review the qualification file.

(b) Otherwise, if the file will be available after the Commission's decision on whether to issue a COL, then pursuant to 10 CFR 52.79(d)(3), the applicant is requested to provide a license condition requiring the provision of an equipment qualification file.

ANSWER:

(1) The files generated by the EQ Program referenced in Subsection 3.10.4.1 include provisions for recording seismic qualification information, including test results where applicable. These records will be available for review during the procurement, construction and preoperational testing phases of the project.

(2) These records are the qualification records for safety-related and important-to-safety equipment. These records are accessible and updated for each individual component. Information that populates these records is recorded during the analysis, design, procurement (including testing information), construction, and preoperational testing phases of the project. Thus the records are

available in various stages of completion throughout the project. The completed records will not be available until after the COL is issued. Implementation of the EQ Program prior to fuel load is governed by a license condition as stated in Table 13.4-201.

Section 3.10 of the FSAR has been revised to recognize that seismic qualification testing is part of the equipment qualification file, and to state the implementation of the EQ Program prior to fuel load is a license condition in accordance with Table 13.4-201.

Impact on R-COLA

Attached FSAR Revision 0, page 3.10-1 mark up is revised to reflect this response.

See attached page 3.10-1. Because of text additions and deletions, the page numbers on the marked-up FSAR pages may not be the same as the page numbers in FSAR Revision 0.

Impact on S-COLA

None.

Impact on DCD

None.

3.10 SEISMIC AND DYNAMIC QUALIFICATION OF MECHANICAL AND ELECTRICAL EQUIPMENT

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

STD COL 3.10(3) Replace the second sentence of the fifth paragraph in DCD Section 3.10 with the following.

RCOL2_03.10-02

The files generated by the environmental qualification (EQ) Program referenced in Subsection 3.10.4.1 include provisions for recording seismic qualification information including test results. The records that form the equipment qualification files include provisions for recording seismic qualification information and are sometimes referred to as equipment qualification summary data sheets (EQSDS). The qualification records for each safety-related and important to safety piece of equipment are updated for individual components as new information becomes available. Information is recorded during the analysis, design, procurement (including testing information), construction, and preoperational testing phases of the project, and will be available for review throughout the project. The implementation of the EQ Program prior to fuel load is a license condition in accordance with Table 13.4-201.~~As part of the equipment seismic qualification program, an equipment qualification file will be developed six months prior to procurement of equipment that contains a list of systems, equipment, and equipment supports, as defined above,and equipment qualification summary data sheets (EQSDSs) for the seismic qualification of each piece of safety-related seismic category I equipment. The data sheets will be populated during the procurement/start up testing phase.~~

~~CP-COL 3.10(10) Replace the sixth paragraph in DCD Section 3.10 with the following.~~

MAP-03-014

~~An equipment seismic qualification program which addresses all requisite aspects of seismic and dynamic qualification of mechanical and electrical equipment is established, as discussed in Subsection 3.10.4.1. The equipment seismic qualification program addresses analysis and testing for qualification of site-specific equipment and components. The site-specific equipment seismic qualification program is also applied for qualification of select standard plant equipment and components, when detailed supplier characteristics cannot be verified prior to procurement. The equipment seismic qualification program incorporates all applicable requirements and guidance, including but not limited to the requirements and guidance of the reference DCD, Institute of Electrical and Electronic Engineers (IEEE) Std 344-1987 (Reference 3.10-6), IEEE Std 344-2004 (for Figure D.1 in Annex D only) (Reference 3.10-8), RG 1.100 (Reference 3.10-7), and SRP 3.10 (Reference 3.10-9).~~

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.: 2370 (CP RAI #25)

SRP Section: 03.10 – Seismic and Dynamic Qualification of Mechanical and Electrical Equipment

QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)

DATE OF RAI ISSUE: 8/11/2009

QUESTION NO.: 03.10-03

By letter dated April 2, 2009, the applicant, Luminant, submitted editorial and technical changes to the FSAR. These changes were dated March 31, 2009. In FSAR Supplemental Submittal titled "FSAR Technical Changes, Update Tracking Report (Technical Correction Version)," dated Mar. 31, 2009, COL Item 3.10(10) is shown as "Deleted from the [design control document] DCD". However, in another FSAR Supplemental Submittal titled "FSAR Editorial Changes, Update Tracking Report (Editorial Correction Version)," dated Mar. 31, 2009, COL Item 3.10(10) remains as a COL Holder Item entry in Table 1.8-201 (sheet 24 of 68). Please clarify whether COL Item 3.10(10) is included in the DCD as a COL Holder Item or is deleted from the DCD.

ANSWER:

The deletion of COL Item 3.10(10) from the FSAR is consistent with the deletion of COL Item 3.10(10) from the DCD, as indicated by MHI Document UAP-HF-08259, "COL Information Update for the US-APWR DCD", dated November 7, 2008 (ML083170228).

The mark-ups to delete COL Item 3.10(10) are correct as indicated in "FSAR Technical Changes, Update Tracking Report (Technical Correction Version)" dated March 31, 2009 (ML091120321). Therefore, there is no further impact on the R-COLA, S-COLA, or DCD.

Table 1.8-201 is updated completely with each COLA revision. The changes associated with this question will be in COLA Revision 1.

Impact on R-COLA

None.

Impact on S-COLA

None.

Impact on DCD

None.

Attachment 2

Response to Request for Additional Information No. 2737 (CP RAI #27)

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.: 2737 (CP RAI #27)

SRP SECTION: 03.06.02 – Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping

QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)

DATE OF RAI ISSUE: 8/11/2009

QUESTION NO.: 03.06.02-1

Comanche Peak Nuclear Power Plant, Units 3 and 4 (CPNPP) FSAR Section 3.6.4, Combined License Information, states that STD COL item 3.6(1) is addressed in Subsection 3.6.1.3. In Subsection 3.6.1.3, the applicant states that a site-specific pipe break evaluation report will be completed prior to the installation and fabrication of site-specific piping systems or installation of connected components and equipment. Regulatory Guide 1.206, 'Combined License Applications for Nuclear Power Plants (LWR Edition),' (June 2007), which establishes the criteria the NRC staff intends to use to review combine license (COL) applications, provides in Section C.III.4.3, that the applicant should supply the NRC with a schedule for completion of detailed engineering information, in this case, the site-specific as-designed pipe break evaluation report. This information is necessary for the coordination of activities with the NRC construction inspection program if the Commission issues a COL. Therefore, pursuant to 10 CFR 52.79 (d)(3), the applicant is requested to propose a license condition pertaining to the closure schedule of the site-specific as-designed pipe break evaluation report that will allow the coordination of activities with the NRC construction inspection program following issuance of the COL.

ANSWER:

As stated in Subsection 3.6.1.3, there is no site-specific high-energy piping, and therefore no license condition pertaining to the closure schedule of the site-specific as-designed pipe break evaluation report is applicable.

In addition, Subsection 3.6.1.3 has been revised to evaluate and address the conditions stated in COL 3.6(1), in place of a site-specific pipe break evaluation report to be submitted in the future.

As noted in Subsection 3.6.1.3, a site-specific pipe break evaluation report for high-energy piping is not applicable and the discussion concerning a high-energy pipe break evaluation is removed from the subsection. The site-specific moderate-energy piping systems are assessed for environmental and flooding impacts in Subsection 3.6.1.3.

Impact on R-COLA

Attached FSAR Revision 0 page 3.6-1 mark up is revised to reflect this response.

See attached pages 3.6-1 and 3.6-2. Because of text additions and deletions, the page numbers on the marked-up FSAR pages may not be the same as the page numbers in FSAR Revision 0.

Impact on S-COLA

None.

Impact on DCD

None.

3.6 PROTECTION AGAINST DYNAMIC EFFECTS ASSOCIATED WITH POSTULATED RUPTURE OF PIPING

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

3.6.1.3 Postulated Failures Associated with Site-Specific Piping

STD COL 3.6(1) Replace the paragraph in DCD Subsection 3.6.1.3 with the following.

RCOL2_03.06.02-1

The site-specific systems or components that are safety-related or required for safe shutdown in CPNPP Units 3 and 4 are limited to the essential service water system (ESWS) and the ultimate heat sink (UHS) system. There is no site-specific high-energy piping in CPNPP Units 3 and 4, and therefore high-energy pipe breaks are not postulated for site-specific piping. The site-specific moderate-energy piping systems in CPNPP Units 3 and 4 are the ESWS and the fire protection water supply system (FSS).

A qualitative evaluation of site-specific moderate-energy piping systems to assess environmental and flooding impacts is provided below.

The ESWS and the UHS consist of four independent trains with each train providing fifty percent (50%) of the cooling capacity required for a design basis accident and subsequent placement of the plant in the safe shutdown condition. Each train of the ESWS in the ESWPT is physically separated from the other trains by concrete walls and floors, and piping penetrations to other buildings are sealed. The failure in the piping of one ESWS train will not affect the other trains of the ESWS from an environmental and flooding perspective. Therefore, the consequences of failures in site-specific ESWS piping does not affect the ability to safely shut down the plant.

The failure in the FSS piping will not affect the safety function of the ESWS and the UHS from an environmental perspective because the FSS water temperature is approximately room temperature. From a flooding perspective, the ESWS is safe from a FSS pipe failure because FSS piping does not exist in the ESWPT, and the ESWPT piping penetrations prevent intrusion from any postulated FSS spillage in other buildings. Therefore, the consequences of the failure in site-specific FSS piping does not affect the ability to safely shut down the plant.
~~There is no site-specific high-energy piping. A site-specific pipe break evaluation report will be completed prior to the installation and fabrication of site-specific piping systems or installation of connected components and equipment. The evaluation report identifies the site-specific systems or components, such as the essential service water piping system, that are safety-related or required for safe shutdown that are located near high-energy or moderate-energy piping systems, and are susceptible to the consequences of these piping failures. The evaluation report also provides a list of site-specific moderate-energy piping systems, which~~

~~includes a description of the layout of all piping systems where physical arrangement of the piping systems provides the required protection, the design basis of structures and compartments used to protect nearby essential systems or components, or the arrangements to assure the operability of safety related features where neither separation nor protective enclosures are practical. Additionally, the evaluation report provides the failure modes and effect analyses that verifies the consequences of failures in site specific moderate energy piping does not affect the ability to safely shut down the plant.~~ RCOL2_03.06.02-1

3.6.2.1 Criteria used to Define Break and Crack Location and Configuration

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STD COL 3.6(4) Replace the second paragraph in DCD Subsection 3.6.2.1 with the following.

There is no site-specific high-energy piping in CPNPP Units 3 and 4. ~~The criteria also apply for defining pipe break and crack locations and configurations, and the locations and configurations of design basis pipe breaks and cracks, for site specific moderate energy piping systems. The postulated rupture orientation of each postulated break location is identified for the site specific moderate energy piping systems. The as built configuration of site specific moderate energy lines will also be evaluated to this criterion. As built inspections will be completed, prior to system turnover for testing and operation, to verify that the installed piping, support locations, types, component locations are consistent with the design intent, and as built drawings are produced showing component locations and support locations and types that confirm this consistency.~~ The site-specific moderate energy piping systems in CPNPP Units 3 and 4 are the ESWS and the FSS. A failure in the ESWS and FSS piping does not affect the safety function of the ESWS and the UHS that are required for a design basis accident and for safe shutdown, as described in Subsection 3.6.1.3. CTS-00737 CTS-00737

~~**3.6.2.5 Implementation of Criteria Dealing with Special Features**~~ CTS-00831

~~STD COL 3.6(6) Replace the sentence in DCD Subsection 3.6.2.5 with the following.~~

~~The criteria dealing with special features will be implemented prior to fabrication and installation of piping and components. Special features include an augmented inservice inspection (ISI) program or use of special protective devices such as pipe whip restraints, including diagrams showing their final configurations, locations, and orientations in relation to break locations.~~

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.: 2737 (CP RAI #27)

SRP SECTION: 03.06.02 – Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping

QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)

DATE OF RAI ISSUE: 8/11/2009

QUESTION NO.: 03.06.02-2

FSAR Section 3.6.4, Combined License Information, states that STD COL item 3.6(4) is addressed in Subsection 3.6.2.1. In Subsection 3.6.2.1, the applicant states that, prior to system turnover for testing and operation, as-built inspections will be completed and will be used to verify that the installed piping, support locations, types, component locations are consistent with the design intent. The applicant also states that as-built drawings are produced showing component locations and support locations and types that confirm this consistency. As described in NUREG-0800 'Standard Review Plan Section' 14.3.3, 'Piping Systems and Components - Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)' (March 2007), an as-built reconciliation of the pipe break evaluation report is required to be included in the ITAAC and be completed prior to the fuel load as required in 10 CFR 52.99(c)(2). Please revise FSAR Subsection 3.6.2.1, to provide that the as-built reconciliation of the pipe break evaluation report, included in the ITAAC, will be completed prior to the fuel load.

ANSWER:

The requirement to provide completed as-built reconciliation of the pipe break evaluation report prior to fuel load is added in DCD Tier 2, Subsection 3.6.2, Revision 2. This evaluation report will satisfy the acceptance criteria of ITAAC Item 4 in Table 2.3-2 of DCD Tier 1, as revised by RAI 180-1594, Question 3.6.1-4, and is applicable to all combined license applications referencing the US-APWR DCD.

Impact on R-COLA

None.

Impact on S-COLA

None.

Impact on DCD

None.

Attachment 3

Response to Request for Additional Information No. 3287 (CP RAI #26)

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.: 3287 (CP RAI #26)

SRP SECTION: 19 – Probabilistic Risk Assessment and Severe Accident Evaluation

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

DATE OF RAI ISSUE: 8/11/2009

QUESTION NO.: 19-1

Please provide the following information related to the high winds and tornadoes risk analysis.

(a) It is stated (page 19.1-6 of FSAR Rev 0) that below design basis tornado strikes can cause four internal events accident initiators (loss of offsite power, main steam line break downstream of main steam isolation valves, loss of feedwater flow, and feedwater line break upstream of the main feedwater isolation valves). However, only loss of offsite power is discussed. Please explain why the other three accident initiators or their combined effect are not discussed.

(b) Tornado-induced accident scenarios were categorized based on the results of the vulnerability analysis into four categories, reported in Table 19.1-203. According to this categorization, the first category (tornado strikes of intensity F1) does not include loss of alternate component cooling water (CCW). However, on page 19.1-6, where plant vulnerabilities to tornado events are discussed, it is stated: "In this analysis, the following systems are assumed to be damaged for tornado strikes of intensity enhanced F-scale 1 and greater: Plant switchyard, fire suppression system and non-essential chilled water system." Since the loss of the fire suppression and the non-essential chilled water systems imply the loss of alternate CCW, it appears that the first of the four categories of Table 19.1-203 should include loss of alternate CCW. Please explain.

ANSWER:

(a) Tornado strikes of intensity enhanced F-scale 3 or larger may initiate a combined initiating event (e.g. loss of offsite power and feed water line break). When combined initiating events are coupled with tornado-induced degradation of mitigation systems such as alternate CCW or the alternative ac power system, the loss of offsite power is the most severe initiating event for enhanced F-scale 3 tornado strikes and dominates the plant risk profile. The PRA result reported in the FSAR is therefore the loss of offsite power event as the most limiting case. Further explanation as to why

the loss of offsite power initiating event is reported as the most limiting initiating event is given below.

When a tornado with enhanced F-scale 3 intensity strikes the plant, the PRA assumes that loss of offsite power (LOOP) occurs with no alternative ac power available. Under this condition, common cause failure of the class 1E gas turbine generators (GTGs) directly results in core damage. For secondary side break events, core damage occurs only when degradation of multiple mitigation systems (such as main steam isolation valve and feed and bleed) has occurred. The core damage scenario caused by LOOP followed by degradation / failure of the GTGs, which can also occur when combined effects of initiating events are considered, dominates the core damage frequency (see the following tabulation of PRA results).

Conditional core damage probabilities given degradation of system structures and components

Event / Degradation	Alternate ac power, fire suppression system for alternate CCW and non-essential service water system for alternate CCW	Fire suppression system for alternate CCW and non-essential service water system for alternate CCW
LOOP	1.6E-3	1.5E-4
MSLB Downstream of Isolation Valves	1.9E-6	2.4E-6
Loss of FW Flow	1.4E-6	2.3E-6
Feedline Break Upstream of Isolation Valves	1.4E-7	5.2E-7

(b) Table 19.1-203 and the core damage frequency for F1 scale tornado strike have been revised. The core damage frequency of high winds increased from 5.9E-8/y to 6.8E-8/y. Core damage frequency has changed, but the conclusion that the tornado risk is very small remains.

Impact on R-COLA

See the attached mark-up FSAR Revision 0 pages 19.1-7 and 19.1-13, reflecting the response to part (b) of the RAI.

Impact on S-COLA

None.

Impact on DCD

None.

- Feedwater line break upstream of the main feedwater isolation valves

The following mitigation and support systems may be degraded by tornado-induced failures from a below design basis tornado strike:

- Alternate CCW utilizing the fire suppression system
- Alternate CCW utilizing the non-essential chilled water system
- Non-safety electric power system
- Alternative ac power supply system (this is a mitigation system for LOOP events, which is initiating event potentially caused by a tornado strike)

Based on the results of the plant vulnerability analysis and the discussion above, tornado induced accident scenarios were categorized into four scenarios as shown in Table 19.1-203. The frequency of each scenario derived from the hazard fragility analysis of the T/B is also shown.

- Quantification

For the tornado induced accident scenarios, the CDF was calculated based on the internal event PRA results. The dominant core damage scenarios were the following:

- Tornado strike induced LOOP and T/B damage combined with failure of all four emergency gas turbine generators.

The plant switchyard and the T/B are assumed to be damaged by the tornado strike. A LOOP occurs and the emergency gas turbine generators fail to operate due to common cause failure. The alternative power source is unavailable since the T/B is damaged and total loss of ac power occurs. Offsite power cannot be recovered due to damage of the T/B. Reactor coolant pump (RCP) seal loss-of-coolant accident (LOCA) occurs and eventually the core is damaged. The CDF for this scenario is 2.2E-08/RY.

- Failure of all safety systems by a beyond design basis tornado. This event leads directly to core damage. This CDF for this scenario is 2.5E-08/RY.

The total CDF caused by a tornado strike is less than ~~6~~7E-08/RY. Tornado induced CDF is one order of magnitude lower than the total CDF for internal events and internal flood and internal fire events. RCOL2_19-1

External Flooding

Subsection 2.4.2 systematically considers the various factors that can contribute to the incident of external flooding. Based on the discussions in this section, the contribution of such events to the total CDF is considered

CP COL 19.3(4)

Table 19.1-203

Tornado Accident Scenarios

RCOL2_19-1

Wind Speed (mph)	Assumed Impact on Plant	Frequency (/yr)	CCDP	CDF (/RY)
86-135 (F1 and F2 scale)	Loss of Offsite Power with - loss of alternate CCW	1.~~0~~E-04	~~6.0E-05~~ 1.5E-04	~~6.0E-09~~ 2.1E-08
~~F2 scale~~	~~Loss of Offsite Power with - loss of alternate CCW~~	~~3.7E-05~~	~~1.5E-04~~	~~5.0E-9~~
135-230 (F3, F4 and F5 scale)	Loss of Offsite Power with - loss of alternate CCW, and - loss of alternate ac power supply	1.4E-05	1.6E-03	2.2E-08
~~> 230 mph~~				
≥230 mph~~>~~ (F5 scale)	Failure of safety related systems Assumed guaranteed core damage	2.5E-08	1	2.5E-08

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.: 3287 (CP RAI #26)

SRP SECTION: 19 – Probabilistic Risk Assessment and Severe Accident Evaluation

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

DATE OF RAI ISSUE: 8/11/2009

QUESTION NO. : 19-2

The staff needs additional information to clarify the basis for screening out of the risk analysis external flooding (page 19.1-7, FSAR Rev 0) and transportation and nearby facility accidents (page 19.1-8, FSAR Rev 0). Statements made in Chapter 2 of the FSAR (e.g., Subsection 2.4.2.2 for external flooding and Subsection 2.2.3.1 for transportation and nearby facility accidents) refer to insignificant impact on the safety-related components of the plant. Please provide in Chapter 19 a summary of the main arguments, derived from the analysis reported in Chapter 2, which clearly support the conclusion that external flooding and transportation and nearby facility accidents can be screened in accordance with the preliminary screening criteria of ANSI/ANS-58.21-2007, including consideration of "the features of advanced light water reactors."

ANSWER:

The screening for external flooding and transportation and nearby facility accidents has been performed using the following steps.

At the first step, qualitative screening has been performed. The qualitative screening is performed using the analysis reported in Chapter 2 in accordance with the guidelines of ANSI/ANS-58.21-2007. Section 4.4 of the standard defined the initial preliminary screening criteria as supporting technical requirement EXT-B1. The five qualitative screening criteria are:

1. Lower damage potential than a design basis event
2. Lower event frequency of occurrence than another event
3. Cannot occur close enough to the plant to have an affect
4. Included in the definition of another event
5. Sufficient time to eliminate the source of threat or to provide an adequate response

At the next step, a quantitative screening of the scenarios that could not be eliminated by the qualitative screening is performed. The supporting technical requirement EXT-B2 of ANSI/ANS-58.21-2007 states that the criteria provided in the 1975 Standard Review Plan can be used as an acceptable basis for the screening criteria of external events. The criteria are:

(i) the contribution to core damage frequency (CDF) is less than 10^{-6}/year or

(ii) the design-basis event at annual frequencies of occurrence is between 10^{-7} and 10^{-6}.

For Comanche Peak Units 3 and 4, a value of 10^{-7} for the annual frequency of occurrence is used as a more conservative quantitative screening criterion. If the criterion of 10^{-6}/year CDF were used, the results would be a lower risk to plant when compared to using the 10^{-7} annual frequency of occurrence criterion. The quantitative screening is performed using the analysis reported in Sections 2.2 and 2.4, and in Subsections 3.5.1 and 6.4.4.2.

The results of the screening, derived using the methods described above, are summarized in the attached Table 19-2-1. As can be seen in the table, none of the scenarios went beyond the need for a qualitative screening (i.e., all were determined to not be applicable to the site).

Impact on R-COLA

Marked-up FSAR Revision 0 Page 19.1-4 and Table 19.1-201 reflect the response to this question. Those markups are provided with the response to RAI No. 3287 (CP RAI #28) Question 19-7 in Luminant letter TXNB-09048 to be submitted on September 24, 2009.

Impact on S-COLA

None.

Impact on DCD

None.

Table 19-2-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability						
Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
Hydrologic Engineering	Floods	2.4.2	The maximum flood level at CPNPP Units 3 and 4 is elevation 788.9 ft msl. This elevation would result from a probable maximum precipitation (PMP) on the Squaw Creek watershed. Coincident wind waves would create maximum waves of 4.56 ft (trough to crest), resulting in a maximum flood elevation of 793.46 ft msl. CPNPP Units 3 and 4 safety-related plant elevation is 822 ft msl, providing more than 28 ft of freeboard under the worst potential flood considerations.	1,3	None	No
	Probable Maximum Flood	2.4.3	The probable maximum flood (PMF) was determined for the Squaw Creek watershed and routed through the Squaw Creek Reservoir (SCR) to determine a water surface elevation of 788.9 ft msl. The CPNPP Units 3 and 4 safety-related facilities are located at elevation 822 ft msl. Therefore, PMF on rivers and streams does not present any potential hazards for CPNPP Units 3 and 4 safety-related facilities. The PMF and maximum coincident wind wave activity results in a flood elevation of 809.28 ft msl. The top elevation of the retaining wall is 805 ft msl. The CPNPP Units 3 and 4 safety-related structures are located at elevation 822 ft msl and are unaffected by flood conditions and coincident wind wave activity.	1,3	None	No
	Dam Failures	2.4.4	There are no surface water impoundments other than small farm ponds that could impact the SCR. The small farm ponds have negligible storage capacity and a breach would have no measurable effect. Failure of downstream dams, including Squaw Creek Dam, would not affect the CPNPP Units 3 and 4. The critical dam failure event is the assumed domino-type failure of the Hubbard Creek Dam, the Morris Sheppard Dam and the De Cordova Bend Dam coincident with the PMF. There are no safety-related structures that could be affected by flooding due to dam failures.	1,3	None	No
	Surge and	2.4.5	CPNPP Units 3 and 4 are located approximately 275 mi inland	3	None	No

Table 19-2-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
	Seiche Flooding		from the Gulf of Mexico. CPNPP Units 3 and 4 safety-related facilities are located at elevation 822 ft msl. A surge due to a probable maximum hurricane (PMH) event would not cause flooding at the site. SCR does not connect directly with any of the water bodies considered for such meteorological events associated with surge and seiche flooding. Because of the inland location and elevation characteristics, CPNPP Units 3 and 4 safety-related facilities are not at risk from surge and seiche flooding.			
	Tsunami	2.4.6	CPNPP Units 3 and 4 are located approximately 275 mi inland from the Gulf Coast. CPNPP Units 3 and 4 safety-related facilities are located at elevation 822 ft msl. Because of their inland location and elevation, CPNPP Units 3 and 4 safety related facilities would not be at risk from tsunami flooding.	3	None	No
	Ice Effects	2.4.7	The USACE ice jam database reports that Brazos River was obstructed by rough ice at Rainbow near Glen Rose, Texas, on January 22-23 and January 25-28, 1940, with flood stage of 20 ft. CPNPP Units 3 and 4 safety-related facilities are located at elevation 822 ft msl. The SCR spillway elevation is 775 ft msl. The maximum water surface elevation during a probable maximum flood event is at 788.9 ft msl, which is more than 30 ft below the CPNPP Units 3 and 4 safety-related facilities. The possibility of inundating CPNPP Units 3 and 4 safety-related facilities due to an ice jam is remote. The climate and operation of SCR prevent any significant icing on the Squaw Creek. There are no safety related facilities that could be affected by ice induced low flow.	3	None	No
	Cooling Water Canals and Reservoirs	2.4.8	There are no current or proposed safety-related cooling water canals or reservoirs required for CPNPP Units 3 and 4. The ultimate heat sink (UHS) is part of the essential (sometimes called emergency) service water system (ESWS). The UHS does not rely on cooling water canals or reservoirs and is not	3	None	No

Table 19-2-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
			dependent on a stream, river, estuary, lake, or ocean.			
	Channel Diversions	2.4.9	There is no evidence suggesting there have been significant historical diversions or realignments of Squaw Creek or the Brazos River. The topography does not suggest potential diversions. The streams and rivers in the region are characterized by traditional shaped valleys with no steep, unstable side slopes that could contribute to landslide cutoffs or diversions. There is no evidence of ice-induced channel diversion. The UHS is part of the ESWS. Each unit's ESWS consists of four wet mechanical draft cooling towers, each providing 50 percent cooling capacity. Therefore, channel diversion can not adversely affect CPNPP Units 3 and 4 safety-related structures or systems.	3	None	No
	Low Water	2.4.11	There are no safety-related facilities that could be affected by low-flow or drought conditions, since the UHS does not rely on the rivers and streams as a source of water.	3	None	No
	Ground-water	2.4.12	Groundwater is not used as an operational or safety-related source of water for CPNPP Units 3 and 4. CPNPP Units 3 and 4 are to be constructed on the Glen Rose Formation. According to the Design Control Document (DCD) for the US-APWR, the design maximum groundwater elevation is 1 ft below plant grade. The CPNPP plant grade elevation is 822 ft msl; therefore, the design maximum groundwater elevation is 821 ft msl relative to the current elevation of the Glen Rose Formation.	3	None	No
Nearby Industrial, Transportation and Military facilities	Explosion	2.2.3.1.1	- Transportation Routes (2.2.3.1.1.1) The nearest commercial traffic is FM 56, which passes approximately 1.4 mi west-southwest of the nearest safety-related structure of CPNPP Units 3 and 4. An evaluation performed for materials with a TNT equivalency of 2.24 and using the maximum cargo for two trucks determined the safe	1,3	None	No

Table 19-2-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability						
Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
			distance to be 0.52 mi. There is considerable margin between the required safe distance and the actual distance to the nearest safety-related structure (1.4 mi). Also there are no navigable waterways used for commercial shipping within 5 mi of the CPNPP Units 3 and 4 sites, and there are no main railroad lines within 5 mi of CPNPP Units 3 and 4. - Nearby Industrial Facilities (2.2.3.1.1.2) Subsection 2.2.2.1 identifies the following facilities located within 5 mi of CPNPP Units 3 and 4, along with any potential hazardous material stored at those locations: the IESI Somervell County Transfer Station; Wolf Hollow 1, LP; the DeCordova SES; the Glen Rose Medical Center; the Glen Rose WWTP; the Texas Department of Transportation Maintenance Station; and Cleburne Propane. Subsection 2.2.1 identifies six registered petroleum storage tanks within 5 mi of the CPNPP Units 3 and 4 sites. The contents, capacities, and locations of the tanks relative to CPNPP Units 3 and 4 are summarized in Table 2.2-201. Those are not to be volatile enough to represent a hazard at the CPNPP Units 3 and 4 sites because of the safe standoff distance or insignificant potential hazards. - On-site Explosion Hazards (2.2.3.1.1.3) Gas explosions from on-site sources outside containment at CPNPP Units 3 and 4 are not credible sources of missile generation per DCD Subsection 3.5.1.1.2.1. The chemicals used for the Makeup Water Treatment System are not flammable or explosive. - Gas Wells - Explosion (2.2.3.1.1.4) One technique used to control wellhead fires is the use of explosives to remove the oxygen from the air and thereby suffocate the fire. Potential wellhead fires in the Barnett Shale formation do not have sufficient flow rates to warrant the use			

Table 19-2-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability						
Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
			of explosives to extinguish them.			
	Flammable Vapor Clouds	2.2.3.1.2	- Transportation Routes (2.2.3.1.2.1) For the evaluation of the potential effects of accidents on FM 56, a single tanker truck volume of 9600 gal was assumed along with assumed rupture sizes of 4.5 square meters (m2) and 1 m2 located at the bottom of the tank. The release rates, puddle formation, and evaporation rates were calculated by the ALOHA code. These evaluations determined that for all cases there is a negligible overpressure at the site resulting from ignition of a vapor cloud, and the concentrations remain below the lower explosive limit at CPNPP Units 3 and 4. - Industrial Facilities (2.2.3.1.2.2) There are five possible sources that may release propane into the environment from Cleburne Propane (four tanks and three trucks). Of these sources, the largest volume of propane is housed in an 18,000-gal tank. Large rupture sizes of 5 m2 and 1 m2 were examined for this facility. The release rates were calculated by the ALOHA code. The evaluation determined that there is a negligible overpressure in the area of CPNPP Units 3 and 4 resulting from a delayed ignition of a vapor cloud, and the concentrations at the CPNPP Units 3 and 4 sites are negligible. - Pipeline (2.2.3.1.2.3) Table 2.2-213 provides detailed information on the pipelines that were evaluated. These pipelines bound the potential effects to CPNPP Units 3 and 4. For the natural gas pipelines, the gas releases were calculated using the ALOHA code assuming each pipeline was connected to an infinite source so that gas escapes from the broken end of the pipeline at a constant rate for an indefinite period of time. The ALOHA results demonstrate that there is a negligible	1,3	None	No

Table 19-2-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability						
Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
			overpressure in the area of CPNPP Units 3 and 4 resulting from ignition of the gas cloud and that the concentration of the natural gas at the CPNPP Units 3 and 4 site remains below 2260 parts per million (ppm), which is well below the lower flammability limit of 44,000 ppm. For the Sunoco crude oil pipeline, both large breaks and small breaks were analyzed. The resulting overpressure at the nearest safety-related structure is 0.274 psi, which is much less than the 1 psi acceptance criteria. The vapor concentration at the CPNPP Units 3 and 4 control room intake is less than 8600 ppm, which is less than the LEL of 13,000 ppm. For the small breaks, a leak rate of 0.62 cfs was assumed for a period of 32 hours (hr). The concentration at the CPNPP Units 3 and 4 control room intakes is below 8680 ppm, which is below the LEL of 13,000 ppm. The Sunoco crude oil pipeline does not represent an explosion or flammable vapor cloud hazard at CPNPP Units 3 and 4. - Gas Wells (2.2.3.1.2.4) The closest functioning natural gas well, owned and operated by XTO Energy Inc., is 1.2 mi from the center point of CPNPP Units 3 and 4. For the purposes of evaluating the consequences of breaching a well, a gas release rate of 15.6 million cu ft/day was assumed. The analysis shows that, at the assumed release rate, the area of flammability is less than 0.1 mi downwind from a gas well release. The results show that the maximum concentration at the CPNPP Units 3 and 4 control room intakes is 346 ppm, which is well below the LEL concentration of 44,000 ppm. The maximum overpressure at the closest safety-related structure resulting from ignition of the natural gas cloud is negligible. The analysis also shows the overpressure from a gas explosion does not exceed 1 psig			

Table 19-2-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability						
Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
			at a distance less than 0.1 mi from the cloud. It is concluded that the delayed ignition of vapor clouds from nearby transportation routes, pipelines, and facilities does not pose a hazard to CPNPP Units 3 and 4.			
	Toxic Chemicals	2.2.3.1.3 6.4.4.2	For releases of hazardous chemicals from stationary sources or from frequently shipped mobile sources in quantities that do not meet the screening criteria, detailed analyses for control room habitability are discussed in Section 6.4. - Mobile Sources (2.2.3.1.3.2.1) Of the three mobile sources (road, railroad, and waterway), only roadways are within 5 mi of the site; neither railroads nor waterways need be considered further based on the distance criteria prescribed in Regulatory Guide 1.78. Based on a postulated chlorine release, the quantity of hazardous material that may transverse FM 56 is greater than the acceptable quantity as identified in Regulatory Guide 1.78. The frequency of a hazardous chemical release on roads was also examined. Results show the total frequency for a road-based hazardous material release is higher than the 1.0E-6 screening frequency of Regulatory Guide 1.78. Therefore, a more detailed control room habitability analysis is necessary for roadway transportation. Table 2.2-214 summarizes the chemical, quantity, and distance to the nearest CPNPP Units 3 and 4 MCR inlets to be considered for the control room habitability analysis in Section 6.4. - Stationary Sources (2.2.3.1.3.2.2) The fixed facilities that could not be initially screened out based on the chemicals stored at the facility are: Wolf Hollow I, LP; Cleburne Propane; DeCordova SES; and Glen Rose WWTP. Table 2.2-214 summarizes the chemicals that do not meet the Regulatory Guide 1.78 screening criteria, and the quantity and distance to the nearest CPNPP Units 3 and 4	1	None	No

Table 19-2-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability						
Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
			MCR inlets to be considered for the control room habitability analysis in Section 6.4. Section 6.4.4.2 performed the analysis on the design based control room habitability to specific toxic chemicals of mobile and stationary sources. Using conservative assumptions and input data for chemical source term, CPNPP Units 3 and 4 control room parameters, site characteristics, and meteorology inputs, postulated chemical releases are analyzed for maximum value concentration to the MCR using the HABIT code, version 1.1. RG 1.78 specifies the use of HABIT 1.1 software for evaluating control room habitability. Instrumentation to detect and alarm a hazardous chemical release in the vicinity of CPNPP Units 3 and 4, and to automatically isolate the control room envelope (CRE) from such releases is not required based on analyses described in Subsection 6.4.4.2. No hazardous chemicals concentrations in the MCR exceeded the IDLH criteria of RG 1.78.			
	Fires	2.2.3.1.4	Fires originating from accidents at any of the facilities or transportation routes discussed previously would not endanger the safe operation of the station because of the distance between potential accident locations and CPNPP Units 3 and 4. The location of CPNPP Units 3 and 4 is at least 0.25 mi away from any potential accident location. The nuclear island is situated sufficiently clear of trees and brush. The distance exceeds the minimum fuel modification area requirements of 30 ft, per NFPA-1144. There is no threat from brush or forest fires. Fire and smoke from accidents at nearby homes, industrial facilities, transportation routes, or from area forest or brush fires, do not jeopardize the safe operation of the plant due to the distance of potential fires from the plant. Any potential heavy smoke problems at the MCR air intakes would not affect	1,3	None	No

Table 19-2-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability						
Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
			the plant operators. A potential gas well fire was analyzed using the ALOHA code. This heat flux is sufficiently low as to not result in exceeding any of the thermal acceptance criteria of the structures. On-site fuel storage facilities are designed in accordance with applicable fire codes, and plant safety is not jeopardized by fires or smoke in these areas. A detailed description of the plant fire protection system is presented in DCD Subsection 9.5.1.			
	Collision with Intake Structure	2.2.3.1.5	The only waterway near CPNPP is SCR, which does not provide public access to the site. There is no commercial or recreational traffic on SCR. There are no navigable rivers within 5 mi of the site. Thus, collisions with the intake structure are not considered to be credible.	3	None	No
	Liquid spills	2.2.3.1.6	The only source of liquid spills in the vicinity of CPNPP is the crude oil pipeline. The accidental release of petroleum products into SCR would not affect operation of the plant. Normal operation of the water intake structure pumps requires submergence. Liquids with a specific gravity less than unity, such as petroleum products, would float on the surface of the river and consequently are not likely to be drawn into the makeup water system.	1, 3	None	No
	Aircraft Hazards	3.5.1.6	The probability of aircraft-related accidents for CPNPP Units 3 and 4 is less than an order of magnitude of 10^{-7} per year for aircraft, airway, and airport information reflected in Subsection 2.2.2.7.	2	$< 10^{-7}$	No
	Site Proximity Missile	3.5.1.5	No potential site-proximity missile hazards.	3	None	No

Table 19-2-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability						
Category	**Event**	**FSAR Section Disposition**	**Description**	**Screening and Applicability**		
				Criteria[1]	**Freq. (/yr)**	**Site Appl.**
	Turbine Missile	3.5.1.3.1 3.5.1.3.2	The probability of turbine failure resulting in the ejection of turbine rotor (or internal structure) fragments through the turbine casing, *P1*, as less than 10-5 per year. The acceptable risk rate *P4 = P1 x P2 x P3* is therefore maintained as less than 10^{-7} per year.	2,3	$< 10^{-7}$	No

NOTES
(1) Screening criteria categories
"1" Lower damage potential than a design basis event
"2" Lower event frequency of occurrence than another event
"3" Cannot occur close enough to the plant to have an affect
"4" Included in the definition of another event
"5" Sufficient time to eliminate the threat or to provide response

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.: 3287 (CP RAI #26)

SRP SECTION: 19 – Probabilistic Risk Assessment and Severe Accident Evaluation

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

DATE OF RAI ISSUE: 8/11/2009

QUESTION NO. : 19-3

Section 19.1.1.4.2, "Risk-Informed Applications," of the FSAR states: "The PRA will be updated to reflect the risk-informed technical specifications in accordance with RG 1.174 and RG 1.177, including Initiatives 4b, [risk managed technical specifications???] RMTS, in accordance with NEI 06-09 ....and Initiative 5b, risk-informed method for control of surveillance frequencies in accordance with NEI-04-10 ....., as described in Subsection 16.1.1.2." The staff believes that PRA upgrades, in addition to PRA updates, will be necessary so that the plant-specific PRA can be used to support risk-informed programs, such as RMTS. Since NRC approval is requested to implement RMTS at the COL application stage (i.e., before a well developed plant-specific PRA model is available and all applicable guidance requirements are met), it is necessary to develop a well defined roadmap that would be used to ensure that all requirements in the applicable guidance will be met on time for plant operation. Please provide a roadmap with specific steps and supporting information, as necessary, that addresses the following:

(1) Develop a list of potential improvements of the design certification (DC) PRA models, whose implementation will be considered before fuel load if it is necessary to meet guidance requirements;

(2) Provide for the inclusion of site-specific models (e.g., essential service water system (ESWS)), detailed design and as-built information as it becomes available and peer review recommendations;

(3) Once all necessary updates and upgrades are implemented, meet Capability Category 2 for all ASME supporting requirements except for the ones that need plant-specific operational experience;

(4) In addition, include steps for developing a list of modeling uncertainties and weaknesses as well as strategies for addressing them (e.g., through specific compensatory actions) to be considered in conjunction with the specific risk-informed programs.

ANSWER:

NEI 06-09, the guideline to implement Risk Managed Technical Specifications (RMTS), describes the technical adequacy required for the PRA. The PRA for RMTS must basically meet Capability Category 2 for the supporting requirements of the ASME internal events at power PRA standard (currently the ASME/ANS integrated standard). The scope of the PRA model must include Level 1 (CDF) plus Large Early Release Frequency (LERF). Contributions from external events, internal flooding events, and internal fire events must also be considered. The PRA for RMTS will be updated to satisfy the PRA technical adequacy described in the NEI guideline and will be available one year prior to fuel load. PRA upgrades and updates planned are listed in Table 1 and a target for each item is provided in Table 2.

(1) PRA upgrades and updates planned in the development of PRA for RMTS are listed in Table 1.

(2) Site-specific models will be included in the first series of PRA upgrades shown as Items A through E in Table 1. Detailed design information will be included when the plant is under construction and detailed design information is available. This update is shown in Table 1 as Item F. Peer-reviews will be performed in time for the findings to be resolved prior to fuel load.

(3) The PRA model that meets Capability Category 2 for all ASME supporting requirements except for the ones that need plant-specific operational experience is planned in the second series of PRA upgrades that will be performed approximately three years prior to fuel load. Emergency operating procedures and detailed design information will be reflected to the PRA during this upgrade. The PRA model will then be peer-reviewed.

(4) Modeling uncertainties and weaknesses will be identified during the first series of PRA upgrades. Strategies for addressing them will be developed along with the implementation of procedures for RMTS that would take place when the second series of PRA upgrades is performed.

Table 1 PRA Upgrades and Updates for Risk-Managed Technical Specifications

Item	Task Name	Content
A	Internal Events PRA	Incorporate operating procedures, HRA update and design changes.
B	Fire PRA	Upgrade of Fire PRA to meet PRA Standard using NUREG/CR 6850 methodology enhancements.
C	Internal Flood PRA	Upgrade internal flooding PRA to meet PRA Standard.
D	Seismic PRA	Finalize SMA for DC and perform seismic PRA for COLA to meet PRA Standard
E	Other External Events PRA	Perform PRA of high winds, tornados, and other external hazards to meet PRA Standard
F	PRA Standards Upgrade	Upgrade internal events PRA to meet PRA standard changes. Update the PRA reflecting design changes.
G	Level 2 PRA	Upgrade Level 2 PRA to recalculate Level 2 risk metrics and support applications; meet LERF requirements in PRA Standard.
H	Configuration Risk Management (CRM) Model	Expand the PRA capabilities to support CRM, select and develop an appropriate CRM tool that is capable of supporting risk informed technical specifications.
I	PRA Peer-Review and Address Findings	Perform PRA Peer-Review in time for the findings to be resolved prior to fuel load.
J	Remaining update	Account for PRA standard requirements in effect 1 year prior to fuel load.

Table 2 PRA Development Plan for Risk Managed Technical Specifications

Item	Task Name	Years before fuel load							
		7	6	5	4	3	2	1	0
A	Internal Events PRA								
B	Fire PRA								
C	Internal Flood PRA								
D	Seismic PRA								
E	Other External Events PRA								
F	PRA Standards Upgrade								
G	Level 2 PRA								
H	CRM Model								
I	Peer Review and Address Findings								
J	Remaining Update								

Impact on R-COLA

None.

Impact on S-COLA

None.

Impact on DCD

None.