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

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4
DOCKET NUMBERS 52-034 AND 52-035
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 6045 (SECTION 19) AND 6166 (SECTION 10.4.8)

Dear Sir:

Luminant Generation Company LLC (Luminant) submits herein the response to Requests for Additional Information (RAIs) No. 6045 (CP RAI #232) and No. 6166 (CP RAI #237) for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. The RAIs address the probabilistic risk assessment and the steam generator blowdown system, respectively.

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

There are no commitments in this letter.

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

Executed on December 8, 2011.

Sincerely,

Luminant Generation Company LLC

Donald R. Woodlan for

Rafael Flores

Attachments: 1. Response to Request for Additional Information No. 6045 (CP RAI #232)
2. Response to Request for Additional Information No. 6166 (CP RAI #237)

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6045 (CP RAI #232)

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

QUESTIONS for PRA and Severe Accidents Branch (SPRA)

DATE OF RAI ISSUE: 10/7/2011

QUESTION NO.: 19-17

In RAI Letter Number 165 (4619) Question 19-10, Item (2), the staff requested additional information to justify or clarify the use of the five qualitative criteria provided in ANSI/ANS-58.21-2007 for an initial screening of external events. The staff stated that the ANSI/ANS-58.21-2007 qualitative criteria, which apply mainly to operating reactors that are usually associated with higher risk than new reactors, should be complemented by appropriate qualitative or quantitative arguments, as necessary, to show that each external event screened out from analysis is indeed an insignificant risk contributor to the total risk of Comanche Peak Nuclear Power Plant (CPNPP) Units 3 and 4. In its response dated June 24, 2010, Luminant states that "External events preliminary screening criteria as defined in ANSI/ANS-58.21-2007 are universal screening criteria without regard for plant types" and "Additionally, the qualitative screening criteria noted above are applicable for advanced plants because those qualitative criteria assure no hazardous potential exist or the effect of hazards have lower damage potential than enhanced design basis." These two statements are not always true because they assume the presence of an "enhanced design basis" for new reactors which results in risk from design basis events that is an insignificant contributor to the total plant risk. The staff believes that this is an assumption that must be supported by supplemental information from Chapter 2 of the FSAR (e.g., information such as that used for external floods in Table 19.1-205). Consistent with the revised Regulatory Guide 1.200, it must be reasonably shown that the qualitative screening criteria are consistent with the quantitative screening criterion assumed in the CPNPP Units 3 and &4 FSAR (i.e., event frequency is $1x10^{-7}$/year or less) in terms of the magnitude of risk allowed to be screened out.

In its response to RAI Letter Number 166 (4638) Question 19-13, Luminant states that "...the basis of qualitative or quantitative screening for each external event has been supplemented in the FSAR Table 19.1-205." The staff's review of Table 19.1-205 identified the need for additional information, as discussed below.

Please address and include in the next revision of the FSAR, as applicable, the following information or clarification:

(a) A more clear definition of the first two qualitative screening criteria, such as "The event is of equal or lesser damage potential than the events for which the plant has been designed" for criterion

#1, and "The event has a significantly lower frequency than another event and cannot result in worse consequences than this other event" for criterion #2.

(b) Link the discussion on each screened out external event (e.g., "External Flooding" on page 19.1-9 in Revision 2 of the CPNPP Units 3&4) to the specific arguments used in Table 19.1-205 for screening out these events. Such arguments must provide reasonable assurance that the use of the preliminary screening criteria of ASME/ANS RA-Sa-2009 do not screen out events that could be significant contributors to the plant overall risk.

(c) Wherever the preliminary screening criteria are used in Table 19.1-205, all needed information for the comparison of the event characteristics to the screening criteria must be clearly stated (e.g., the applicable design basis event must be described when criterion #1 is used) together with any arguments (qualitative or quantitative) that support the assumption that the combined effect of frequency and consequence of the event would result in an insignificant contribution to the total risk of the plant. Also please list separately, in the corresponding column, the criteria used for each described event (e.g., explosion in transportation routes versus on-site explosion hazards).

(d) Table 19.1-205 (on page 19.1-52) has two entries for "Toxic Chemicals." It appears that the second entry is a continuation of the first. Please clarify.

(e) External fires are discussed on Table 19.1-205 (page 19.1-54 and 19.1-55). The preliminary screening criterion #1 is referenced without any definition of the design basis event used. Also, criterion #3 is referenced without any clear definition of the distance between the assumed fire sources and the plant site (clarification is needed regarding terms used in the description of distance, such as "protected area distance," "security area," "security zone," "security isolation," "setback distance" and "combined distance") and why it is assumed that fire propagation beyond this distance is very unlikely. It is stated that "a wildfire in the vicinity of the site will not continue to propagate onto the Protected Area" without stating the basis for such a statement. Wild fires are known to travel big distances and in the presence of high winds to jump over cleared areas. Please discuss.

(f) Explain the applicability of preliminary screening criterion #2 for external floods as shown in Table 19.1-205.

(g) Include additional "site-specific key assumptions," listed in Table 19.1-205 of the FSAR and in responses to staff RAIs (e.g., regarding external flooding), in Table 19.1-206.

ANSWER:

(a) The definitions of the qualitative screening criteria have been revised on Table 19.1-205 (Sheet 37 of 37).

(b) Subsection 19.1.5 has been revised to link the criteria used to screen out each external event.

(c) Table 19.1-205 has been revised so that the discussion on each screened-out external event is clearly linked to the applied screening criterion.

(d) Table 19.1-205 has been revised to correct the editorial error.

(e) The following provides clarification for applying Criterion #1 and #3 to Table 19.1-205 and for terms such as protected area distance, security area, security zone, security isolation, setback distance,

and combined distance used to describe the overall distance between plant structures and the flame front of a wildfire.

CPNPP Units 3 and 4 are located within a Protected Area as required in 10 CFR 73.55. The perimeter of the Protected Area has a physical barrier that limits access to the Protected Area. The Protected Area perimeter requires an isolation zone (i.e., security zone, security area, or security isolation zone), which is used by the security force for observation and assessment of activities on either side of the Protected Area barrier. For CPNPP Units 3 and 4, the isolation zone begins at the Protected Area perimeter and extends outward for 20 ft to an outer fence and inward (within the Protected Area) for 20 ft. The isolation zone is kept clear to ensure security observation and assessment activities can be accomplished. As a result, this area will be void of any vegetation that could contribute to propagation of a wildfire flame front. The protected area distance refers to the distance between the Protected Area perimeter and a safety-related plant structure.

NFPA 1144 identifies a typical defensible space as 30 ft or more between improved property and a potential wildland fire where combustible materials and vegetation have been removed or modified to reduce the potential for fire on improved property spreading to wildland fuels or to provide a safe working area for fire fighters protecting life and improved property from wildland fire. This distance will begin from the outer fence of the isolation zone and outward into the Owner Controlled Area. For the purposes of this discussion, this defensible space is referred to as the setback distance.

Plant structures containing safety-related equipment are constructed of non-combustible materials such as steel reinforced concrete with fire resistant roof designs to meet the International Building Code (Criterion #1). At CPNPP Units 3 and 4, the closest safety-related buildings to the Protected Area perimeter are the four Essential Service Water (ESW) buildings/Ultimate Heat Sink (UHS) basins located at the north side of each unit. The corners of the farthest east and farthest west UHS water basins are approximately 50 ft from the Protected Area perimeter. Although the UHS basins are safety-related, they consist of a large basin of water located in the ground where a wildfire is not anticipated to adversely affect their integrity or function. The safety-related components of the ESW building are located in the southern half of the building placing them approximately 64 ft farther from the Protected Area perimeter. The overall distance of the setback distance (30 ft), the security isolation zone (20 ft) and the distance the building is from the Protected Area perimeter (approx. 114 ft) is the minimum combined distance (approx. 164 ft) between the closest building and the flame front of a wildfire (Criterion #3). Refer to FSAR Figure 1.2-1R.

Burning embers of a wildfire can spread from one fuel source to another through the fire plume and wind currents. It is expected that hot embers will land on plant structures and within the Protected Area in the event of a wildfire near CPNPP Units 3 and 4. As stated above, the plant structures housing safety-related systems and components are constructed with non-combustible materials that will provide sufficient fire resistance to the burning embers that may contact the structures. The Protected Area is typically limited to small areas of vegetation (lawn and some sparsely placed ornamental trees), which do not represent a large fuel package necessary to sustain a fire that would adversely affect the plant structures housing safety-related systems and components.

Table 19.1-205 has been revised to provide the discussion above.

(f) Flood events were screened out using the quantitative screening criterion. Table 19.1-205 has been revised to provide discussion on how the quantitative screening criterion has been applied.

(g) Site-specific key assumptions regarding external events listed in Table 19.1-205 have been added to Table 19.1-206.

Impact on R-COLA

See attached marked-up FSAR Revision 2 pages

2.4-20	19.1-53	19.1-61	19.1-70	19.1-79
19.1-9	19.1-54	19.1-63	19.1-71	19.1-80
19.1-10	19.1-55	19.1-64	19.1-72	19.1-82
19.1-48	19.1-56	19.1-65	19.1-73	19.1-83
19.1-49	19.1-57	19.1-66	19.1-74	19.1-84
19.1-50	19.1-58	19.1-67	19.1-75	19.1-86
19.1-51	19.1-59	19.1-68	19.1-77	
19.1-52	19.1-60	19.1-69	19.1-78	

Impact on S-COLA

None; this response is site-specific.

Impact on DCD

None

The summary results of the events evaluated to determine the worst potential flood are provided as follows:

- Probable maximum precipitation (PMP) on the total watershed and critical sub-watersheds, including seasonal variations and potential consequent dam failures, with a corresponding water surface elevation of 793.66 ft msl (discussed in Subsection 2.4.3).
- Dam failures, including a postulated domino-type failures of three upstream dams coincident with the Probable Maximum Flood (PMF), with a corresponding water surface level of 760.68 ft msl (discussed in Subsection 2.4.4).
- Two year coincident wind waves with a corresponding water surface level of 810.64 ft msl (discussed in Subsection 2.4.3).

Specific analysis of Brazos River flood levels resulting from ocean front surges, seiches, and tsunamis is not required because of the inland location and elevation characteristics of the CPNPP site. Additional details are provided in Subsections 2.4.5 and 2.4.6. Snowmelt and ice effect considerations are unnecessary because of the temperate zone location of CPNPP. Additional details are provided in Subsection 2.4.3 and Subsection 2.4.7. Flood waves from landslides into reservoirs required no specific analysis, in part because of the absence of major elevation relief. In addition, elevation characteristics of the vicinity relative to the associated water features, combined with limited slide volumes prohibit significant landslide induced flood waves. Additional details are provided in Subsection 2.4.9.

The maximum flood level at CPNPP Units 3 and 4 is elevation 793.66 ft msl. This elevation would result from a PMP on the Squaw Creek watershed, as described in Subsection 2.4.3. Coincident wind waves would create maximum waves of 16.98 ft resulting in a design basis flood elevation of ~~810.87~~810.64 ft msl. CPNPP Units 3 and 4 safety-related plant elevation is 822 ft msl, providing more than 11 ft of freeboard under the worst potential flood considerations. RCOL2_19-17

2.4.2.3 Effects of Local Intense Precipitation

~~CPNPP Units 3 and 4 drainage system was evaluated for the PMP on the local area. The site is graded such that overall runoff will drain away from safety-related structures directly to the SCR. The PMP flood analysis assumes that storm drainage structures within the local area are non-functioning. Computed water surface elevations in the vicinity of safety related structures are below site grade elevation of 822 ft msl. The site grading and drainage plan is shown in Figure 2.4.2-202.~~The effects of local intense PMP at CPNPP Units 3 and 4 are evaluated by performing a site drainage analysis based on the guidelines provided in Regulatory Guide 1.59 and ANSI/ANS-2.8-1992 (Reference 2.4-229) including determination of the maximum water level associated with potential flooding resulting from a storm producing the PMP on the local area. The site is graded such that overall runoff drains away from safety-related structures to onsite ponds RCOL2_02.04.02-2 S01

than the total CDF for internal events and internal flood and internal fire events.

The CDF from tornadoes during LPSD does not contribute more than ten percent of the total shutdown CDF and total shutdown LRF compared to the US-APWR DCD PRA. Tornado event during LPSD does not have significant contribution to risk.

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 insignificant as described in Table 19.1-205. ~~These events meet the preliminary screening criteria of ASME/ANS RA-Sa-2009.~~Bounding analysis show that the CDF from probable maximum flood is below the quantitative screening criterion of 10^{-7}/year. RCOL2_19-17

Transportation and Nearby Facility Accidents

These events consist of the following:

- Hazards associated with nearby industrial activities, such as manufacturing, processing, or storage facilities
- Hazards associated with nearby military activities, such as military bases, training areas, or aircraft flights
- Hazards associated with nearby transportation routes (aircraft routes, highways, railways, navigable waters, and pipelines)

In Subsection 2.2.3.1, design basis events internal and external to the nuclear power plant are defined as those events that have a probability of occurrence on the order of about 10^{-7}/RY or greater and potential consequences serious enough to affect the safety of the plant to the extent that the guidelines in 10 CFR Part 100 could be exceeded. The following categories are considered for the determination of design basis events: explosions, flammable vapor clouds with a delayed ignition, toxic chemicals, fires, collisions with the intake structure, and liquid spills.

The effects of these events on the safety-related components of the plant are insignificant as discussed in Subsection 2.2.3.1. These events meet the preliminary screening criteria of ASME/ANS RA-Sa-2009. The applicable preliminary screening criteria for each events are described in Table 19.1-205. RCOL2_19-17

Aircraft Crash

As described in Subsection 3.5.1.6, the probability of aircraft-related accidents for CPNPP Units 3 and 4 is less than the order of 10^{-7} per year for aircraft, airway,

and airport information reflected in Subsection 2.2. ~~Thus, this event~~This event meets the quantitative screening criteria and is not addressed further. RCOL2_19-17

19.1.5.1.1 Descriptions of the Seismic Risk Evaluation

CP COL 19.3(4) Replace the last sentence of the first paragraph after the first bullet "Selection of review level earthquake" in DCD Subsection 19.1.5.1.1 with the following.

The seismic margin analysis of the DCD is incorporated by reference although the RLE of CPNPP is less than the DCD RLE of 0.5g, which is 1.67 times the SSE (0.3g).

CP COL 19.3(5) Add the following paragraph after the description of the bullet item "Fragility analysis." RCOL2_19-8S01

There are no site specific deviations from the HCLPF values or other assumptions in the seismic margins evaluation provided in the DCD Subsection 19.1.5.1. Seismic fragility will be re-evaluated considering the site-specific designs before the first fuel load. Seismic fragilities of the structures are developed using the methodology in Reference 19.1-204

19.1.5.1.2 Results from the Seismic Risk Evaluation

CP COL 19.3(5) Add the following text at the beginning of DCD Subsection 19.1.5.1.2. RCOL2_19-8S01

The site-specific design that has potential effect on seismic risk is the site-specific UHS.

The UHS is designed with sufficient inventory to provide cooling for at least 30 days following the most limiting design basis accident without makeup water in accordance with the guidance of RG 1.27. No credit is taken for the availability of makeup water during the design basis accident. Therefore, the possibility of loss of CWT function caused by seismic failure of makeup water is negligible.

The design of the UHS consists of reinforced concrete structures that are directly founded on the Glen Rose Formation limestone Layer C, and does not include any earth embankments for side wall support. Additionally, the layout design of the site-specific seismic Category I SSCs ensures that there are no adjacent non-seismic Category I structures that may adversely affect site-specific seismic Category I SSCs including the UHS structures. Accordingly, seismic Category I SSCs are not exposed to the possible impact of a failure or collapse of non-seismic Category I SSCs. Therefore, the presence of the subject retaining

CP COL 19.3(4)

Table 19.1-205 (Sheet 1 of 37)
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.
Nearby Industrial, Transportation and Military ~~f~~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 percent and using the maximum cargo for two trucks determined the safe 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 site~~s~~, 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. ~~These 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~~.	~~1,~~3 3	None	No

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CP COL 19.3(4)

Table 19.1-205 (Sheet 2 of 37)
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.	
			- 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~~3. The frequency of this event is calculated to be $<10^{-7}$ (criterion 6). The chemicals used for the Makeup Water Treatment System are not flammable or explosive.	6			RCOL2_19-17 RCOL2_19-17
			- 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 of explosives to extinguish them. Therefore, the likelihood of utilizing this technique is negligible. ~~Thus, explosions from transportation routes, nearby industrial facilities, on-site explosion hazards and gas wells cannot affect the plant because of the safe distance (criterion 3) or the insignificance of the potential hazards (criterion 1).~~	3			RCOL2_19-17 RCOL2_19-17
	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 s~~g~~quare meters (m^2) and 1 m^2 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.	~~1,~~3	None	No	RCOL2_19-17 RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 3 of 37)
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.
			- Industrial Facilities (2.2.3.1.2.2) There are five possible sources that may release ~~prolpane~~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 m^2 and 1 m^2 were examined for this faciliy. 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 va~~l~~por cloud~~-~~, and the concentrations at the CPNPP Units 3 and 4 site~~s~~ are negligible.	3		
			- 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 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.	3		

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CP COL 19.3(4)

Table 19.1-205 (Sheet 4 of 37)
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.	
			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)	3			RCOL2_19-17
			The closest functioning natural gas well, owned and o~~g~~perated 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 shows that, at the assumed release rate, the area of flammability is less than 0.1 mi downwind from a gas well release. The analysis also shows the overpressure from a gas explosion does not exceed 1 psig at a distance less than 0.1 mi from the cloud. It is concluded that the delayed ignition of va~~g~~por clouds from nearby transportation routes, pipelines, and facilities does not pose a hazard to CPNPP Units 3 and 4.				RCOL2_19-17 RCOL2_19-17 RCOL2_19-17 RCOL2_19-17 RCOL2_19-17 RCOL2_19-17
			~~Thus, flammable vapor clouds from transportation routes, nearby industrial facilities, pipelines and gas wells cannot affect the plant because of the safe distance (criterion 3) or insignificance of the potential hazards (criterion 1).~~				

CP COL 19.3(4)

Table 19.1-205 (Sheet 5 of 37)
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.
	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 main control room habitability are discussed in Section 6.4.	1	None	No
			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 main 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 main control room habitability analysis in Section 6.4.	1	None	No
	~~Toxic Chemicals~~	~~2.2.3.1.3~~ ~~6.4.4.2~~				

RCOL2_19-17

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Table 19.1-205 (Sheet 6 of 37)
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.
			- 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. ~~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 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. Thus, the main control room is habitable for toxic chemicals from mobile or stationary sources because no hazardous chemical concentration in the main control room exceeds the criteria of RG 1.78 (criterion 1).			

RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 7 of 37)
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.
	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 awa~~ll~~y from any potential accident location.	1, 3	None	No
			The nuclear island is situated sufficiently clear of trees and brush. The distance exceeds the minimum fuel modification area re~~q~~quirements of 30 ft. per NFPA-1144. NFPA 1144 minimum setback distance in the Owner Controlled Area (OCA) will be procedurally maintained. Also, the OCA adjacent to the isolation zone will be cleared of any concentration of vegetation for security reasons as well. There is no threat from brush or forest fires. Based on the CPNPP Units 3 and 4 site configuration, the Protected Area distance from the perimeter fence to the power block, the security isolation zone of 20 feet and the setback distance in accordance with the guidance in NFPA 1144 of minimum 30 feet, a wildfire in the vicinity of the site will not continue to propagate onto the Protected Area. Furthermore, this combined distance will ensure that the power block will not experience temperatures from a wildfire that would affect the CDF established in the PRA.			

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Table 19.1-205 (Sheet 8 of 37)
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.
			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 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 .			

RCOL2_19-17

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Table 19.1-205 (Sheet 9 of 37)
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.
			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. ~~Thus, fire and smoke from accidents at nearby facilities and transportation routes, forest or brush fires, and on-site fuel storage facilities can not affect the plant because of the safe distance from (criterion 3) or the insignificance of the potential hazards (criterion 1).~~Plant structures containing safety-related equipment are constructed of non-combustible materials such as steel reinforced concrete with fire resistant roof designs to meet the International Building Code (Criterion 1). At CPNPP Units 3 and 4, the closest safety-related buildings to the Protected Area perimeter are the four Essential Service Water Buildings (ESW)/Ultimate Heat Sink (UHS) Basins located at the north side of each unit. The corners of the farthest east and farthest west UHS water basins are approximately 50 ft from the Protected Area perimeter. Although the UHS basins are safety-related, they consist of a large basin of water located within the ground where a wildfire is not anticipated to adversely affect their integrity or function. The safety-related components of the ESW Building are located in the southern half of the building placing them farther from the Protected Area perimeter. This distance is approximately 64 ft farther into the protected Area. The overall distance of the set back distance (30 ft), the security isolation zone (20 ft) and the distance the building is from the Protected Area perimeter (approx. 114 ft) is the minimum combined distance (approximately 164 ft) between the closest building and the flame front of a wildfire (Criterion 3). Refer to FSAR Figure 1.2-1R.			

RCOL2_19-17

RCOL2_19-17

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Table 19.1-205 (Sheet 10 of 37)
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.	
	Collision with Intake Structure	2.2.3.1.5 2.4.8	The ESWS and the CWS draw ~~make up~~ water from the intake structure on Lake Granbury. The ESWS is supplied with water from the ultimate heat sink (UHS) and returns water to the UHS. The UHS is designed to assure sufficient cooling water inventory to mitigate the consequences of a design basis accident for a minimum of 30 days without makeup. The intake structure is not safety related. Thus, collision with the intake structure is of equal or lesser damage potential than the events for which the plant has been designed, bounded by the impact from Loss of Cooling Water Reservoirs (criterion 1).	1	None	No	RCOL2_19-17 RCOL2_19-17
	~~Liquid~~Liquid spills	2.2.3.1.6	The accidental release of petroleum products into Lake Granbury, the most likely material released, would not affect operation of the plant. The normal water level in Lake Granbury is El. ~~696~~693.00 ft, with the pump intake screen at 656.00 ft. Liquids with a specific gravity less than unity, such as petroleum products, would float on the surface of the lake and are not likely to be drawn into the makeup water system. Liquids with a specific gravity greater than unity would disperse and be diluted before reaching the pump intake (criterion 3). ~~Thus~~Furthermore, liquid spills ~~cannot affect the plant because no potential for it to be~~ drawn into the makeup water system~~.~~ are bounded by the impact from complete Loss of Cooling Water Reservoirs (criterion 1).	1, 3	None	No	RCOL2_19-17 RCOL2_19-17 RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 11 of 37)
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.
	Aircraft Hazards	3.5.1.6	Thus, the probability of aircraft-related hazards for CPNPP Units 3 and 4 is less than 10-7 per year (criterion ~~2~~6). There are no commercial airports within 5 mi of CPNPP site. Only one military training route, Victor air route VR-158, passes within 10 mi of CPNPP site. The probability of an aircraft crashing into the plant (PFA) is estimated in the following manner: $PFA = C \times N \times A/w$ Where C = In-flight crash rate per mile for aircraft using the airway (4×10^{-10}) w = Width of airway, plus twice the distance from the airway edge to the site, conservatively provided in statute miles, equals 10 statute miles + (2 x 2 statute miles) N = Estimated annual number of aircraft operations A = Effective area of plant in square miles (0.0907) In order to maintain PFA less than the order of 10^{-7} , the above equation is rearranged to solve for N using values of C, A, and w given above: $N = PFA / (C \times A/w)$ = 19,300 operations per year	~~2~~6	$<10^{-7}$	No

RCOL2_19-17

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Table 19.1-205 (Sheet 12 of 37)
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 annual number of aircraft operations on military training route VR-158 are less than 19,300 operations per year. Thus the probability of aircraft-related hazards for CPNPP Units 3 and 4 is less than 10^{-7} per year (criterion ~~2~~6).			
	Site Proximity Missle	3.5.1.5	Externally initiated missiles considered for design are based on tornado missiles as described in DCD Subsection 3.5.1.4. As described in Section 2.2, no potential site-proximity missile hazards are identified except aircraft, which are evaluated in Subsection 3.5.1.6. Thus, no site proximity missile hazard is identified (criterion 3).	3	None	No
	Turbine Missile	3.5.1.3.1 3.5.1.3.2	The CPNPP site plan shows the location of CPNPP Units 3 and 4 is such that no postulated low trajectory turbine missiles from CPNPP Units 1 and 2 can affect CPNPP Units 3 and 4 ~~(Criterion 3)~~. The probability of of turbine missile accidents for CPNPP Units 3 and 4 is less than 10^{-7} per year is analyzed in FSAR Subsection 3.5.1.3.2. Mathematically, *P4 = P1 x P2 x P3*, where RG 1.115 considers an acceptable risk rate for *P4* as less than 10^{-7} per year. For unfavorably oriented T/Gs determined in Subsection 3.5.1.3, the product of *P2* and *P3* is estimated as 10^{-2} per year, which is a more conservative estimate than for a favorably oriented single unit. 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. CPNPP Units 3 and 4 procedures will require inspection intervals and a turbine valve test frequency to maintain *P1* within acceptable limits. The acceptance risk rate *P4 = P1 x P2 x P3* is therefore maintained as less than the frequency of Tornado Missiles, 10^{-7} per year (criterion ~~2~~6).	~~2, 3~~6	$<10^{-7}$	No

RCOL2_19-17 RCOL2_19-17 RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 13 of 37)
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.
Meteorology	Hurricanes	2.3.1.2.2	The Gulf of Mexico and the Atlantic Coast areas are the most susceptible to tropical cyclones. The number of ~~trogical~~tropical storms passing within 50 statute mi of the CPNPP site are listed on Table 2.3-208 and shown on Figure 2.3-213. These data, obtained from the NOAA Coastal Services Center, show that only one hurricane, in 1900, passed within 50 mi of the site during the period 1851 ~~-~~–2006. After a hurricane or tropical storm makes landfall, it begins to break apart, although remnants of the storm can continue moving inland. These remnants have been known to bring heavy precipitation, high winds, and tornadoes to locations near the CPNPP Site. Tropical cyclones including hurricanes lose strength rapidly as they move inland, and the greatest concern is potential damage from winds or flooding due to excessive rainfall. Figure 2.3-214 shows the decay of tropical cyclone winds after landfall. As seen, only the fastest moving storms will maintain any significant wind speed by the time they reach the CPNPP site. From this figure, a tropical cyclone with 86 mph winds traveling at 18 mph will have dissipated to less than 40 mph at the CPNPP site. The Probable Maximum Hurricane (PMH) for the CPNPP site, the PMH sustained (10-minute average) wind speed at 30 ft aboveground is 81 mph.	1	None	No

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Table 19.1-205 (Sheet 14 of 37)
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 determination of the frequency that hurricanes, with wind speed above 90 mph, could reach the CPNPP site depends on the frequency of hurricanes striking this section of the Texas coast, the hurricane wind speed at landfall, the attenuation of wind speed while traveling inland, and the probability of a hurricane striking the CPNPP site. As stated in FSAR Subsection 2.3.1.2.2, thirty-nine tropical storms or hurricanes have struck the Texas coast between 1899 through 2006. For major hurricanes (Category 4 or higher), the return period is ~~17.7~~12.5 yr (annual frequency of ~~5.7~~8x10^{-2}). The minimum wind speed for a Category 4 hurricane on the Saffir/Simpson scale is 131 mph. FSAR Figure 2.3-212 gives the number of hurricanes as a function of wind speed. These results were based on the entire U. S. coast not only the Gulf coast. As expected, the hurricane frequency of occurrence decreases as wind speed increases. ~~This figure gives a return period of 1000 years f~~For a wind speed of ~~175~~125 knots (~~204~~144 mph) the return period is given as 10 yr. The shape of the wind speed versus return period curve in Figure 2.3-212 shows that there is a maximum probable wind speed. This has been investigated by Jagger and Elsner (Reference 19.1-202) who determined that the maximum possible near-coastal hurricane wind speed is estimated to be 183 kt (211 mph) using a maximum likelihood approach and 208 kt (240 mph) using a Bayesian approach. The Gulf coast model presented in this paper gives a mean 1000-year return level of 173 kt (199 mph) with a 95% confidence limit of 191 kt (220 mph). In the following evaluations, the hurricane wind speed will be assumed to be the maximum possible wind speed of 240 mph with a recurrence interval of zero.			

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Table 19.1-205 (Sheet 16 of 37)
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.
			Assuming a maximum landfall wind speed or 208 kt (~240 mph), a translational velocity of 16 kt (18.4 mph), and a distance of 400 miles from the CPNPP site to Galveston, gives a maximum possible wind speed of 61 mph at the CPNPP site. This should be considered as the upper bound of possible hurricane wind speed at the CPNPP site. Only one hurricane, in 1900, passed within 50 mi of the site during the period 1851 – 2006. This gives a frequency of 1/156 yr = 6.4×10^{-3} per yr of a hurricane striking the CPNPP site. As shown above, the probability of a major hurricane striking the Texas coast is small (~~5.7~~8x10^{-2} per year) and the probability of a major hurricane passing within 50 miles of the CPNPP site is also small (6.4×10^{-3} per yr). Even if a major hurricane is assumed to strike the CPNPP site, the maximum wind speed would be 61 mph based on the maximum possible hurricane landfall wind speed. Therefore, hurricane winds can be screened out as not risk significant because the frequency of hurricanes reaching the CPNPP site with a wind speed above 90 mph is exceedingly small and thus bounded by the potential damage from the Tornado Missiles spectrum that the US-APWR is designed to withstand (criterion 1).			

RCOL2_19-17

RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 17 of 37)
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.	
	Tornadoes	2.3.1.2.3	The tornadoes reported during the years 1950-2006 in the vicinity of the site (Bosgue, Erath, Hood, and Johnson Counties) are shown in Tables 2.3-209 and 2.3-210. During this period, a total of 158 tornadoes touched down in these counties that have a combined area of 3414 sq mi. These local tornadoes have a mean path area of 0.21 sq mi excluding tornadoes with a zero length or without a length specified. The site recurrence frequency of tornadoes can be calculated using the point probability method as follows: Total area of tornado sightings =3414 sq mi Average annual frequency =158 tornadoes/56. 58 yr =2.79 tornadoes/yr Annual frequency of a tornado striking a particular point P =([0.21 mi2/tornado] [2.79 tornadoes/yr])/3414 sq mi = 0.00017 yr-1 Mean recurrence interval =1/P =5883 yr	~~No screening~~ Not screened - (bounding analysis conducted)	Close to 10^{-7}	Yes (Section 19.1.5)	RCOL2_19-17 RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 18 of 37)
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 corresponding expected maximum tornado wind speed and upper limit (95 percentile) of the expected wind speed based on a 2 degree longitude and latitude box centered on the CPNPP site are given below with the associated probabilities. Probability — Expected maximum tornado wind speed (mph) — Upper limit (90 percent) of the expected tornado wind speed (mph) 10-5 — ~~133~~141 — ~~139~~146 10-6 — ~~171~~178 — ~~177~~184 10-7 — 205 — ~~212~~217 The design basis tornado parameters used in the design and operation of CPNPP are based on Revision 1 of Regulatory Guide 1.76. For Region I, as described in RG 1.76, the design parameters are listed below: Translational Speed 46 mph (21 meter/sec) Rotational Speed 184 mph (82 meters/sec) Maximum Wind Speed (sum of the translational and rotational speed) 230 mph (103 meters/sec) Radius of Maximum Rotational Speed 150 ft (45.7 meters) Maximum Pressure Drop 1.2psi (83mb) Rate of Pressure Drop .5psi/sec (37mb/sec)			

RCOL2_19-17

RCOL2_19-17

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Table 19.1-205 (Sheet 19 of 37)
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.	
			Compliance with Regulatory Guide 1.76 is discussed in Section 1.9. Tornado loadings are discussed in Subsection 3.3.2. It is easily lost when stand alone. This event is not screened out. Perform a bounding analysis.				
	Thunder-storm~~s~~	2.3.1.2.4	Thunderstorms, from which damaging local weather can develop (tornadoes, hail, high winds, and flooding), occur about ~~eight~~16 days each year based on data from the counties surrounding the site. The maximum frequency of thunderstorms and high wind events occurs from April to June, while the months from November through February have few thunderstorms. The ~~monthly and regional~~ distributions of thunderstorms and high wind events by county are displayed in Table 2.3-211. ~~Thus, thunder storms cannot affect the plant because of the insignificance of the potential hazards (criterion 1) and the impact is less than hurricanes or tornadoes (criterion 4).~~Impacts (criterion 1) and design criteria (criterion 4) from thunderstorms at CPNPP are bounded by and included in the tornado design criteria	1, 4	Not determined	No	RCOL2_19-17 RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 20 of 37)
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.	
	Lightning~~s~~	2.3.1.2.5	The annual mean number of thunderstorm days in the site area is conservatively estimated to be 48 based on interpolation from the isokeraunic map; therefore it is estimated that the annual lightning stroke density in the CPNPP site area is 25 strikes/~~sg~~sq mi/yr. Recent studies based on data from the National Lightning Detection Network (NLDN) indicate that the above strike densities are upper bounds for the CPNPP site. ~~The lightning cannot affect the plant because of the insignificance of potential hazards (criterion 1), and the impact is less than that of hurricanes and tornadoes (criterion 4).~~Impacts from lightning (criterion 1) and design criteria (criterion 4) for lightning at CPNPP are bounded by and included in the definition for hurricanes (and therefore tornado) design criteria.	1, 4	None	No	RCOL2_19-17 RCOL2_19-17 RCOL2_19-17
	Hail~~s~~	2.3.1.2.6	Almost all localities in Texas occasionally experience damage from hail. While the most commonly reported hailstones are 1/2 to 3/4 inch in diameter, hailstones 3 to 3-1/2 inch in diameter are reported in Texas several times a year. Fortunately, recurrence of damaging hail at a specific location is very infrequent. The ~~monthly and seasonal breakdown~~total number of large-hail occurrences (3/4 in diameter or larger) for the fire county area around the CPNPP site is given in Table 2.3-212. ~~Hail cannot affect the plant because of the insignificance of the potential hazard (criterion 1). Also, the impact is less than from hurricanes or tornadoes (criterion 4).~~The impact from hail is bounded by the tornado missile spectrum design criteria for CPNPP (criterion 1) and is included in the definition for hurricanes (and therefore tornado) (criterion 4).	1, 4	None	No	RCOL2_19-17 RCOL2_19-17 RCOL2_19-17

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Table 19.1-205 (Sheet 21 of 37)
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.	
	Air Pollution Potential	2.3.1.2.7 6.4.4.2	The Clean Air Act, which was last amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set National Air Quality Standards for pollutants considered harmful to the Public health and the environment. The EPA Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards for six principle pollutants, which are called "Criteria" pollutants. The newly promulgated EPA 8-hour ozone standard (62 FR 36, July 18, 1997) is 0.08 ppm in accordance with 40 CFR 50.10 (Reference 2.3-226). Somervell County is in attainment for all criteria pollutants (carbon monoxide, lead, nitrogen dioxide, particulate matter ([PM_{10}, particulate matter less than 10 micron], [$PM_{2.5}$, particulate matter less than 2.5 micron]), ozone, and sulfur oxides. The main control room is designed according to the habitability criteria defined in RG 1.78 (criterion 1).	1~~, 4~~	None	No	RCOL2_19-17 RCOL2_19-17

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Table 19.1-205 (Sheet 22 of 37)
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 ventilation rate is a significant consideration in the dispersion of pollutants. Higher ventilation rates are better for dispersing pollution than lower ventilation rates. The atmospheric ventilation rate is numerically equal to the product of the mixing height and the wind speed within the mixing layer. Conditions in the region generally favor turbulent mixing. Two conditions which reduce mixing, increasing the air pollution potential, are surface inversions and stable air layers aloft. The surface inversion is generally a short-term effect and surface heating on most days creates a uniform mixing layer by mid-afternoon. The air stagnation trend for this general area is negative (Figure 2.3-246) over the 50-yr period of record. Thus, air pollution is not a significant site hazard (criterion 1)~~, and is less severe than the impact from toxic chemicals (criterion 4)~~.				RCOL2_19-17
	Precipitation	2.3.1.2.8 2.3.2.1.5 3.8.4.3.4.2	Probable Maximum Precipitation (PMP), sometimes called maximum possible precipitation, for a given area and duration is the depth which can be reached but not exceeded under known meteorological conditions. For the site area, using a 100-yr return period, the PMP for 6, 12, 24, and 48 hours is 6.9, 8.3, 9.5, and 11.0 in, respectively (Table 2.3-217).	1	None	No

RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 23 of 37)
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 annual average and maximum 24-hour snowfall for these stations are given below: ~~Annual Average Maximum 24-hr Snowfall (in) and Yr Snowfall (in)~~ Annual Average Snowfall (in) / Maximum 24-hr Snowfall (in) and Yr Fort Worth 2.5 12.1 (1964) Dallas Love Field 1.7 6.0 (1978) Mineral Wells 1.8 4.0 (1978) Glen Rose 1.8 4.5 (1973) To estimate the weight of the 100-yr snowpack at the CPNPP site, the maximum reported snow depths at Dallas Fort Worth Airport were determined. Table 2.3-202 shows that the greatest snow depth over the 30-yr record is 8 in. The 100-yr recurrence snow depth is 11.2 in using a factor of 1.4 to convert from a 30 yr recurrence interval to 100-yr interval. In the CPNPP site area, snow melts and/or evaporates quickly, usually within 48 hours, and does so before additional snow is added; thus, the water equivalent of the snowpack can be considered equal to the water equivalent of the falling snow as reported hourly during the snowfall. A conservative estimate of the water equivalent of snowpack in the CPNPP site area would be 0.20 in of water per inch of snowpack. Then, the water equivalent of the 100-yr return snowpack would be 11.2 in snowpack x 0.2 in water equivalent/inch snowpack =2.24 in of water. The 100-yr return period snow and ice pack for the area in which the plant is located, in terms of snow load on the ground and water equivalent, is listed below: • Snow Load =11.7 lb/ft^2 • Ice Load =5.06 in * 5.20 lb/ft^2/in =26.1 lb/ft^2			

RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 24 of 37)
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.	
			As stated in the US-APWR DCD Subsection 3.4.1.2, if PMWP was to occur, US-APWR safety-related systems and components would not be jeopardized. US-APWR seismic category I building roofs are designed as a drainage system capable of handling the probable maximum winter precipitation (PMWP). The US-APWR DCD also states that seismic category I structures have sloped roofs designed to preclude roof ponding. This is accomplished by channeling rainfall expeditiously off the roof. Also in subsection 3.4.1.2, the design-basis flooding level (DBFL) listed in Section 2.4, and adequate sloped site grading and drainage prevents flooding caused by probable maximum precipitation (PMP) or postulated failure of non safety-related, non seismic storage tanks located on site. Thus, ~~precipitation cannot affect the plant because of the insignificant potential hazard~~the US-APWR design criteria bound the static and dynamic loadings (criterion 1).				RCOL2_19-17 RCOL2_19-17
	Dust Storms	2.3.1.2.9	Blowing dust or sand may occur occasionally in West Texas where strong winds are more ~~frequent~~frequent and vegetation is sparse. While blowing dust or sand may reduce visibility to less than five mi over an area of thousands of ~~eg~~sq mi, dust storms that reduce visibility to one mi or less are quite localized and depend on soil type, soil condition, and vegetation in the immediate area. The NCDC Storm Event database did not report any dust storms in Somervell County between January 1,1950 and August 31,2007. ~~Thus, dust storms cannot affect the plant because of the insignificant potential hazard (criterion 1).~~Furthermore, atmospheric particulate resulting from dust storms will have a minimal effect in comparison to missiles considered in the tornado missile spectrum for the US-APWR (criterion 1).	1	None	No	RCOL2_19-17 RCOL2_19-17 RCOL2_19-17

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Table 19.1-205 (Sheet 25 of 37)
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.
	Ultimate Heat Sink	2.3.1.2.10 2.3.2.1.3	The performance of the ultimate heat sink is discussed in Subsection 9.2.5. The wet bulb design temperature for the ultimate heat sink was selected to be 80°F based on 30 yr (1977 -2006) of climatological data obtained from National Climatic Data Center/National Oceanic and Atmospheric Administrator for Dallas/Fort Worth International Airport Station in accordance with RG 1.27. The worst 30 day period was selected from the above climatological data between June 1, 1998 and June 30, 1998, with an average wet bulb temperature of 78.0°F. A 2°F margin was added to the maximum average wet bulb temperature for conservatism. These are not significant impact to ultimate heat sink.	1	None	No
	Extreme Winds	2.3.1.2.11 3.3.1.1	Estimated extreme winds (fastest mile) for the general area based on the Frechet distribution are: Return Period (y~~i~~ear) — Wind Speed (mi per hr) 2 — 51 10 — 61 50 — 71 100 — 76 Fastest mile winds are sustained winds, normalized to 30 ft above_ground and include all meteorological ~~ghenomena~~phenomena ~~exceg~~except ~~tornadoes~~tornados.	1, 4	None	No

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CP COL 19.3(4)

Table 19.1-205 (Sheet 26 of 37)
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 design wind has a basic speed of 155 mph, corresponding to a 3-second gust at 33 ft above ground for exposure category C (open terrain). For all seismic category I and II SSCs, the basic wind speed is multiplied by an importance factor of 1.15 correlating to essential facilities in hurricane-prone regions as defined in ASCE/SEI 7-05 Tables 1-1 and 6-1. Site-specific structures, systems, and components (SSCs) are designed using the site-specific basic wind speed of 90 mph, or higher. Therefore, the maximum wind speed by extreme winds is not greater than the F-scale intensity F1 of tornadoes for CPNPP. Also all seismic category I and II SSCs including fire suppression systems are designed for the wind load and are not damaged by the extreme winds. Although only loss of offsite power is the hazardous potential by extreme winds, it is considered as the loss of offsite power (LOOP) event for internal event PRA as weather-related LOOP. Thus, extreme winds are insignificant potential hazards bounded by the impact and design criteria for tornadoes (criteria 1 and 4).			

RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 27 of 37)
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.
	Surface Winds	2.3.2.1.2	Annually, the prevailing surface winds in the region are from the south to southeast while the average wind speed is about 10 mi per hour (mph) based on-site data from ~~2001 through 2006~~2001-2004 and 2006. As shown on Figures 2.3-208 through 2.3-210, the annual resultant wind vectors for the Dallas Fort Worth Airport, Mineral Wells, and CPNPP are 149°, 138°, and 153°, respectively. The annual average wind speeds for Dallas Fort Worth Airport, Mineral Wells, and CPNPP are 10.3, 9.0, and 9.8 mi per hour, respectively. In winter there is a secondary wind direction maximum from the north to northwest due to frequent outbreaks of polar air masses (Figures 2.3-274 and 2.3-306). Monthly and seasonal wind roses for the lower level CPNPP data are provided on Figures 2.3-278 through 2.3-293. On a monthly basis, these figures show the dominant south south-southeast wind direction. The seasonal wind rose plots show a significant additional north and north-northwest component in the winter and fall. The annual wind rose plot for CPNPP is provided on Figure 2.3-210. Monthly and seasonal wind roses for the upper level CPNPP data are provided on Figures 2.3-294 through 2.3-309. On a monthly basis, these figures show the dominant south-southeast wind direction. The seasonal wind rose plots show that the only significant north and north-northwest component is in the winter. The annual wind rose plot for CPNPP is provided on Figure 2.3-310. Thus, surface winds cannot severely affect the plant because of the insignificant potential hazards in comparison to dynamic loads resulting from tornadoes (criterion 1).	1	None	No

RCOL2_19-17

RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 28 of 37)
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 2.4.10 3.4	The maximum flood level at CPNPP Units 3 and 4 is elevation 793.66 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 ~~4.59~~16.98 ft (trough to crest), resulting in a maximum flood elevation of 810.64 ft msl. CPNPP Units 3 and 4 safety-related plant elevation is 822 ft msl, providing more than 11 ft of freeboard under the worst potential flood considerations. The Probable Maximum Precipitation (PMP) distributions used as input to the determination of the Probable Maximum Flood (PMF) for the CPNPP Units 3 and 4 were developed using Hydrometerological Report (HMR) 51 and HMR 52. The PMP distributions were calculated for the following scenarios: • Overall PMP for storm centers within the Squaw Creek watershed • Overall PMP for storm centers within the Paluxy River watershed • Squaw Creek Reservoir PMP for storm centers within the Squaw Creek watershed.	1, ~~2~~6	~~$<10^{-7}$~~	No

RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 30 of 37)
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.
			Therefore, the frequency of a PMP of 25 inches over a 10 square mile is estimated to be 1.4 X 10^{-7} per year. This is a conservative estimate of the frequency of the PMP that results in a PMF for CNNPP Units 3 and 4 because additional periods of significant rainfall must also occur in close temporal proximity to the 25-inch 6-hour rainfall event. Given the calculated PMF is not projected to reach the safety-related elevation of the plant (criterion 1) and the estimated PMP and PMF frequency of 1. 4 X 10^{-7}/year, the frequency of a flooding event that would reach the safety-related elevation of the plant is projected to be well below 10^{-7} per year. Note considering that safety related systems will be available during the PMF the Conditional Core Damage Probability (CCDP) given the maximum PMF is < .01. Therefore, the CCDF for PMF is well below the screening criteria of 10^{-7} (criterion ~~2~~6).			

RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 31 of 37)
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.
	Probable Maximum Flood	2.4.3 2.4.10 3.4	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 793.66 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 810.64 ft msl. The top elevation of the retaining wall is 795 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. Thus, the probable maximum flood cannot affect the plant because of the insignificance of the potential hazards (criterion 1) and the frequency of the PM~~P~~F is less than 10^{-7} per year (criterion 2).	1, ~~2~~6	$< 10^{-7}$	No

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RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 32 of 37)
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 retaining wall is located approximately 555 ft. northeast from the center point of CPNPP Unit 3 on the slopes of the Squaw Creek Reservoir. Above the retaining wall, a 2:1 (horizontal to vertical) slope continues up to elevation 820 ft. The coincident wind wave activity analysis result is based on the run up on a continuous vertical wall. Comparative analysis for run up on adjacent slopes concludes it is conservative to assume that run up above the top elevation of the retaining wall rises vertically, because run up evaluated for the 2:1 slope would result in a lower elevation. It is assumed that the PMF with coincident wind wave activity elevation of 810.64 ft is applicable to the entire rim of the Squaw Creek Reservoir. The estimated frequency of a PMF capable of reaching the plant grade elevation is estimated to be less than 10-7 per year. Consideration of the maximum coincident wind wave activity along with the PMF would tend to lower the overall frequency. Note that the CDF resulting from an PMF is two orders of magnitude lower for this initiating event (criterion 6). This CDF estimate is derived from the CCDP (conditional damage failure probability) for an event in which all non-safety systems are lost (while only crediting *Safety Related Facilities*).			

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CP COL 19.3(4)

Table 19.1-205 (Sheet 33 of 37)
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.
	Dam Failures	2.4.4 2.4.8	Qualitative analysis considers both existing and future conditions and is performed based on comparison of distance from the confluence of the Paluxy River with the Brazos River, reservoir storage, dam height, and drainage area. Domino-type failures and simultaneous failures are postulated when applicable. The qualitative analysis resulted in two potential scenarios that were evaluated further by quantitative analysis. The quantitative analysis results in the critical dam failure event of the assumed domino-type failure of Fort Phantom Hill Dam, the proposed Cedar Ridge Resevoir, Morris Sheppard Dam, and De Cordova Bend Dam. In addition, Lake Stamford Dam is assumed to fail simultaneous with the Cedar Ridge Reservoir Dam. Dam failures are assumed coincident with the PMF. The resulting water surface elevation at the confluence of the Paluxy River and the Brazos River is ~~760.71~~760.02 ft. CPNPP Units 3 and 4 safety-related facilities are located at elevation 822 ft. There are no safety-related structures that could be affected by flooding due to dam failures. Thus, there are no safety-related structures that could be structurally affected by flooding due to dam failures because the displacing inventory released from a dam failure upstream of CPNPP would be sufficiently dispersed and retained in the remaining reservoir holdup volumes (~~criteria 1 and~~criterion 3). Furthermore, the resulting impact from a dam failure on safety-related systems relying on the heat sink are bounded by a loss of makeup accident.	1, 3	None	No

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RCOL2_19-17

RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 35 of 37)
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.	
	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 ~~793.66~~810.64 ft msl, which is more than ~~28~~11 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. Thus, ice effects cannot affect the plant because of the location (criterion 3).	3	None	No	RCOL2_19-17
	Cooling Water Canals and Resevoirs	2.4.8 2.4.9	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 dependent on a stream, river, estuary, lake, or ocean ~~(criterion 3)~~. The UHS has the capacity to remove heat for at least 30-days in the instance of the (bounding) event of loss of makeup (criterion 1).	~~3~~1	None	No	RCOL2_19-17 RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 36 of 37)
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.	
	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.	~~3~~1	None	No	RCOL2_19-17
			~~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 (criterion 3).~~ The UHS has the capacity to remove heat for at least 30-days in the instance of the (bounding) event of loss of makeup (criterion 1).				RCOL2_19-17
	Low Water	2.4.8 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 (criterion 3). The UHS has the capacity to remove heat for at least 30-days in the instance of the (bounding) event of loss of makeup (criterion 1).	~~3~~1, 5	None	No	RCOL2_19-17

CP COL 19.3(4)

Table 19.1-205 (Sheet 37 of 37)
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.	
	Groundwater	~~2.4.12~~2.4.3 2.4.10 2.4.12 3.4	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. ~~Thus, ground water cannot affect the plant because of its location (criterion 3).~~ Rainfall data presented was collected from the Opossum Hollow rain gauge located approximately 3.4-mi southwest of the CPNPP Unit 3 and 4 site. Overall, the hydrographs show that water levels in the deeper Glen Rose Formation (C-Zone) do not fluctuate and remain at a constant level near the base of the well or depict a steadily increasing water level, indicating the wells were dry (no groundwater infiltration into the well) or exhibiting slow recharge with the static water level not in equilibrium with the groundwater within the formation (criterion 6).	~~3~~6	None	No	RCOL2_19-17 RCOL2_19-17

NOTES
(1) Screening criteria categories
"1" ~~Lower damage potential than a design basis event~~ The event is of equal or lesser damage potential than the events for which the plant has been designed
"2" ~~Lower event frequency of occurrence than another event~~ The event has a significantly lower frequency than another event and cannot result in worse consequences than this other 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 an adequate response
"6" Meets the quantitative screening criteria < 10^{-7}/year

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CP COL 19.3(4)
CP COL 19.3(5)

Table 19.1-206 (Sheet 2 of 2)

Site-specific Key Assumptions

RCOL2_19-8 S01

Key Insights and Assumptions	Disposition	
The elevation of pumping equipment and cooling fans are higher than the elevation of the basin wall and the ground elevation, and are enclosed by a concrete wall. The pumping equipment and cooling fans are protected from flooding due to the failure of the non-seismic intake piping to the UHS.	FSAR 3.8.4.1.3.2	RCOL2_19-8 S01
NFPA 1144 minimum setback distance in the Owner Controlled Area will be procedurally maintained. Also, the Owner Controlled Area adjacent to the isolation zone will be cleared of any concentration of vegetation for security reasons.	FSAR 9.5 NFPA 1144 minimum setback distance will be procedurally maintained	
Administrative control will be in place to ensure that the truck bay entrance of the reactor building is closed when a tornado is nearby or source of high wind is forecast for the immediate area.	FSAR 13.5	
Adequate sloped site grading and drainage prevents flooding caused by probable maximum precipitation (PMP) or postulated failure of non safety-related, non seismic storage tanks located on site.	FSAR 3.4.1.2	RCOL2_19-17
All seismic Category 1 buildings and structures below-grade are protected against the effects of flooding, including ground water.	FSAR 3.4.1.2	RCOL2_19-17

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.: 6045 (CP RAI #232)

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

QUESTIONS for PRA and Severe Accidents Branch (SPRA)

DATE OF RAI ISSUE: 10/7/2011

QUESTION NO.: 19-18

The staff's review of Revision 2 of the CPNPP Units 3 and 4 FSAR Chapter 19 identified several areas that lack clarity, such as the following:

(1) On page 19.1-3, Tables 19.1-2 and 19.1-23 are referenced but no tables are included in the report. Please clarify.
(2) Table 19.1-204, was included which lists important basic events related to the site-specific design. The FSAR must also list, or clearly describe, important basic events listed in the referenced US-APWR DCD that are not part of the site-specific design.
(3) Table 19.1-119R "Key Insights and Assumptions" is not mentioned anywhere in the FSAR. Since the site-specific "Key Insights and Assumptions" are summarized in Table 19.1-206, please clarify how Table 19.1-119R compares to the corresponding US-APWR DCD table.
(4) Clarify the following sentence on page 19.1-4 in Section 19.1.5: "At first, qualitative screenings are performed because they are easy to obtain lower risk from advanced reactors design features or site characteristics."
(5) Table 19.1-205 (on page 19.1-48) describes the design basis event as "...materials with TNT equivalency of 2.24 ..." Please clarify.

ANSWER:

(1) DCD Tables 19.1-2 and 19.23 are incorporated by reference (IBR) in FSAR Subsection 19.1.4.1.2.

(2) Since the numerical changes to the importance values of the standard design SSCs is negligible, DCD tables that provide a list of important basic events (DCD Tables 19.1-30 through 19.1-37) are IBR. FSAR Subsection 19.1.4.1.2 has been revised to make clear that the basic event importance documented for the standard US-APWR design is negligible and the only changes to basic event importance are those related to the site-specific design.

(3) FSAR Subsection 19.1.7.1 has been revised to reference Table 19.1-119R.

(4) The sentence has been revised to read "At first, qualitative screenings are performed."

(5) Table 19.1-205 (Sheet 1 of 37) has been revised to read "materials with TNT equivalency of 224 percent...."

Impact on R-COLA

See attached marked-up FSAR Revision 2 pages 19.1-3, 19.1-4, 19.1-12, and 19.1-48.

Impact on S-COLA

None; this response is site-specific.

Impact on DCD

None

degradation of heat release from the ESWS to the atmosphere, which would result increase of the ESWS temperature in the faulted train. Failure of both fans in a single CTW train is considered a potential failure mode of the ESWS.

Failures of CTW fans were modeled in ESWS fault tree to address the effect of site-specific UHS. The reliability of ESWS affects both the initiating event frequency of loss of CCW and the reliability of ESWS after the initiating event. Therefore, the initiating event frequency given later in this subsection based on the US-APWR design was re-quantified based on the site-specific ESWS designs along with re-quantification of post-initiating event ESWS reliability.

Assumptions and important design features regarding the UHS and ESWS are as follows:

- A drain line is provided as an overfill protection from overfilling the basin and failing the pump(s).
- There are adequate low-level and high-level alarms to provide rapid control room annunciation of a level problem and to allow adequate time to confirm the level and take effective action to address it.
- On failure of the fans during normal plant operation, operating status of each fan is indicated in the main control room (MCR).
- Should the plant trip, two basins are effective in removing decay heat for more than 24 hours without replenishment or transferring water from another basin.
- The transfer line is a high integrity line, regularly tested and inspected for corrosion.
- Failure of the transfer line will not drain any CTW basin.
- The basin water is tested regularly and maintained in a condition to preclude corrosion and organic material from plugging strainers.
- Ventilation of the ESWP room is sufficiently reliable that the availability of the ESWP is not degraded.

The internal event core damage frequency (CDF) was found to be numerically the same as reported later in this subsection with an actual increase in the CDF due to the site-specific designs of less than 1 percent. The initiating event frequency for loss of component cooling water (CCW), as reported later in this subsection in Tables 19.1-2 and 19.1-23, increases from 2.4E-05/reactor-year (RY) to 2.6E-05/RY due to the site-specific ESWS designs. The effect of the site-specific ESWS designs on the internal CDF is very small. Therefore, any discrepancy of cutsets, basic event importances of the standard design SSCs and operator actions, and dominant sequences from that documented for the standard US-APWR design is considered negligible. Changes in importance are the basic events related to the site-specific design shown in Table 19.1-204. The results described below are considered sufficient and applicable. RCOL2_19-18

19.1.4.2.2 Results from the Level 2 PRA for Operations at Power

STD COL 19.3(4) Add the following text after the first sentence in DCD Subsection 19.1.4.2.2.

The only site-specific design that has potential effect on level 2 PRA is the site-specific UHS.

As is the case of the Level 1 PRA for operations at power (Subsection 19.1.4.1.2), modeling of the site-specific UHS results in small effect on the reliability of the component cooling water system (CCWS) for internal events. There is only small increase of CDF resulting from loss of CCW initiating events, also the contribution of total loss of 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 that are based on the standard US-APWR design. Therefore, the results described below are considered sufficient and applicable.

19.1.5 Safety Insights from the External Events PRA for Operations at Power

CP COL 19.3(4) Replace the second and third paragraphs in DCD Subsection 19.1.5 with the following.

The last three events listed above receive detailed evaluation in the following subsections. The first four events are subject to the screening criteria consistent with the guidance of ASME/ANS RA-Sa-2009, taking into consideration the features of advanced light water reactors.

The assessment of the other external events is provided below:

The screenings for other external events are performed using the following steps taking into consideration the features of advanced light water reactors. At first, qualitative screenings are performed ~~because they are easy to obtain lower risk from advanced reactors design features or site characteristics. The qualitative screenings are performed~~ using the analysis reported in Chapter 2 in accordance with the guidelines of ASME/ANS RA-Sa-2009. Section 6-2 of the standard defined the initial preliminary screening criteria as supporting technical requirement EXT-B1. The five qualitative screening criteria are: RCOL2_19-18

1. Lower damage potential than a design basis event

Four-train separation is maintained in the site-specific UHS design. Modeling of the site-specific UHS shows a small effect on the reliability of CCWS for internal flooding events. As was the case with the results of the Level 1 PRA for operations at power (Subsection 19.1.4.1.2), it has been determined that consideration of the site-specific UHS would have no discernible effect on the internal flooding PRA results that are based on the standard US-APWR design. Therefore, the results described below are considered sufficient and applicable.

19.1.6.2 Results from the Low-Power and Shutdown Operations PRA

STD COL 19.3(4) Add the following text at the beginning of DCD Subsection 19.1.6.2.

The only site-specific design that has potential effect on low-power and shutdown risk is the site-specific UHS.

As was the case with the Level 1 PRA for operations at power (Subsection 19.1.4.1.2), modeling of the site-specific UHS shows a small effect on the reliability of CCWS for internal events. Considering the small increase of loss of CCW initiating event frequency, it has been determined, that consideration of the site-specific UHS would have no discernible effect on the low-power and shutdown (LPSD) results that are based on the standard US-APWR design. Therefore, the results described below are considered sufficient and applicable.

19.1.7.1 PRA Input to Design Programs and Processes

STD COL 19.3(4) ~~Add the following text after the~~Replace the last sentence of DCD Subsection 19.1.7.1 with the following. RCOL2_19-18

Key insights and assumptions are summarized in Table 19.1-119 and specified pages replaced by Table 19.1-119R. Site-specific key assumptions are summarized in Table 19.1-206.

19.1.7.6 PRA Input to the Technical Specification

CP COL 19.3(1) Replace the last paragraph in DCD Subsection 19.1.7.6 with the following.

The PRA needed for implementation of RMTS, SFCP, and peer review will be available one year prior to fuel load.

CP COL 19.3(4)

Table 19.1-205 (Sheet 1 of 37)
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.
Nearby Industrial, Transportation and Military ~~f~~Eacilities	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 percent and using the maximum cargo for two trucks determined the safe 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 site~~s~~, and there are no main railroad lines within 5 mi of CPNPP Units 3 and 4 .	~~1,~~ 3	None	No
			- 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~~.	3		

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6166 (CP RAI #237)

SRP SECTION: 10.04.08 - Steam Generator Blowdown System

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

DATE OF RAI ISSUE: 11/3/2011

QUESTION NO.: 10.04.08-3

The staff requests that the applicant provide the information listed below regarding the site-specific portion of the Steam Generator Blowdown System (SGBDS). These items are based on the piping information added in Revision 2 of the Comanche Peak Nuclear Power Plant, Units 3 and 4 COLA, Part 2, FSAR, Section 10.4.

1. Confirm that materials for pressure-retaining components are specified in accordance with RG 1.143, position C.1.1.2 (as indicated in FSAR Table 3.2-201). If the materials differ from those specified in RG 1.143 position C.1.1.2 (as indicated in FSAR Table 3.2-201), then provide justification for the differences.

2. Beginning on page 10.4-7 of the FSAR, there is a list of numbered paragraphs describing the startup SGBDS piping segments. With respect to Paragraph Number 2, the single-walled stainless steel piping between the startup SGBDS and the turbine building is described as being insulated and wrapped for protection against the environment. Please describe the codes and standards for the insulation and wrapping, including materials selection, application, and inspection.

3. Describe how the double-wall carbon steel piping between the startup SGBDS and the turbine building is insulated and protected from external corrosion (Paragraph Number 2).

ANSWER:

1. The materials selected for the SGBDS pressure-retaining components are specified in accordance with RG 1.143, position C.1.1.2. The selected materials are compatible with the chemical, physical, and radioactive environment of the SGBDS during normal conditions and anticipated operational occurrences.

2. With respect to FSAR Page 10.4-7 Paragraph Number 2, single-walled stainless steel piping is designed to transfer the blowdown water to the LWMS for processing. The first discharge line contains contaminated blowdown water. The piping has been changed to a double-walled pipe consisting of a stainless steel inner pipe and a carbon steel outer pipe. The blowdown is already cooled at that point and no insulation is required. The outer surface of the carbon steel double-walled

cooled at that point and no insulation is required. The outer surface of the carbon steel double-walled pipe is coated to minimize corrosion, similar to the pipe segment that transports blowdown water to Waste Management Pond C.

3. As mentioned above, the outer surface of the double-walled piping between the Startup SGBDS and the turbine building (FSAR Figure 12.03-201) does not require insulation and is coated with corrosion-resistant coating to protect the piping. Coating selection considers weather-resistance to moisture, chemical (salty) environment, ultra-violet light, temperature, and durability.

Impact on R-COLA

See attached marked-up FSAR Revision 2 pages 10.4-7, 12.3-7, and Figure 12.3-201.

Impact on S-COLA

None; this response is site-specific.

Impact on DCD

None.

The SGBDS also includes startup SG blowdown flash tank, startup blowdown heat exchanger, piping, valves and instrumentation used during plant startup and abnormal water chemistry conditions.

CP COL 10.4(2) Replace the thirteenth and fourteenth paragraph in DCD Subsection 10.4.8.2.1 with the following.

During plant startup, the blowdown rate is up to approximately 3 % of maximum steaming rate (MSR) at rated power. The blowdown from each SG flows to the startup SG blowdown flash tank. The blowdown lines from SGs A and B and the blowdown lines from SGs C and D are joined together before flowing to the startup SG blowdown flash tank.

The blowdown water from each SG is depressurized by a throttle valve located downstream of the isolation valves located in the startup blowdown line. The throttle valves can be manually adjusted to control the blowdown rate.

The depressurized blowdown water flows to the startup SG blowdown flash tank, where water and flashing vapor are separated. The vapor is diverted to the condenser and the water flows to the startup SG blowdown heat exchanger for cooling. The CWS cools blowdown water in this heat exchanger before discharging to the existing waste water management Pond C. Pond C has 6.7×10^6 gal storage capacity.

This discharge line consists of the following piping segments:

1. Single-walled stainless steel pipe from the startup SGBD heat exchanger up to and including the radiation monitor and the valves associated with the startup SGBD equipment. This line section includes the condensate return line and the discharge piping;

2. Of the two discharge piping segments, including the portion through the wall penetrations, the first piping segment in between the Startup SGBD system and the T/B (going to the Waste Holdup Tanks) is ~~single-walled stainless steel piping and is insulated and wrapped for protection against the environment~~double-walled piping with stainless steel inner pipe and carbon steel outer pipe with no insulation. The second piping segment in between the Startup SGBD system and the T/B (going to the Waste Management Pond C) is double-walled carbon steel piping. The outer carbon steel pipe on both segments is coated to protect against corrosion; RCOL2_10.04.08-3 RCOL2_10.04.08-3

3. Once inside the T/B, the discharge piping is connected (transferring effluent to the Waste Holdup Tanks) to single-walled stainless steel piping and is routed in pipe chases. And the other piping segment (transferring effluent to Waste Management Pond C) is connected to single-walled carbon steel piping and is also routed in pipe chases;

CP COL 12.3(10)

Table 12.3-201 (Sheet 1 of 5)

Regulatory Guide 4.21 Design Objectives and Applicable FSAR Subsection Information for Minimizing Contamination and Generation of Radioactive Waste

Steam Generator Blowdown System

**(Note: This table addresses the site-specific components and must be reviewed in parallel with the DCD Table 12.3-8 for standard components.
The "System Features" column consists of excerpts from the FSAR)**

Objective		System Features	FSAR Reference
1	Minimize leaks and spills and provide containment in areas where such events may occur.	This discharge line consists of the following piping segments: 1. Single-walled stainless steel pipe from the startup SGBD heat exchanger up to and including the radiation monitor and valves associated with the startup SGBD equipment. This line section includes the condensate return line and the discharge piping; 2. Of the two discharge piping segments, including the portion through the wall penetrations, the first piping segment in between the Startup SGBD system and the T/B (going to the Waste Holdup Tanks) is ~~single-walled stainless steel piping and is insulated and wrapped for protection against the environment~~double-walled piping with stainless inner pipe and carbon steel outer pipe with no insulation. The second piping segment in between the Startup SGBD system and the T/B (going to the Waste Management Pond C) is double-walled carbon steel piping. The outer carbon steel pipe on both segments is coated to protect against corrosion; 3. Once inside the T/B, the discharge piping is connected (transferring effluent to the Waste Holdup Tanks) to single-walled stainless steel piping and is routed in pipe chases. And the other piping segment (transferring effluent to the Waste Management Pond C) is connected to single-walled carbon steel piping and is also routed in pipe chases. 4. From the pipe chase, the discharge pipe exits the T/B penetration and is routed as a single-walled carbon steel piping in a concrete trench from the T/B to the transition manhole downstream of the condensate storage tanks (CSTs). This portion of the piping is in the same concrete trench as the condensate transfer piping to the CST. The conrete trench is sloped and has an epoxy coating to facilitate drainage. This design eliminates liquid accumulation in the trench and thus minimizes unintended release. Using single-wall carbon steel pipe in the trench facilitates additional radial cooling of the fluid and enables the use of High Density Polytheylene (HDPE) piping for underground burial;	10.4.8.2.1
2	Provide for adequate leak detection capability to provide prompt detection of leakage for any structure, system, or component which has the potential for leakage.		

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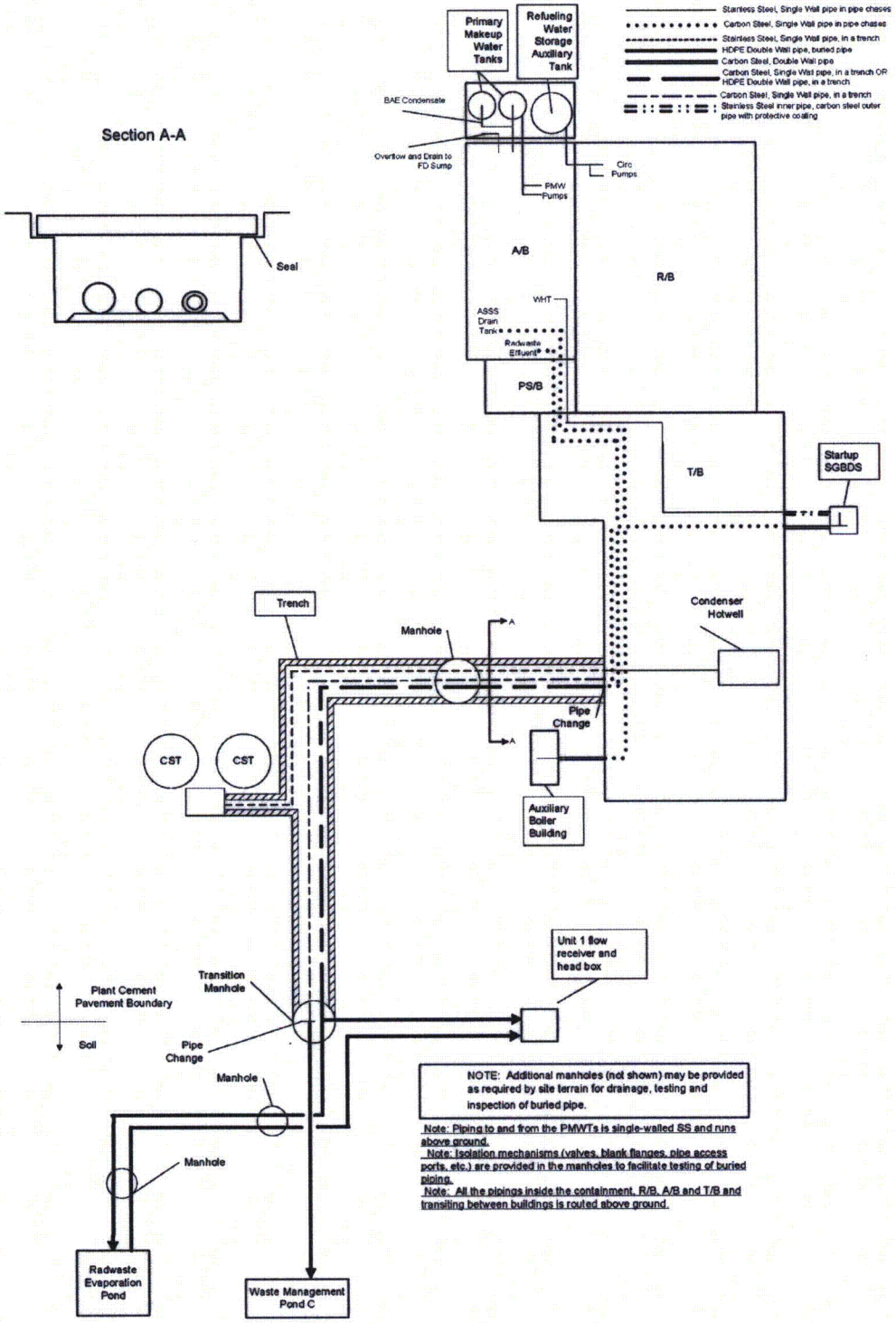

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CP COL 12.3(10) **Figure 12.3-201 Yard Piping Routing and Building Penetration Schematic (Not to scale)**