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Ref. # 10 CFR 52

October 21, 2009

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

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4
DOCKET NUMBERS 52-034 AND 52-035
RESPONSES TO REQUESTS FOR ADDITIONAL INFORMATION
NO. 2814, 3294, AND 3555

Dear Sir:

Luminant Generation Company LLC (Luminant) herein submits responses to Requests for Additional Information No. 2814, 3294, and 3555 for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. The affected Final Safety Analysis Report pages are included with the responses.

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

The only commitment in this letter is presented on page 3.

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

Executed on October 21, 2009.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

Rafael Flores

Attachments -
1. Response to Request for Additional Information No. 2814 (CP RAI #53)
2. Response to Request for Additional Information No. 3294 (CP RAI #52)
3. Response to Request for Additional Information No. 3555 (CP RAI #51)
4. North Central Texas Council of Governments HazMAP Multi-Hazard Risk Assessment: Forewarnings of Natural Hazards to the year 2030 (on CD)

D090

cc: Stephen Monarque w/all Attachments (on CD)

Electronic Distribution w/Attachments 1-3

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Regulatory Commitments in this Letter

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

Number	Commitment	Due Date/Event
6551	A heavy load handling program, including associated procedural and administrative controls, will be established prior to fuel load and will address the following attributes consistent with the standards and regulatory guidance identified in revised FSAR Section 9.1.5: • A listing of all heavy loads and heavy load handling equipment outside the scope of loads described in the referenced certified design and the associated heavy load attributes (load weight and typical load path) • Heavy load handling safe load paths and routing plans including descriptions of automatic and manual interlocks and safety devices and procedures to assure safe load path compliance • Heavy load handling equipment maintenance manuals and procedures • Heavy load handling equipment inspection and test plans • Heavy load handling personnel qualifications, training, and control programs • Quality assurance (QA) programs to monitor, implement, and ensure compliance with the heavy load handling program.	Prior to fuel load

The Commitment Number is used by Luminant for internal tracking.

Attachment 1

Response to Request for Additional Information No. 2814 (CP RAI #53)

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.: 2814 (CP RAI #53)

SRP SECTION: 03.07.04 – SEISMIC INSTRUMENTATION

QUESTIONS for Geosciences and Geotechnical Engineering Branch 1 (RGS1)

DATE OF RAI ISSUE: 9/9/2009

QUESTION NO.: 03.07.04-1

The regulatory basis for this question is NUREG-0800, Standard Review Plan, Chapter 3.7.4, "Seismic Instrumentation," and Regulatory Guide (RG) 1.12, "Nuclear Power Plant Instrumentation for Earthquakes."

In FSAR Subsection 3.7.4.2, Luminant stated that a minimum of 3-second pre event and a 5-second post event will be selected (the minimum times listed in RG 1.12, section 4.4). Please provide further details on the methodologies to be used to select the final pre- and post-event recording times. How will Luminant take into account the distance and the duration of any potential earthquakes occurring at controlling earthquake distances and magnitudes? When such an earthquake occurs will Luminant have sufficient pre-event and post-event memory to record the complete waveform?

ANSWER:

FSAR Subsection 3.7.4.2 was deleted as shown in Revision 0 of the Combined License Application Update Tracking Report attached to Luminant letter TXNB-09005, dated April 2, 2009 (ML091120280). The seismic instrumentation described in DCD Subsection 3.7.4.2 will measure and record seismic waves at the plant site regardless of the distance and duration of potential earthquakes that may occur at controlling earthquake distances and magnitudes. The accelerometers initiate the recording process at free field acceleration values significantly below the operating basis earthquake (OBE).

The minimum recorded duration time of an earthquake measured at the site, excluding the actual length of event time that exceeds the instrumentation trigger threshold, is eight seconds based on the minimum three-second pre-event recording time plus the minimum five-second post-event recording time cited in RG 1.12. A period of eight seconds, plus the length of event time that exceeds the trigger threshold, is a sufficient time history to capture 1) waveforms in the frequency range of interest for the design and analysis of the plant (approximately 0.25 Hz and above as given by the ground motion design response spectra), and 2) waveforms needed for shutdown analysis using OBE exceedance checks in accordance with RG 1.166. As stated in RG 1.12, when an event occurs at some distance and the trigger threshold is not exceeded until a portion of the event time has elapsed, then a part of the low-amplitude record is lost. This portion of the record is considered to contain waveforms that are not significant with respect to the RG 1.12 goals of ensuring (1) that the data provided are comparable with the data used in the design of the nuclear power plant, and (2) that exceedance of the OBE can be determined. This is also considered to be true for post-event waveforms.

The actual pre-event and post-event times specified may be larger than the RG 1.12 minimum values, depending on the particular instrumentation that is procured. Actual total recording times for a significant seismic event are expected to be much greater than eight seconds and would depend on the period of time during which the trigger value of the instrumentation is exceeded. The instrumentation is provided with an uninterruptible power supply battery backup to provide a minimum of 25 minutes total recording time.

Impact on R-COLA

None.

Impact on S-COLA

None.

Impact on DCD

None.

Attachment 2

Response to Request for Additional Information No. 3294 (CP RAI #52)

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.: 3294 (CP RAI #52)

SRP SECTION: 09.01.05 - OVERHEAD HEAVY LOAD HANDLING SYSTEMS

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

DATE OF RAI ISSUE: 9/9/2009

QUESTION NO.: 09.01.05-1

Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," Section C.I.9.1.5 states that the applicant should describe the program and schedule for implementation of the program governing heavy load handling, including several bulleted items (see below) as listed in the RG 1.206.

NUREG-0800, Standard Review Plan (SRP) Section 9.1.5, "Overhead Heavy Load Handling Systems," and Section 5.1.1 of NUREG-0612, "Control of Heavy Load at Nuclear Power Plants," also describe heavy load handling guidelines.

As a minimum, Luminant should describe the program and schedule for heavy load handling including the following:

- A listing of all heavy loads and heavy load handling equipment outside the scope of loads described in the referenced certified design and the associated heavy load attributes (load weight and typical load path)
- Heavy load handling safe load paths and routing plans including descriptions of automatic and manual interlocks and safety devices and procedures to assure safe load path compliance
- Heavy load handling equipment maintenance manuals and procedures
- Heavy load handling equipment inspection and test plans
- Heavy load handling personnel qualifications, training, and control programs
- Quality assurance (QA) programs to monitor, implement, and ensure compliance with the heavy load handling program

A heavy load handling program that meets Section 5.1.1 of NUREG-0612, SRP Section 9.1.5 and RG 1.206 Section C.I.9.1.5 should be in place before there is a possibility that a load drop could cause a release of radioactivity, a criticality accident, an inability to cool fuel within the reactor vessel or spent fuel pool, or prevent safe shutdown of the reactor.

Provide a description in the FSAR of the key elements of the heavy loads handling program at a level of detail similar to that of Section 5.1.1 of NUREG-0612, SRP Section 9.1.5, and RG 1.206. Include in the FSAR a description of the program areas that will be addressed by the procedures developed to cover load handling operations, a discussion on the establishment and use of safe load paths, programs or procedures for training and qualification of crane operator, programs or procedures for crane inspection testing and maintenance, and the heavy loads quality assurance program. In addition, provide a schedule as to when the procedures will be completed.

ANSWER:

Subsection 9.1.5 has been revised to describe the heavy load handling program.

A heavy load handling program, including associated procedural and administrative controls, will be established prior to fuel load and will address the following attributes consistent with the standards and regulatory guidance identified in revised FSAR Section 9.1.5:

- A listing of all heavy loads and heavy load handling equipment outside the scope of loads described in the referenced certified design and the associated heavy load attributes (load weight and typical load path)
- Heavy load handling safe load paths and routing plans including descriptions of automatic and manual interlocks and safety devices and procedures to assure safe load path compliance
- Heavy load handling equipment maintenance manuals and procedures
- Heavy load handling equipment inspection and test plans
- Heavy load handling personnel qualifications, training, and control programs
- Quality assurance (QA) programs to monitor, implement, and ensure compliance with the heavy load handling program.

<u>Impact on R-COLA</u>

See attached marked-up FSAR Draft Revision 1 pages 9.1-1 and 9.1-2.

<u>Impact on S-COLA</u>

None.

<u>Impact on DCD</u>

None.

9.0 AUXILIARY SYSTEMS

9.1 FUEL STORAGE AND HANDLING

This section of the referenced design control document (DCD) is incorporated by reference with the following departures and/or supplements.

9.1.2.2.2 Spent Fuel Storage

CP COL 9.1(1) Replace the first sentence of sixteenth paragraph in DCD Subsection 9.1.2.2.2 with the following.

Detailed procedures will be prepared for the coupon measurements, prior to fuel load. The pre-characterization and in-service characterization of the coupons involves the same testing. Acceptance criteria for the irradiated coupons will be established as part of the surveillance program development. As a minimum, testing criteria includes mechanical and geometrical properties, weight and specific gravity, and visual examination and imaging.

9.1.5 Overhead Heavy Load Handling System

RCOL2_09.01.05-1

CP COL 9.1(6) Insert the following after the last paragraph in DCD Subsection 9.1.5:

To assure proper handling of heavy loads during plant life, a Heavy Load Handling Program, including associated procedural and administrative controls, will be established prior to fuel load. The program will satisfy commitments made in Subsection 9.1.5 of the DCD and meet the guidance of ANSI/ASME B30.2, ANSI/ASME B30.9, ANSI N14.6, ASME NOG-1, CMMA Specification 70-2000, NUREG-0554, NUREG-0612, and NUREG-0800, Section 9.1.5. The Heavy Load Handling Program will include consideration of temporary cranes and hoists, and will adopt a defense-in-depth strategy to enhance safety when handling heavy loads. For instance, the program will restrict lift heights to practical minimums and limit lifting activities as much as practical to those plant modes in which load drops have a small potential for adverse consequences, particularly when critical loads are being handled. Further, prior to lifting heavy loads after fuel load, the program will institute additional reviews to assure that potential drops of these loads due to inadvertent operations or equipment malfunctions, separately or in combination, will not jeopardize safe shutdown functions; cause a significant release of radioactivity; a criticality accident; or result in the inability to cool fuel within the reactor vessel or spent fuel pit.

CP COL 9.1(1) ***9.1(1)*** *A sample coupon monitoring program for neutron absorbing material*

This COL item is addressed in Subsection 9.1.2.2.2.

9.1(2) *Deleted from the DCD.*

9.1(3) *Deleted from the DCD.*

9.1(4) *Deleted from the DCD.*

9.1(5) *Deleted from the DCD.*

CP COL 9.1(6) ***9.1(6)*** ~~*Deleted from the DCD.*~~*The establishment of a Heavy Load Handling Program* RCOL2_09.01.05-1

This COL item is addressed in Subsection 9.1.5.

9.1(7) *Deleted from the DCD.*

9.1(8) *Deleted from the DCD.*

Attachment 3

Response to Request for Additional Information No. 3555 (CP RAI #51)

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.: 3555 (CP RAI #51)

SRP SECTION: 02.03.01 - REGIONAL CLIMATOLOGY

QUESTIONS for Siting and Accident Conseq Branch (RSAC)

DATE OF RAI ISSUE: 9/9/2009

QUESTION NO.: 02.03.01-1

NUREG-0800, Standard Review Plan, Chapter 2.3.1, "Regional Climatology," establishes criteria that the NRC staff intends to use to evaluate whether an applicant meets the NRC's regulations.

Luminant is requested to update combined license (COL) application, FSAR Section 2.3.1.2 to describe the data sources and support calculations for the ambient design air temperature statistics (i.e., 0 percent and 1 percent exceedance values) presented as Comanche Peak Nuclear Power Plant, Units 3 and 4 site characteristics in COL FSAR Table 2.0-1R, 'Key Site Parameters.'

ANSWER:

Supporting calculations for the ambient design air temperature statistics have been prepared that utilize the National Oceanic and Atmospheric Administration's National Climactic Data Center (NOAA/NCDC) data from Dallas/Fort Worth International Airport (DFW) for the years 1977- 2006 for the source data. These data include dry bulb temperature and dew point readings on an hourly basis for the 30-year period stated above. The calculation uses an algorithm derived from wet bulb temperature conversion equations provided in American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Handbook – Fundamentals (2005) to convert the available NOAA/NCDC data into wet-bulb temperatures. The resulting wet bulb temperatures were compiled in a Microsoft Excel file. 1.0 percent exceedance values for temperature (dry bulb and non-coincident wet bulb) were calculated using the "PERCENTILE" feature (data, percent value). The "AVERAGE" feature was used to calculate the mean coincident wet bulb temperatures. The 100 year return period extreme dry bulb temperatures were calculated based on the method presented in ASHRAE Fundamentals Handbook Chapter 28, Equation (1).

The 1-day, 5-day and 30-day worst time periods for the 30-year period were selected from these data. The 0 percent exceedance values – maximum and minimum historical limits – were selected by screening the 30-year hourly temperature records with maximum or minimum dry bulb temperature readings for at least 2 consecutive hours.

This information was derived in accordance with RG 1.27, Rev 2 (for comment) and NUREG 0800, Rev 3, SRP 2.3.1.

Impact on R-COLA

See attached marked-up FSAR Draft Revision 1 pages 2-liv, 2-lix, and 2.3-21.

Impact on S-COLA

None.

Impact on DCD

None.

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
ΔT	vertical temperature difference
χ/Q	relative concentration, in sec/m^3
AADT	annual average daily traffic
ACFT	acre feet
ac-ft	acre feet
AF	amplification factor
AFB	Air Force Base
ALOHA	Areal Locations of Hazardous Atmospheres
AMRT	Average Mean Residence Time
ANL	Argonne National Laboratory
ANSS	Advanced National Seismic System
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers RCOL2_02.03.01-1
a_y	yield acceleration
BB	Broad-Banded
BE	Best Estimate
bgs	below ground surface
BIS	Banks Information Solutions Inc.
BRA	Brazos River Authority
BRM	Brazos River Mile
BTS	Bureau of Transportation Statistics
CAV	Cumulative Absolute Velocity
C_d	overtopping discharge coefficient

ACRONYMS AND ABBREVIATIONS

NIOSH	National Institute for Safety and Health
NLDN	National Lightning Detection Network
NMSZ	New Madrid Seismic Zone
NMT	New Mexico Institute of Mining and Technology
NOAA	National Oceanic and Atmospheric Administration RCOL2_02.03.01-1
NRC	U.S. Nuclear Regulatory Commission
NRHM	non-radioactive hazardous materials
nT	nanoTeslas
NTAD	National Transportation Atlas Database
OBE	Operating Basis Earthquake
OCR	over-consolidation ratio
ODCM	Off-site Dose Calculation Manual
OGS	Oklahoma Geological Survey
OSHA	Occupational and Safety Health Administration
Pa	probability of activity
pcf	pounds per cubic foot
PDE	Preliminary Determination of Epicenters
PEL	Permissible Exposure Limit
PFD	Process Flow Diagram
PI	plasticity index
PGA	peak ground acceleration
PLI	Point Load Strength Index
PMF	Probable Maximum Flood
PMH	probable maximum hurricane
PMP	probable maximum precipitation
PMT	Pressuremeter tests

that seismic category I structures have sloped roofs designed to preclude roof ponding. This is accomplished by channeling rainfall expeditiously off the roof.

2.3.1.2.9 Dust Storms

Blowing dust or sand may occur occasionally in West Texas where strong winds are more frequent and vegetation is sparse. While blowing dust or sand may reduce visibility to less than five mi over an area of thousands of 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.

2.3.1.2.10 Ultimate Heat Sink

The performance of the ultimate heat sink is discussed in Subsection 9.2.5. The ambient design air temperatures in Table 2.0-1R are considered in the design of the UHS and are derived based on hourly readings of dry bulb temperature and dew point data from Dallas/Fort Worth Airport (DFW) for the 30-year period from 1977- 2006. Wet bulb temperatures are determined from the NOAA/NCDC data using psychrometric conversion algorithms consistent with the ASHRAE Handbook – Fundamentals (2005). The 1-percent exceedance values for dry bulb temperature and non-coincident wet bulb temperature represent the 99th percentile values (minimum and maximum). The 1-day, 5-day and 30-day worst time periods for the 30-year period were selected from these data. The 0-percent exceedance values (maximum and minimum historical limits) were selected by screening the 30-year hourly temperature records with maximum or minimum dry bulb temperature readings for at least two consecutive hours. Mean coincident wet bulb temperatures represent the average wet bulb values associated with the corresponding dry bulb temperatures at the specified exceedance value. 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. The potential for freezing of the ultimate heat sink is remote due to the infrequent occurrence of low temperatures and the short duration of low temperatures. RCOL2_02.03.01-1

2.3.1.2.11 Extreme Winds

Estimated extreme winds (fastest mile) for the general area based on the Frechet distribution are:

Return Period (year)	Wind Speed (mi per hr)
2	51

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.: 3555 (CP RAI #51)

SRP SECTION: 02.03.01 - REGIONAL CLIMATOLOGY

QUESTIONS for Siting and Accident Conseq Branch (RSAC)

DATE OF RAI ISSUE: 9/9/2009

QUESTION NO.: 02.03.01-2

10 CFR 52.79(a)(1)(iii) states, in part, that the COL application must contain the meteorological characteristics of the proposed site with appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and time in which the historical data have been accumulated.

a. FSAR Section 2.3.1.2.3 states that, according to NUREG/CR-4461, "Tornado Climatology of the Contiguous United States," (April 2005) there have been 148 tornadoes based on a 1-degree longitude and latitude box centered on the Comanche Peak Nuclear Power Plant (CPNPP) site. Based on FSAR Reference 2.3-210, this analysis was conducted using the Rev. 1 (2005) version of NUREG/CR-4461. Please justify why these values were not derived from NUREG/CR-4461, Revision 2 (February 2007).

b. The table at the top of FSAR Page 2.3-13 lists the values for the corresponding expected maximum tornado wind speed and upper limit (95 percentile) of the expected wind speed based on a 2-degree box centered on the CPNPP site. Similar to the 1-degree box values described above, please justify why these 2-degree box values were not derived from Rev. 2 (2007) of NUREG/CR-4461.

ANSWER:

Subsection 2.3.1.2.3 has been revised to reflect NUREG/CR-4461, Rev 2.

<u>Impact on R-COLA</u>

See attached marked-up FSAR Draft Revision 1 pages 2.3-12, 2.3-13, and 2.3-49.

<u>Impact on S-COLA</u>

None.

<u>Impact on DCD</u>

None.

counties (Bosque, Erath, Hood, and Johnson) (Reference 2.3-225). It should be noted that statistical data on severe local storms, tornadoes particularly, are highly dependent on human observation. For example, as population density increases, the number of tornado occurrences observed and accurately reported generally increases. However, tornadoes that cross county lines may be counted twice due to this increase in reporting.

The probability that a tornado will occur at the CPNPP site is low. Records show that in a 56-yr period (1950 – 2006) there were three tornadoes reported in Somervell County, the location of the site (Reference 2.3-225). The data reported by the NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) (Reference 2.3-225) are given in Tables 2.3-209 and 2.3-210. From these data, the average tornado area in Somervell and the surrounding counties, ignoring events with a zero path length, is approximately 0.21 sq mi. Using the principle of geometric probability described by H. C. S. Thom (Reference 2.3-208), a mean tornado path area of 0.21 sq mi, and an average tornado frequency of 2.79 per year for this area (3414 mi^2), the point probability of a tornado striking the plant is 1.7×10^{-4}/yr. This corresponds to an estimated recurrence interval of 5881 yr.

The tornadoes reported during the years 1950 – 2006 in the vicinity of the site (Bosque, 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 (Reference 2.3-209). 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 mi^2/tornado] [2.79 tornadoes/yr]) / 3414 sq mi = 0.00017 yr-1

Mean recurrence interval = 1/P = 5883 yr

This result shows that the frequency of a tornado in the immediate vicinity of the site is low. However, the frequency increases northward until "tornado alley" is entered north of Dallas. Another methodology for determining the tornado wind speed and associated strike probability at the CPNPP site is given in NUREG/CR-4461 (Reference 2.3-210). Based on a 1 degree longitude and latitude box centered on the CPNPP site, the number of tornadoes is ~~148~~246 between 1950 and 2003. 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. RCOL2_02.03.01-2

Probability	Expected maximum tornado wind speed (mph)	Upper limit (~~90~~95 percent) of the expected tornado wind speed (mph)	
			RCOL2_02.03.01-2
10^{-5}	~~133~~141	~~139~~146	RCOL2_02.03.01-2
10^{-6}	~~171~~178	~~177~~184	RCOL2_02.03.01-2
10^{-7}	205	~~212~~217	RCOL2_02.03.01-2

In the area north of about 34 degrees north latitude, there is a greater frequency of large tornadoes with wide paths and long trajectories.

Based on the approximately 56-yr period of record from 1950 through 2006, the mean seasonal and annual number of tornado occurrences for the area around the site are (Reference 2.3-225):

Winter	0.14
Spring	1.73
Summer	0.37
Autumn	0.57
Annual	2.81

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	1.2 psi (83 mb)
Rate of Pressure Drop	0.5 psi/sec (37 mb/sec)

Compliance with Regulatory Guide 1.76 is discussed in Section 1.9. Tornado loadings are discussed in Subsection 3.3.2.

Waterspouts are common along the southeast U.S. coast, especially off southern Florida and the Keys and can happen over seas, bays, and lakes worldwide. However, waterspouts are not expected to occur at the CPNPP site because the only nearby bodies of water are Squaw Creek Reservoir (SCR) and Lake

http://cdo.ncdc.noaa.gov/cgi-bin/climatenormals/climatenormals.pl ?direc, accessed January 7, 2008 5:31 PM.

2.3-205 Comanche Peak Steam Electric Station. Texas Utilities Generation Company (TXU), 2007, "Final Safety Analysis Report (FSAR)", Amendment 101, Comanche Peak Steam Electric Station, Glen Rose, Texas (February 1, 2007).

2.3-206 NOAA Technical Memorandum NWS SR-206, "Atlantic Tropical storms and Hurricanes Affecting the United States: 1899 – 1999", Donovan Landreneau, 1999.

2.3-207 NOAA Technical Memorandum NWS SR-206 (Updated Through 2002), "Atlantic Tropical Storms and Hurricanes Affecting the United States: 1899 – 2002", Donovan Landreneau, 2002.

2.3-208 Thom, H. C. S., "Tornado Probabilities," Monthly Weather Review, October-December, 1963.

2.3-209 US Census, s.v. ì,î http://quickfacts.census.gov/qfd/states/48/48425.html (accessed February 4, 2008).

2.3-210 NUREG-4461, Rev 2 Tornado Climatology of the Contiguous United States, ~~April 2005~~February 2007. RCOL2_02.03.01-2

2.3-211 IAEA 2003 IAEA Safety Standards Series, Meteorological Events in Site Evaluation for Nuclear Power Plants, Safety Guide No. NS-G-3.4, International Atomic Energy Agency, Vienna.

2.3-212 Isokeraunic map contained in Hubbell Power Systems, Lightning: The Most Common Source of Overvoltage, Bulletin EU 1422-H, 2001.

2.3-213 F. D'Alessandro, A Statistical Analysis of Strike Data from Real Installations Which Demonstrates Effective Protection of Structures Against Lightning, ERICO Lightning Technologies, Hobart, Australia.

2.3-214 Gary R. Huffines and Richard E. Orville, Cooperative Institute for Applied Meteorological Studies, Department of Meteorology, Texas A&M University, College Station, Texas. Lightning Ground Flash Density and Thunderstorm Duration in the Continental United States: 1989 – 96, American Meteorological Society, 1999.

2.3-215 Holzworth, G. C., Mixing Heights, Wind Speeds, and Potential For Urban Air Pollution Throughout the Contiguous United States, EPA, Research Triangle, N.C., January 1972.

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.: 3555 (CP RAI #51)

SRP SECTION: 02.03.01 - REGIONAL CLIMATOLOGY

QUESTIONS for Siting and Accident Conseq Branch (RSAC)

DATE OF RAI ISSUE: 9/9/2009

QUESTION NO.: 02.03.01-3

The last paragraph in FSAR Section 2.3.1.2.6 indicates that there is an annual and seasonal breakdown of large-hail events in FSAR Table 2.3-212, "Hail Storm Events." FSAR Table 2.3-212, however, only provides a breakdown of all events and an annual average for the five county area. For clarification, please either add the seasonal and annual breakdown of large-hail events to FSAR Table 2.3-212 or correct the text in FSAR Section 2.3.1.2.6.

ANSWER:

Subsection 2.3.1.2.6 has been revised to indicate that FSAR Table 2.3-212 contains total data for the period instead of a monthly and seasonal breakdown.

Impact on R-COLA

See attached marked-up FSAR Draft Revision 1 page 2.3-15.

Impact on S-COLA

None.

Impact on DCD

None.

area. Fortunately, recurrence of damaging hail at a specific location is very infrequent.

~~The monthly and seasonal breakdown of large-hail occurrences (3/4 in diameter or larger) for the area around the CPNPP site is given in Table 2.3-212~~The total number of large-hail occurrences (3/4 in diameter or larger) for the five county area around the CPNPP site is given in Table 2.3-212. The average number per year for this area is also provided.. Damaging hailstorms are most frequent during April, May, and June, the period of severe-thunderstorm activity. RCOL2_02.03.01-3

2.3.1.2.7 Air Pollution Potential

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. Units of measure for the standards are parts per million (ppm), milligrams per cu meter ($\mu g/m^3$), and micrograms per cu meter of air ($\mu gm/m^3$). Areas are either in attainment of the air quality standards or in non-attainment. Attainment means that the air quality is better than the standard.

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. There are nine counties (or parts of counties) north and northeast of Somervell County that are in non-attainment with the 8-hour ozone standard (Reference 2.3-227). Texas non-attainment areas are shown on Figure 2.3-381. Currently designated (as of March 2, 2006) non-attainment areas in this region of Texas for the criteria pollutants are as follows:

TEXAS (Region VI)

Dallas - Fort Worth, TX (Moderate)

Collin Co [(a)] [(b)]

Dallas Co [(a)] [(b)]

Denton Co [(a)] [(b)]

Ellis Co

Johnson Co

Kaufman Co

Parker Co

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.: 3555 (CP RAI #51)

SRP SECTION: 02.03.01 - REGIONAL CLIMATOLOGY

QUESTIONS for Siting and Accident Conseq Branch (RSAC)

DATE OF RAI ISSUE: 9/9/2009

QUESTION NO.: 02.03.01-4

FSAR Section 2.3.1.2.8 provides data from Reference 2.3-224, "North Central Texas Council of Governments (NCTCOG) HazMAP Multi-Hazard Risk Assessment, Forewarnings of Natural Hazards to the year 2030, Approved by the NCTCOG Executive Board January 22, 2004," regarding droughts and ice thickness amounts. Please provide a public internet link to this document or provide an electronic copy of this document.

ANSWER:

The public internet link has been removed by NCTCOG. An electronic copy of the report is attached.

<u>Impact on R-COLA</u>

None.

<u>Impact on S-COLA</u>

None.

<u>Impact on DCD</u>

None.

<u>Attachment:</u>

North Central Texas Council of Governments HazMAP Multi-Hazard Risk Assessment: Forewarnings of Natural Hazards to the year 2030. Approved by the NCTCOG Executive Board January 22, 2004 (on CD)

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.: 3555 (CP RAI #51)

SRP SECTION: 02.03.01 - REGIONAL CLIMATOLOGY

QUESTIONS for Siting and Accident Conseq Branch (RSAC)

DATE OF RAI ISSUE: 9/9/2009

QUESTION NO.: 02.03.01-5

Update FSAR Section 2.3.1.2.8 to address the extreme frozen winter precipitation event and extreme liquid winter precipitation event site characteristics in accordance with the Interim Staff Guidance (ISG) DC/COL-ISG-07, "Interim Staff Guidance on Assessment of Normal and Extreme Winter Precipitation Loads on the Roofs of Seismic Category I Structures" (ML081990438) and provide a discussion for the site characteristic values chosen.

ANSWER:

Subsection 2.3.1.2.8 has been revised to provide the requested information.

Impact on R-COLA

See attached marked-up FSAR Draft Revision 1 page 2.3-20.

Impact on S-COLA

None.

Impact on DCD

None.

Texas is not a heavy snow load region. ANSI/ASCE 7-05, "Minimum Design Loads for Buildings and Other Structures," (Reference 2.3-220) identifies that the ground snowload for the CPNPP area is 4 lbf/ft^2 based on a 50-yr recurrence. This is converted to a 100-yr recurrence weight of 4.9 lbf/ft^2 (psf) using a factor of 1.22 (1/0.82) taken from ANSI/ASCE 7-05 Table C7-3. Local snow measurements support this ANSI/ASCE 7-05 value.

To estimate the weight of the 100-yr snowpack at the CPNPP site, the maximum reported snow depths at the 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 (Reference 2.3-220). MET-04

Freshly fallen snow has a snow density (the ratio of the volume of melted water to the original volume of snow) of 0.07 to 0.15, and glacial ice formed from compacted snow has a maximum density of 0.91 (Reference 2.3-221). 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.

Because one cu in of water is approximately 0.0361 pounds in weight, a one in water equivalent snowpack would exert a pressure of 5.20 pounds per sq ft (0.0361 lb/cu in x 144 sq in). For the 100-yr return snowpack, the water equivalent would exert a pressure of 11.7 pounds per sq ft (5.20 lbm/sq ft/in x 2.24 in). This very conservative estimate is approximately twice the value provided in ANSI/ASCE 7-05.

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

From Hydrometeorological Report No. 53, NUREG/CR-1486, the 24-hour Probable Maximum Winter Precipitation (PMWP) for a 10 sq-mi area is estimated to be ~~43~~27 in. The 72-hour PMWP for a 10 sq-mi area is estimated to be ~~53~~35 in. CTS-00647
Assuming a linear relationship between these values gives a 48-hour PMWP of ~~48~~31 in. Because of the southern location of the site, almost all of this PMWP occurs as liquid. To ensure safety even in the most extreme winter conditions, an assumption was made to combine the 100-year return valves for ice load and snow pack. This yields a maximum extreme winter loading of 37.8 lb/ft^2. As stated in the US-APWR DCD Subsection 3.4.1.2, If PMWP were to occur, US-APWR CTS-00647 RCOL2_02.03.01-5

Attachment 4

North Central Texas Council of Governments HazMAP Multi-Hazard Risk Assessment: Forewarnings of Natural Hazards to the year 2030 (on CD)