May 8 2009

Comanche Peak Nuclear Power Plant, Units 3 & 4
COL Application

Part 2, FSAR

Update Tracking Report

Revision 2

Revision History

Revision	Date	Update Description
0	3/31/2009	Original Issue Updated Chapters: Ch.1, 2, 3, 5, 6, 8, 9, 11, 12, 13, 14, 17 and 19 Incorporated responses to following RAIs: No.1
1	4/24/2009	Updated Chapters: Ch. 2, 6
-	5/1/2009	Updated Chapters: Ch. 1, 5,14 See Luminant Letter no. TXNB-09010 Date 5/1/2009 Incorporated responses to following RAIs: No. 1, 2
2	5/08/2009	Updated Chapters: Ch 1, 2

Chapter 1

Chapter 1 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00586	1.2	1.2-3 1.2-4	Consistent with Subsection 9.4.5.2.6	Add “UHS” before “ESW pump”.	0
CTS-00586	1.2	1.2-4	Erratum	Change the number of pumps.	0
CTS-00534	1.8	1.8-13	Consistent with DCD Rev.1	Correct COL 3.2(4) and 3.2(5) to reflect wording changes in DCD Rev1.	0
CTS-00535	1.8	1.8-16	Consistent with DCD Rev.1	Correct COL3.5(2) to reflect wording changes in DCD Rev1.	0
CTS-00536	1.8	1.8-23	Editorial correction	Change “AD/V2” to “AD/V^2”.	0
CTS-00537	1.8	1.8-28	Consistent with DCD Rev.1	Correct COL3.8(19) to reflect wording changes in DCD Rev1.	0
CTS-00527	1.8	1.8-30	Consistent with DCD Rev.1	Correct COL3.9(2) to reflect wording changes in DCD Rev1.	0
CTS-00538	1.8	1.8-33	Consistent with DCD Rev.1	Correct COL3.10(9) to reflect wording changes in DCD Rev1.	0
CTS-00550	1.8	1.8-41	Editorial correction	Delete “these” from COL 6.2(1).	0
CTS-00539	1.8	1.8-43	Editorial correction	Add “and” in COL 6.4(5).	0
CTS-00540	1.8	1.8-55	Editorial correction	Change “an” to “a ” in COL10.3(1).	0
CTS-00541	1.8	1.8-56	Editorial correction	Change “deta” to “data” in COL11.2(3).	0
CTS-00542	1.8	1.8-61	Consistent with DCD Rev.1	Correct COL12.1(1) to reflect wording changes in DCD Rev1.	0
DCD_12.01-2	1.8	1.8-61	Delete Outdated RG	Delete reference to RG8.20, 8.26, and 8.32 from COL12.1(3).	0
CTS-00543	1.8	1.8-64	Consistent with DCD Rev.1	Correct COL13.1(5), 13.2(2) and 13.2(3) to reflect wording changes in DCD Rev1.	0
CTS-00610	13.5.2	1.8-66	Update	Add Subsection “13.5.2.1” in Table 1.8-201.	0
CTS-00544	1.8	1.8-67	Consistent with DCD Rev.1	Correct COL13.6(1)and 13.7(1) to reflect wording changes in DCD Rev1.	0
CTS-00545	1.8	1.8-70	Consistent with DCD Rev.1	Delete COL16.1_3(1).	0
CTS-00546	1.8	1.8-71	Editorial correction	Delete “and” from COL16.1_3.3.2(1).	0
CTS-00526	1.8	1.8-74	Consistent with DCD Rev.1	Correct COL17.5(1) to reflect wording changes in DCD Rev1.	0
CTS-00530	1.9	1.9-7	Correct Corresponding Section	Delete reference to 5.2.1.2 from RG1.84.	0
CTS-00529	1.9	1.9-16	Correct	Add “with exceptions” to	0

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
			COLA/FSAR Status	“Conformance” in RG 4.15.	
DCD_12.01-2	1.9	1.9-18 1.9-19	Delete Outdated RG	Delete reference to RG8.20, 8.26, and 8.32 from Table1.9-203.	0
RCOL2_14.03-1	Table 1.8-201	1.8-69	Responses to RAI No. 1 Luminant Letter TXNB-09010 Dated 5/1/2009	Add FSAR location “14.2.12.1.90.C8” as resolution of COL 14.2(10).	-
CTS-00703	Table 1.9-201	1.9-4	To Reflect CPNPP Units 3 and 4 compliance with RG 1.23.	Added “Second Prepared Revision, April 1986” in the Revision/Date category and “revision of record CPNPP Units 1 and 2” to the COLA FSAR Status category.	2

CP COL 1.9(1)

Table 1.9-201 (Sheet 1 of 12)

Comanche Peak Nuclear Power Plant Units 3 & 4 Conformance with Division 1 Regulatory Guides

RG Number	RG Title	Revision/Date	COLA FSAR Status	Corresponding Chapter/ Section
1.8	Qualification and Training of Personnel for Nuclear Power Plants	Revision 3 May 2000	Conformance with exceptions (Criterion 2: The minimum qualification requirement of the plant staff conforms to CPNPP Units 3 and 4 technical specification and Chapter 13. And QA conforms to quality assurance program description [QAPD].)	12.1.1.3.1 13.1 13.2 14.2 Appendix 14AA COLA Part 4
1.12	Nuclear Power Plant Instrumentation for Earthquakes	Revision 2 March 1997	Conformance	3.7.4 13.4
1.16	Reporting of Operating Information – Appendix A Technical Specifications	Revision 4 August 1975	Conformance with exceptions (CPNPP Units 3 and 4 conform to 10 CFR 50.72 and 50.73 and technical specification requirement.)	14.2.6 14.2.7 COLA Part 4
1.21	Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants	Revision 1 June 1974	Conformance with exceptions (ANSI N13.1-1999 is applied in C.6.)	3.1.6 11.5.1 11.5.2 12.3.4
1.23	Meteorological Monitoring Programs for Nuclear Power Plants	Second Proposed Revision 1 ~~March 2007~~April 1986	Conformance; revision of record CPNPP Units 1 and 2	2.3.3 2.3.4
1.24	Assumptions Used for Evaluating the Potential Radiological Consequences of a Pressurized Water Reactor Radioactive Gas Storage Tank Failure	Revision 0 March 1972	Conformance	11.3.3

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Chapter 2

Chapter 2 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00636	Table 2.0-1R	2.0-3 2.0-13	Editorial correction	Change “X/Q” to “ χ /Q”. (χ is a Greek letter.)	0
CTS-00637	Table 2.2-203 Table 2.2-206	2.2-28 2.2-33	Editorial correction	Change “CPNPP Units 1 & 2” to “CPNPP Units 1 and 2”.	0
CTS-00587	Table 2.3-206	2.3-71	Erratum	Change “5” to “3”.	0
CTS-00636	Table 2.3-342	2.3-252 2.3-253	Editorial correction	Change “X/Q” to “ χ /Q”. (χ is a Greek letter.)	0
CTS-00590	2.4.1.1	2.4-2	Editorial correction	Change “grade” to “floor elevation”.	0
CTS-00591	2.4.1.1	2.4-3	Editorial correction	Change “Category I seismic requirement” to “seismic category I requirement”.	0
CTS-00661	2.4.1.2.1	2.4-5	Editorial correction	Add "(Figure 2.4.1-207)" after Morris-Sheppard Dam.	0
CTS-00662	2.4.1.2.1	2.4-6	Editorial correction	Add reference numbers according to CTS-00666.	0
CTS-00592	2.4.1.2.3.2	2.4-7	Editorial correction	Change “intake pumping station” to “makeup water intake structure” and “cooling tower makeup pumps” to “makeup water pumps, makeup water jockey pump”.	0
CTS-00663	2.4.1.2.3.3	2.4-8	Editorial correction	Add reference numbers as appropriate according to CTS-00666.	0
CTS-00664	2.4.1.2.3.3	2.4-8	Editorial correction	Delete "contributing".	0
CTS-00665	2.4.1.2.3.3	2.4-8	Update	Change "16,113 sq mi" to "25,679 sq mi".	0
CTS-00593	2.4.11.5	2.4-38	Editorial correction	Remove “to the cooling water system flow”.	0
CTS-00655	2.4.12.2.4	2.4-46	Editorial correction	Change “X” to “XX”.	0
CTS-00513 RCOL2_ 2.4.13-1 through RCOL2_ 2.4.13-7	2.4.12.2.4 2.4.12.2.5 2.4.12.3.1 2.4.12.5 2.4.13	2.4-46 through 2.4-64	To reflect information provided during acceptance review	Re-write section reflecting RAI #1.	0

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00656	2.4.12.3.1	2.4-51	Editorial correction	Delete “(or are) expected to be”.	0
CTS-00657	2.4.12.3.1	2.4-52	Editorial correction	Change X to lower-case in mathematical expressions.	0
CTS-00658	2.4.12.5	2.4-53	Editorial correction	Add “aquifer”.	0
CTS-00659	2.4.13	2.4-56	Editorial correction	Change “Kd” to K_d”.	0
CTS-00666	2.4.16	2.4-63	Editorial correction	Add new references.	0
CTS-00589	Table 2.4.1-203	2.4-68 through 2.4-70	Erratum	Add reference citations.	0
CTS-00654	Table 2.4.1-203	2.4-68 through 2.4-70	Editorial correction	Change header titles and lower case from MSL to msl.	0
CTS-00655	Table 2.4.1-203	2.4-68 through 2.4-70	Erratum	Change values to match reference.	0
CTS-00588	Table 2.4.1-206	2.4-72	Erratum	Change “8186” to” 6354” and “0.383” to “0.362”. Add reference citations.	0
CTS-00594	2.5.1	2.5-53	Clarification	Add “potable” and “beneath the site”.	0
CTS-00599	2.5.2	2.5-61 2.5-62	Editorial correction	Delete the semi-colon in the bullet item list.	0
CTS-00595	2.5.2	2.5-61	Editorial correction	Remove IBR statement.	0
CTS-00515	2.5.2.5.1	2.5-110 through 2.5-113	To reflect information provided during acceptance review	Add three pages to clarify discussion.	0
CTS-00516	2.5.2.6.1.1 2.5.2.6.1.2	2.5-113 2.5-117	To reflect information provided during acceptance review	Revise Subsection reflecting commitment to NRC.	0
CTS-00667	2.5.4.3.3	2.5-166	Editorial correction	Change "The average elevation of the top of engineering Layer C is about 780 ft to 782 ft below the Unit 3 power block, and about 782 ft to 784 ft below the Unit 4 power block (Figure 2.5.4-214)." to "The average elevation of the top of engineering Layer C is approximately 782 ft below the Unit 3 and Unit 4 power block (Figure 2.5.4-214)".	0
CTS-00597	2.5.4	2.5-121	Editorial correction	Remove IBR statement.	0

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00514	2.5.4.5.4	2.5-177 2.5-179	To reflect information provided during acceptance review	Revise Subsection reflecting commitment to NRC.	0
CTS-00517	2.5.4.8	2.5-187	To reflect information provided during acceptance review	Revise Subsection reflecting commitment to NRC.	0
CTS-00598	2.5.5	2.5-195	Editorial correction	Remove IBR statement.	0
CTS-00515	2.5.2.5	2.5-224	Editorial correction	Revise Subsection reflecting commitment to NRC.	0
CTS-00515	2.5.7	2.5-227 2.5-228	To reflect information provided during acceptance review	Add references 2.5-432 through 2.5-436	0
CTS-00515	2.5.7	2.5-228	To reflect information provided during acceptance review	Add reference 2.5-432.	0
CTS-00668	Table 2.5.1-201	2.5-229 2.5-230	Editorial correction	Delete "from the Studies of Madole (1988), Crone and Luza (1990), and Swan et al. (1993)" from the title of the table.	0
CTS-00669	Table 2.5.1-201	2.5-230	Editorial correction	Add reference citations.	0
CTS-00672	Table 2.5.1-202	2.5-231	Editorial correction	Delete notes.	0
CTS-00673	Table 2.5.1-203	2.5-232	Editorial correction	Add reference citations.	0
CTS-00673	Table 2.5.1-203	2.5-232	Editorial correction	Delete and rewrite notes.	0
CTS-00670	Table 2.5.1-205	2.5-252	Editorial correction	Add reference citations.	0
CTS-00671	Table 2.5.1-206	2.5-254	Editorial correction	Add reference citations.	0
CTS-00674	Table 2.5.2-227	2.5-312	Editorial correction	Delete references in notes.	0
CTS-00515	List of Tables List of Figures	2-xxxii 2-xlviii	Commitment to NRC	Add Tables 2.5.2-230 through 2.5.2-235. Add Figures 2.5.2-240 through 2.5.2-246.	0

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00516	List of Tables List of Figures	2-xxxii 2-xlviii	Commitment to NRC	Add Tables 2.5.2-236 and 2.5.2-237. Add Figures 2.5.2-247 through 2.5.2-252.	0
CTS-00515	Tables 2.5.2-230 through 2.5.2-237	-	To reflect information provided during acceptance review	Add new Tables.	0
CTS-00516	Figures 2.5.2-240 through 2.5.2-250	-	To reflect information provided during acceptance review	Add new Figures	0
MET-04	List of Tables	2-xxiv, 2-xxv	Erratum	Add “Dallas” in front of “Fort Worth” and “Airport” after “Fort Worth” for table number 2.3-296	1
CTS-00696	2.2.2.2.8	2.2-5	Increase information as discussed with NRC during the 03-23-25-09 Hazards Analysis Audit	Changed distance for DeCordova to 9.35 miles.	1
CTS-00697	2.2.2.6	2.2-8	Increase information as discussed with NRC during the 03-23-25-09 Hazards Analysis Audit	Added clarification that rail transport of hazardous materials is outside the 5 mile radius of CPNPP 3 & 4	1
CTS-00699	2.2.2.7.1	2.2-9	Increase information as discussed with NRC during the 03-23-25-09 Hazards Analysis Audit	Added clarifying statement that the airports listed were predominant airports in the area outside 10 miles that did not exceed the 1000 D^2 criterion. Added back in the discussion for each predominant airport in the area outside the 10 miles.	1
CTS-00698	2.2.3.1.1.2	2.2-12	Increase information as discussed with NRC during the 03-23-25-09 Hazards Analysis Audit	Added clarifying discussion on how the Wolf Hollow hazardous materials were sceened for the hazards analysis since quantities were not made available.	1
CTS-00698	2.2.3.1.3.1	2.2-17	Increase information as discussed with NRC during the 03-23-25-09 Hazards	Added clarifying discussion on how the Wolf Hollow hazardous materials were sceened for the control room	1

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
			Analysis Audit	habitability analysis since quantities were not made available.	
CTS-00696	2.2.3.1.3.2.2	2.2-18	Increase information as discussed with NRC during the 03-23-25-09 Hazards Analysis Audit	Clarified discussion regarding DeCordova was analyzed for Hazards and Control Room Habitablilty analyses even though the distance is outside the 5 mile radius of Units 3 & 4.	1
CTS-00698	Table 2.2-205	2.2-32	Increase information as discussed with NRC during the 03-23-25-09 Hazards Analysis Audit	Added footnote that the quantities of chemicals were not made available for Wolf Hollow and a pointer added to indicate what sections have the sceening criteria utilized for Wolf Hollow.	1
CTS-00696	Table 2.2-214	2.2-43	Increase information as discussed with NRC during the 03-23-25-09 Hazards Analysis Audit	Added IDLH and Max concentration in Control Room and footnote (b) indicating that DeCordova was conservatively analyzed even though it is outside the 5 mile radius of U3/4. Distance to nearest Units 3 and 4 MCR Inlet for DeCordova SES has been revised from 3.6 to 3.7.	1
CTS-00696	Figure 2.2-201		Erratum	Corrected the figure since the location of DeCordova, which is outside the 5 mile radius of CPNPP Units 3 & 4, showed DeCordova inside the 5 mile radius	1
MET-03	2.3.1.2.4	2.3-14	Increase information as discussed with the NRC.	Add “16” to number of days each year; remove “monthly and regional” and add “by county” to wind events to reconcile thunderstorm information.	1
MET-04	2.3.1.2.8	2.3-20	Erratum	Add “the” in front of Dallas Fort Worth Airport	1
MET-13	2.3.2.1.2	2.3-22	Erratum	Replace “2001 through 2006” with “2001 – 2004 and 2006” to describe which data years were used.	1
MET-13	2.3..2.1.3	2.3-27	Erratum	Replace “2001- 2006” with “2001 – 2004 and 2006” to	1

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
				describe which data years were used.	
MET-04	2.3.2.1.4	2.3-27	Erratum	Add “Dallas” in front of “Fort Worth”	1
MET-13	2.3.2.2.4	2.3-32	Erratum	Add “Fort” for the years “2001 – 2006”	1
MET-3 MET-13	Table 2.3-211	2.3-83	Erratum	Replace numbers in column “Average per Yr (#/yr) and Replace “2006 and (-24 yr) with “7/31/2006”	1
MET-13	Table 2.3-285	2.3-164	Errata	Replace “2001 – 2006” with “2001 – 2004 and 2006” to describe which data years were used.	1
MET-04	Table 2.3-286	2.3-165	Erratum	Add “Dallas” in front of “Fort Worth” for the title.	1
MET-04	Table 2.3-296	2.3-177	Erratum	Add “Dallas” in front of Fort Worth and “Airport” after Worth in the title	1
MET-04	Table 2.3-299	2.3-180 2.3-181	Erratum	Add “Dallas” in front of ”Fort Worth” in the title	1
CTS-00554	List of Tables	2-xxxiii	Increase information as discussed with the NRC to summarize the reports provided in Luminant’s letter TXNB-08027 to NRC dated November 4, 2008.	Added Tables 2.5.4-228 through 2.5.4-231	2
CTS-00554	List of Figures	2-I	Increase information as discussed with the NRC to summarize the reports provided in Luminant’s letter TXNB-08027 to NRC dated November 4, 2008.	Added Figure 2.5.4-245	2
CTS-00703	Table 2.3-332	2.3-233 2.3-234	To reflect CPNPP Units 3 and 4 compliance with RG 1.23	Added “Second Proposed Revision, April 1986” to the footnotes	2
CTS-00554	2.5.4.10.1	2.5-189	Increase information as discussed with the NRC to summarize the reports provided in	Additional discussion and equations to reflect what calculations and analyses were performed to demonstrate bearing	2

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
			Luminant's letter TXNB-08027 to NRC dated November 4, 2008.	capacity.	
CTS-00554	2.5.4.10.2	2.5-190	Increase information as discussed with the NRC to summarize the reports provided in Luminant's letter TXNB-08027 to NRC dated November 4, 2008.	Additional discussion on settlement, including calculations, equations and discussion of laboratory test results, layered versus unlayered method.	2
CTS-00554	2.5.4.10.3	2.5-191	Increase information as discussed with the NRC to summarize the reports provided in Luminant's letter TXNB-08027 to NRC dated November 4, 2008.	Additional information added to excavation rebound potential.	2
CTS-00554	2.5.7	2.5-228	Increase information as discussed with the NRC to summarize the reports provided in Luminant's letter TXNB-08027 to NRC dated November 4, 2008.	Added references 2.5-432 through 2.5-434 to reflect additional discussion on bearing capacity and settlement subsection discussed.	2
CTS-00554	Tables 2.5-4-228 through 2.5.4-231	-	Increase information as discussed with the NRC to summarize the reports provided in Luminant's letter TXNB-08027 to NRC dated November 4, 2008.	Added new tables to reflect bearing capacity discussion and settlement discussion within subsections.	2
CTS-00554	Figure 2.5.4-245		Increase information as discussed with the NRC to summarize the reports provided in Luminant's letter TXNB-08027 to NRC dated November 4, 2008.	Added Figure 2.5.4-245.	2

LIST OF FIGURES (Continued)

LIST OF TABLES (Continued)

CTS-00554

LIST OF TABLES (Continued)

CTS-00554

CP COL 2.3(1)

Table 2.3-332
CPNPP Meteorological System Accuracies

CTS-00703

Parameter	Recording Type	System Accuracy (ANSI/ANS-2.5-1984)[1]*	Actual System Accuracy[2]
Wind Speed	Digital	±0.5 mph, WS<5mph ±10%, otherwise	±0.39mph, WS<25mph ±1.10%, otherwise
	Paperless Digital	±0.75mph, WS<5mph ±15%, otherwise	±0.58mph, WS<25mph ±1.18%, otherwise
Wind Direction	Digital	±5°	±3.4°
	Paperless Digital	±7.5°	±4.5°
Temperature	Digital	±0.9°F	±0.6°F
	Paperless Digital	±0.9°F	±0.9°F
Delta Temperature	Digital	±0.27°F	±0.17°F
	Paperless Digital	±0.27°F	±0.19°F
Precipitation	Digital	Rain gauge with ±0.01 in resolution ±10% measured value for total accumulated catch greater than 0.2 in	Rain gauge with ±0.01 resolution ±0.011 in or ±1.1%
	Paperless Digital	Rain gauge with ±0.01 in resolution +10% measured value for total accumulated catch greater than 0.2 in	Rain gauge with ±0.01 resolution ±0.013 in or ±1.3%

Notes:

1. Endorsed by Reg. Guide 1.23, Second Proposed Revision 1, ~~March 2007~~April 1986. CTS-00703

2. Accuracy values shown were calculated for the original system. Calculations made for subsequent equipment upgrades computed uncertainties equal to or less than those stated. All uncertainties computed are within acceptance criteria.

CP COL 2.3(1)

Table 2.3-333
CPNPP Meteorological Delta Temperature System Accuracy

Instrument Accuracy	
1. Sensor Accuracy	
Signal Conditioner Accuracy	±0.13°F
Instrument Accuracy	±0.08°F
Temperature Coefficient	±0.05°F
2. Sq Root of the Sum of the Squared Tolerances	±0.09°F
3. Transmitter Accuracy	±0.04°F
4. Receiver Accuracy	±0.04°F
5. Current Driver Accuracy	±0.04°F
6. Digital Recorder Accuracy	
Input Resistor Accuracy	±0.05°F
Input Accuracy	±0.05°F
7. Sq Root of the Sum of the Squared Tolerances	±0.071°F
8. Analog Data Reduction Accuracy	±0.05°F
System Accuracy [(a)]	
Digital Recording	
Sq Root of the Sum of the Squared Tolerance of 1, 2, 3, 4, 5 and 6	±0.17°F

a) These values are well within the ±0.27°F criteria established by ASI/ANS-2.5-1984, which is endorsed by Regulatory Guide 1.23 and the criteria of Regulatory Guide 1.23 Second Proposed Revision 1, April 1986. CTS-00703 provided in Subsection 2.5.2.6. The GMRS satisfies the requirements of 10 CFR 100.23 for development of a site-specific SSE ground motion. The SSE is the envelope of the GMRS and the minimum earthquake requirements of 10 CFR Part 50 Appendix S, based on the shape of the Certified Seismic Design Response Spectra (CSDRS) scaled down to a PGA of 0.1g. The CSDRS for the US-APWR is a modified RG 1.60 shape formed by shifting the control points at 9 Hz and 33 Hz to 12 Hz and 50 Hz, respectively.

As recommended in RG 1.208, the following general steps were undertaken:

- Review and update the EPRI (1986) (Reference 2.5-369) seismic source model for the site region (200 mi radius), including updated characterization of the Meers fault, which represents the nearest active seismic source to the site
- Update the EPRI (1989) (Reference 2.5-370) ground motion attenuation model using the EPRI (2004) (Reference 2.5-401) ground motion attenuation model
- Perform sensitivity studies and an updated Probabilistic Seismic Hazard Analysis (PSHA) to develop rock hazard spectra and define the controlling earthquakes
- Derive performance-based GMRS from the updated PSHA at a free field hypothetical outcrop at the top of competent material beneath the site (defined as top of Glen Rose Formation Layer C)

The resulting GMRS and derivative FIRS are presented in Subsection 2.5.2.6.

2.5.4.10 Static Stability

CP COL 2.5(1) Replace the content of DCD Subsection 2.5.4.10 with the following.

2.5.4.10.1 Bearing Capacity

Seismic category I and II structures for Units 3 and 4 are founded on mat foundations bearing directly on sound Glen Rose Formation limestone Layer C (Subsection 2.5.4.3), or concrete fill placed over limestone. Strength and compressibility properties for the Glen Rose Formation materials are discussed in Subsection 2.5.4.2. Extensive core borings and geophysical surveys performed throughout the CPNPP Units 3 and 4 seismic category I and II structure footprints demonstrate that the targeted Glen Rose Formation engineering Layer C limestone is approximately 60 ft thick below foundation subgrade elevation, massive, and highly uniform in characteristics. Average RQD of the limestone below the foundation subgrade is greater than 95 percent (Figure 2.5.4-240), and S-wave and P-wave velocities average over 5500 fps ~~to~~and 11,000 fps, respectively (Figure 2.5.4-239). The rock is horizontally to subhorizontally layered, and no significant voids, shears, or weak zones occur in the Layer C limestone CTS-00554 that could form potential bearing sliding surfaces or differential settlement. The foundation subgrade elevation of 782 ft provides deep confinement of the limestone of about 40 ft below plant grade, and no slopes or sloping rock surfaces exist around the Units 3 and 4 power blocks that could result in lateral confinement reduction.

Ultimate bearing capacity for both Units 3 and 4 seismic category I and II structures was estimated for three potential failure mechanisms of general shear failure, local shear failure, and compressive failure, as presented in the Rock Foundations Manual by the U.S. Army Corps of Engineers (COE, Reference 2.5-420).

The traditional Buisman-Terzaghi bearing capacity expression is used to calculate ultimate bearing capacity for the general shear failure condition, as shown below: CTS-00554

$$q_{ult} = cC_c N_c + 0.5\gamma B C_\gamma N_\gamma + \gamma D N_q$$

$$N_c = 2N_\phi^{1/2}\left(N_\phi + 1\right)$$

$$N_\gamma = N_\phi^{1/2}\left(N_\phi^2 - 1\right)$$

$$N_q = N_\phi^2$$

$$N_\phi = \tan^2\left(45 + \frac{\phi}{2}\right)$$

Where:

q_{ult}	=	Ultimate bearing capacity
γ	=	Effective unit weight (i.e. submerged unit weight if below groundwater table) of rock mass
B	=	Width of foundation
D	=	Depth of foundation
c	=	The cohesion intercept for rock mass
ϕ	=	Angle of internal friction angle for rock mass
C_c	=	Foundation shape correction factor for N_c (see Table 6-1, Reference 2.5-420)
C_γ	=	Foundation shape correction factor for N_γ (see Table 6-1, Reference 2.5-420)

N_c, N_γ, N_q = Bearing capacity factors CTS-00554

Local shear failure is a case where a failure surface starts to develop but does not propagate to the surface. For this mode of failure, depth of embedment contributes little to the total bearing capacity. The expression for the ultimate bearing capacity applicable to localized shear failure is as follows:

$$q_{ult} = cC_cN_c + 0.5\gamma BC_\gamma N_\gamma$$

The parameters are the same as those defined for the general shear failure condition.

Compressive failure is a case characterized by a foundation that is supported on poorly constrained columns of rock, and the failure mode is similar to unconfined compression failure. The expression for the ultimate bearing capacity applicable to compressive failure is as follows:

$$q_{ult} = 2c\tan(45 + \frac{\phi}{2})$$

The parameters are the same as those defined for the general shear failure condition. Assuming ϕ=0, the ultimate bearing capacity for compressive failure is approximated by the unconfined compressive strength of rock mass (q_{ult}=2c).

~~For selecting the design parameters,~~ COE recommends that ~~because rock masses generally provide generous margins of safety against bearing capacity failure,~~ the initial strength parameters selected for analysis should be based on lower bound estimates because rock masses generally provide generous margins of safety against bearing capacity failure. ~~In general, as~~For a conservative estimation of the bearing capacity using the above procedures, the angle of internal friction is assumed ~~as~~to be zero and the cohesion is ~~taken as~~assumed to be one-half of the lower bound of the unconfined compression strength values. CTS-00554

Results of the bearing capacity analysis performed for ~~all~~main seismic category I and II structures (Table 2.5.4-228) indicate that the ultimate bearing capacity for foundations bearing in Glen Rose Formation engineering Layer C limestone is governed by the compressive failure mode and is at least 146 ksf. The estimated bearing capacity is compared to minimum bearing capacity values referenced in the US-APWR Key Site Parameters (DCD Table 2.0-1) that are 15 ksf static and 95 ksf dynamic. The estimated ultimate bearing capacity for ~~site~~engineering Layer C limestone provide factors of safety against bearing capacity failure of about 10 for static loading and at least 1.5 for seismic loading. The actual available factors of safety for specific structures (Table 3.8-202) are much higher than these levels and clearly indicate that the Glen Rose Formation engineering Layer C limestone provides adequate bearing capacity for support of the proposed structures. CTS-00554

Additional information and details regarding the procedure and results of the bearing capacity calculations are provided in the Settlement and Bearing Capacity report.

2.5.4.10.2 Settlement

As discussed in Subsection 2.5.4.3, massive and sound Glen Rose Formation engineering Layer C extends ~~for~~ about 60 ft below foundation subgrade for seismic category I and II structures. Layer C is underlain by competent Glen Rose Formation engineering Layers D through F that consist principally of limestone with similar characteristics to Layer C, and interbedded indurated shale. As shown in Figure 2.5.4-240, the rock mass for a minimum distance of about 150 ft below foundation level is massive, and exhibits an average RQD greater than 95 percent. Settlement estimates are based on interpreted compressibility characteristics and elastic modulus properties of Glen Rose Formation limestone and shale materials, as discussed in Subsection 2.5.4.2. Elastic modulus values that were interpreted based on field and laboratory tests, were used to develop a "Best Estimate (BE)" as well as a "Lower Bound (LB)" modulus profile. CTS-00554

For the BE profile, the subsurface rock deformation characteristics were estimated using in situ S-wave velocities measured during the borehole suspension P-S logging. Because the borehole velocity measurements reflect the local influence of rock discontinuities and material variations, the resulting calculated modulus values are considered to be more indicative of the rock mass conditions. However, due to the low strain nature of the S-wave velocity, the calculated modulus is an upper bound case when used for settlement calculations. The low strain modulus values were then adjusted to reflect the relative higher strain levels anticipated for the fully loaded foundations. The modulus values developed based on this procedure are considered to represent the best estimated model for use in settlement analysis.

In situ rock modulus is estimated from the shear wave velocities using the following relationships: CTS-00554

$$G_{max} = \frac{\gamma}{g} \cdot V_s^2$$

Where:

G_{max}	=	Low Strain Shear Modulus (psf)
V_s	=	Shear Wave Velocity (fps)
γ	=	Total Unit Weight (pcf)
g	=	Gravitational Acceleration Constant (32.2 ft/s^2).

Poisson's ratio (ν) is determined as follows:

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$$\nu = \frac{V_p^{\,2} - 2V_s^{\,2}}{2 \cdot \left(V_p^{\,2} - V_s^{\,2}\right)}$$

Where:

ν = Poisson's ratio

V_p = Compression Wave Velocity (fps).

From the above information, the Modulus of Elasticity or Young's Modulus (E) is determined from:

$$E_{max} = 2G \cdot (1 + \nu)$$

$$E = E_{max}(RF)$$

Where:

E_{max} = Low Strain Modulus of Elasticity or Young's Modulus

E = Strain Adjusted Modulus of Elasticity or Young's Modulus

RF = Reduction Factor for Modulus Strain Adjustment

The low strain modulus (E_{max}) values were empirically reduced in order to develop a modulus model that is more compatible with the level of anticipated settlement. An iterative process was used between strain, calculated modulus, and settlement in order to select the appropriate reduction factor for each layer. A summary of the velocity data, Poisson's ratio values, calculated Modulus values, and the calculated BE modulus profile versus depth and engineering layers is presented in Table 2.5.4-226218 presents a summary of the calculated BE modulus profile and other pertinent data versus depth and engineering layers.

For the LB profile, the subsurface rock deformation characteristics were estimated using the results of stress-strain measurements in the laboratory on intact core samples, and in situ tests in boreholes using the pressuremeter. Because the individual core samples and pressuremeter tests do not consider the discontinuities or material variations, the Rock Mass Rating (RMR) System (Reference 2.5-409), and Geological Strength IndexGSI System (References 2.5-421 and 2.5-422) were used with empirical approaches to incorporate the effects of discontinuities and material variations and assess the overall rock mass deformation characteristics. The modulus model developed based on this procedure is expected to produce a conservative lower bound modulus model for use in settlement analysis. CTS-00554

Laboratory test results from individual rock samples and the RMR and GSI values were used to estimate the deformation modulus of the rock mass by using empirical equations summarized by Hoek and Diederichs (Reference 2.5-422) . Four empirical approaches recommended by Nicholson & Bieniawski (1990), Mitri et al. (1994), Sonmez et al. (2004), and Hoek & Diederichs (2006) were selected to define the Rock Mass Modulus range (Reference 2.5-422) for the CPNPP Units 3 and 4 site. The estimated range of the Rock Mass Modulus (E_{rm}) values for each of the stratigraphic layers, based on the above four correlations and their average value, is presented on Figure 2.5.4-245. Modulus values from the field pressuremeter tests and the laboratory unconfined compression tests are also shown on Figure 2.5.4-245 for comparison. The average estimated rock mass modulus compare well with the lower bound of the intact modulus values from the laboratory or field measurements and is considered to be a reasonable representation of LB modulus profile for deformation characteristics of the site rock mass profile. Table 2.5.4-227 presents a summary of the calculated LB modulus profile and other pertinent data versus depth and engineering layers. CTS-00554

A summary of both BE and LB models used for the settlement calculations (i.e., the variation of elastic modulus versus elevation), ~~along with~~the modulus values calculated directly based on in situ S-wave velocities, ~~as well as~~and pressuremeter and UC tests, are shown on Figure 2.5.4-241. CTS-00554

Due to the elastic nature of the subsurface rock materials, settlements from foundation loading are anticipated to be elastic in nature. Settlements ~~were~~are estimated by elastic theory using two methods of non-layered and layered systems. For the non-layered system, the subsurface rock layers supporting the foundations ~~were~~are considered to be a homogeneous elastic half-space medium with a uniformly loaded rectangular area. CTS-00554 CTS-00554

The formulas by Schleicher (1926) are used to calculate the settlement of any location beneath a loaded rectangle foundation (Reference 2.5-437). CTS-00554

$$\delta_d(x,y) = C_s q B \left(\frac{1-\nu^2}{E}\right)$$

The parameter C_s is a geometric factor that accounts for the shape of the rectangle and the position of the point for which the settlement is being calculated. The formula for calculating C_s is as follows (Reference 2.5-437):

$$C_s = \frac{1}{2\pi}(C_1 + C_2 + C_3 + C_4)$$

$$C_1 = B_1 \ln \frac{\sqrt{A_1^2 + B_1^2} + A_1}{\sqrt{A_2^2 + B_1^2} - A_2}$$

$$C_2 = B_2 \ln \frac{\sqrt{A_1^2 + B_2^2} + A_1}{\sqrt{A_2^2 + B_2^2} - A_2}$$

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$$C_3 = A_1 \ln \frac{\sqrt{A_1^2 + B_1^2} + B_1}{\sqrt{A_1^2 + B_2^2} - B_2}$$

$$C_4 = A_2 \ln \frac{\sqrt{A_2^2 + B_1^2} + B_1}{\sqrt{A_2^2 + B_2^2} - B_2}$$

$$A_1 = 1 - \frac{2x}{B}$$

$$A_2 = 1 + \frac{2x}{B}$$

$$B_1 = \frac{L}{B} - \frac{2y}{B}$$

$$B_2 = \frac{L}{B} + \frac{2y}{B}$$

Where:

$\delta_d(x, y)$	=	Settlement of the point with coordinates x and y
q	=	Uniform load intensity
C_s	=	Geometric factor
B	=	Width of the loaded area
L	=	Length of the loaded area
ν	=	Poisson's ratio
E	=	Average Elastic or Young's modulus
A_1, A_2	=	Factors to be calculated based on the above formulas and then inserted into the formulas for C_1 through C_4
B_1, B_2	=	Factors to be calculated based on the above formulas and then inserted into the formulas for C_1 through C_4
$C_1 - C_4$	=	Factors to be calculated based on the above formulas and then inserted into the main formula for C_s
x, y	=	Coordinates of the point

The average elastic modulus for the half-space was calculated using a weighted average modulus approach, as indicated by the following relationships (Reference 2.5-420): CTS-00554

$$E_{avg} = \frac{\sum_{i=1}^{n}\left(E_i \Big/ \sum_{j=1}^{i} h_j \right)}{\sum_{i=1}^{n}\left(1 \Big/ \sum_{j=1}^{i} h_j \right)}$$

Where:

E_{avg} = Weighted average modulus

E_i = Elastic modulus of each layer

h_j = Thickness of each layer

n = Number of layers

The layered method is similar to the non-layered method, but considers the subsurface rock materials supporting the foundations to be a layered system. The stress increase with depth caused by a rectangular uniform surface load is computed using a stress distribution theory. Superposition of rectangular areas covering the loaded surfaces is used in the cases where the stress calculation point is not located directly under the corner of a given loaded area or when there is more than one loaded area. The strain of each layer is calculated by dividing the stress increment by the layer modulus, and then the strain is multiplied by the layer thickness to provide the layer compression or settlement. The computed settlement values of all layers are summed to provide the total settlement values shown below:

$$\delta = \sum_{i=1}^{n} \delta_i = \sum_{i=1}^{n} \varepsilon_i h_i = \sum_{i=1}^{n} \frac{\Delta\sigma_i}{E_i^e} h_i$$

Where:

δ = Total Settlement

δ_i = Settlement of each layer

ε_i = Strain in each layer

h_i = Thickness of each layer

$\Delta\sigma_i$ = Stress increment in each layer due to loading

E_i^e = Equivalent elastic modulus of each layer CTS-00554

In the above formula for the equivalent elastic modulus (E_i^e), values of Young's modulus (E_i), plane strain modulus ($E_i^{'}$), or constrained modulus (M_i) may be used as defined below, depending on the boundary conditions or location of the settlement point (Reference 2.5-439).

$$E_i^{'} = \frac{E_i}{1 - \nu^2}$$

$$M_i = E_i \left[\frac{1 - \nu_i}{(1 + \nu_i)(1 - 2\nu_i)} \right]$$

Where:

E_i = Young's modulus of each layer

$E_i^{'}$ = Plane strain modulus of each layer

M_i = Constrained modulus of each layer

ν_i = Poisson's ratio of each layer

For the cases where the foundation dimensions are relatively large, the lateral deformation at points below the center of the foundation is considered fully constrained and use of the constrained modulus is more appropriate. For the cases of small foundations or areas near corners or edges of large foundations, the lateral deformations are not constrained and the Young's modulus is more appropriate for settlement computations. For the settlement calculations provided herein, the plane strain modulus, which consider the strain to be constrained in only one direction, was adopted. The plane strain modulus, which is lower than the constrained modulus and slightly higher than the Young's modulus, is judged to be a reasonable selection and appropriate for representing all points below loaded areas for both large and small size foundations.

There are several elastic solutions that can be used to calculate stress distribution, such as Boussinesq, Mindlin, and Westergaard. There is no definitive proof that either of these solutions is more accurate than the other for soil or rock applications. Among the available solutions, the Boussinesq solution has been most widely used for geotechnical applications. It has also been found that settlements obtained through use of the Boussinesq equation are larger than the observed settlements in the great majority of cases. The Boussinesq solution was conservatively selected for computing the stresses distribution under the loaded areas for the settlement calculations. The Boussinesq equation for calculating vertical stress increment under a corner of a rectangular uniformly distributed flexible loaded area is expressed as follows (Reference 2.5-438): CTS-00554

$$\sigma_z = \frac{q}{4\pi}\left[\frac{2mn\sqrt{m^2+n^2+1}}{m^2+n^2+m^2n^2+1}\,\frac{m^2+n^2+2}{m^2+n^2+1}+\sin^{-1}\left(\frac{2mn\sqrt{m^2+n^2+1}}{m^2+n^2+m^2n^2+1}\right)\right]$$

$$m = \frac{L}{Z}$$

$$n = \frac{B}{Z}$$

Where:

σ_z	=	Stress increment at a depth z
q	=	Uniform load intensity as surface
B	=	Width of the loaded area
L	=	Length of the loaded area
Z	=	Distance below the loaded area
m, n	=	Ratio of loaded area width or length to depth

The vertical stress induced at other locations than the corner or by more than one foundation can be obtained through the superposition approach.

A summary of the results of the settlement and deformation analyses conducted by the non-layered and layered methods described above for the two BE and LB deformation modulus models are presented in Tables 2.5.4-229 and 2.5.4-230, respectively. For the layered system, the load-induced stress increase with depth was conservatively computed using the Boussinesq stress distribution theory and superposition was used to calculate stresses due to different loaded areas.

Estimated total settlements for seismic category I and II structures founded on Glen Rose limestone Layer C are estimated to be less than 1/2 in. Estimated differential settlement is not anticipated to exceed about 1/4 in across the foundation widths or around the perimeters of the structures. Settlement estimates assume excavation procedures do not affect integrity or compromise the load bearing capacity of limestone to any appreciable degree.

These estimated settlements are consistent with estimated settlements for foundations of CPNPP Units 1 and 2 supported in similar Glen Rose Formation limestone, as discussed in the FSAR (Reference 2.5-201). They conform to total and differential settlement criteria for the US-APWR Standard Design. CTS-00554

Additional information and details regarding the procedure and results of the settlement calculations are provided in the Settlement and Bearing Capacity report.

2.5.4.10.3 Excavation Rebound Potential

As discussed in Subsection 2.5.4.1, regional stresses in the geologic formations at the CPNPP site are low, and significant stress relief during excavation is not expected. Rebound deformation estimates madeare carried out using a similar procedure as described in Subsection 2.5.4.10.2 do not exceed about 1/8 in. The BE modulus profile was considered more applicable and therefore was used for the rebound estimates. Rebound deformation due to removal of about 40 ft of soil and rock material to the top of Layer C limestone rock is not anticipated to exceed about 1/8 in. A summary of the rebound estimates for the center points of the main structures is shown in Table 2.5.4-231. Based on these results of the rebound estimates, the potential for any significant heave or rebound of the foundation rock due to foundation excavation during the construction is considered very low. CTS-00554 CTS-00554

The CPNPP Units 1 and 2 FSAR (Reference 2.5-201) discusses rock stress relief measurements associated with general plant site excavation recorded in two extensometers. A maximum rebound of 0.02 in was measured by the extensometers during deep excavation (approximately 30 ft to 60 ft) into upper Glen Rose Formation strata that are laterally contiguous with the rock strata that will be excavated for the CPNPP Units 3 and 4 plant site and seismic category I and II foundations. No occurrences of high stress or stress-induced instability are described.

Additional information and details regarding the procedure and results of the excavation rebound calculations are provided in the Settlement and Bearing Capacity report.

2.5.4.10.4 Lateral Earth Pressures

Lateral earth pressures acting on below-grade structures and walls are due to the self weight of backfill soils, backfill compaction, hydrostatic, surface (temporary or permanent) loads, and transient (seismic) loads.

Lateral active and at-rest earth pressures are calculated for select granular backfill, and are summarized on Figures 2.5.4-242 and 2.5.4-243, respectively. Lateral earth pressures acting on non-yielding walls (rigid and restrained from displacement and rotation), such as the seismic category I and II structures, are to be calculated for an at-rest condition. Other walls that are capable of yielding (including flexible or walls free to displace or to rotate at the top) are calculated for active conditions. Intermediate cases of lateral earth pressure may exist depending on the degree of rigidity, stiffness, and restraining characteristics of the wall system.

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Table 2.5.4-228
Summary of Ultimate Bearing Capacities

Structure	Category	Foundation Size (ft)		Foundation Bottom Elev. (ft)	Ultimate Bearing Capacity (ksf)		
		E-W	N-S		General Shear	Local Shear	Compression
R/B	I	213	309	783	354	348	146
T/B	II	186	315	795	342	339	146
A/B	II	133	239	785	338	335	146
EPS/B	I	115	69	785	343	340	146
WPS/B	I	115	69	785	343	340	146
PSFSV	I	85	78	782	365	362	146
UHS	I	131	131	787	369	365	146

Table 2.5.4-229
Summary of Settlement Estimates Based on "BE" Profile

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Structure	Category	Foundation Size (ft)		Foundation Bottom Elev. (ft)	Foundation Static Load (ksf)	Settlement Estimate for Center (in)	
		E-W	N-S			Non-Layered Method	Layered Method
R/B	I	213	309	783	11.3	0.12	0.20
T/B	II	186	315	795	5.9	0.07	0.11
A/B	II	133	239	785	6.8	0.09	0.14
EPS/B	I	115	69	785	4.3	0.07	0.10
WPS/B	I	115	69	785	4.3	0.08	0.12
PSFSV	I	85	78	782	5.4	0.06	0.09
UHS	I	131	131	787	3.6	0.05	0.06

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Table 2.5.4-230
Summary of Settlement Estimates Based on "LB" Profile

Structure	Category	Foundation Size (ft)		Foundation Bottom Elev. (ft)	Foundation Static Load (ksf)	Settlement Estimate for Center (in)	
		E-W	N-S			Non-Layered Method	Layered Method
R/B	I	213	309	783	11.3	0.30	0.37
T/B	II	186	315	795	5.9	0.19	0.20
A/B	II	133	239	785	6.8	0.23	0.26
EPS/B	I	115	69	785	4.3	0.18	0.18
WPS/B	I	115	69	785	4.3	0.20	0.21
PSFSV	I	85	78	782	5.4	0.17	0.16
UHS	I	131	131	787	3.6	0.14	0.12

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Table 2.5.4-231
Summary of Rebound Estimates Based on "BE" Profile

Structure	Category	Foundation Size (ft)		Excavation Depth (ft)	Rebound Estimates for Center (in)	
		E-W	N-S		Non-Layered Method	Layered Method
R/B	I	213	309	40-50	0.07	0.12
T/B	II	186	315	40-50	0.06	0.10
A/B	II	133	239	40-50	0.07	0.10
EPS/B	I	115	69	40-50	0.06	0.08
WPS/B	I	115	69	40-50	0.06	0.10
PSFSV	I	85	78	40-50	0.05	0.08
UHS	I	131	131	40-50	0.05	0.07

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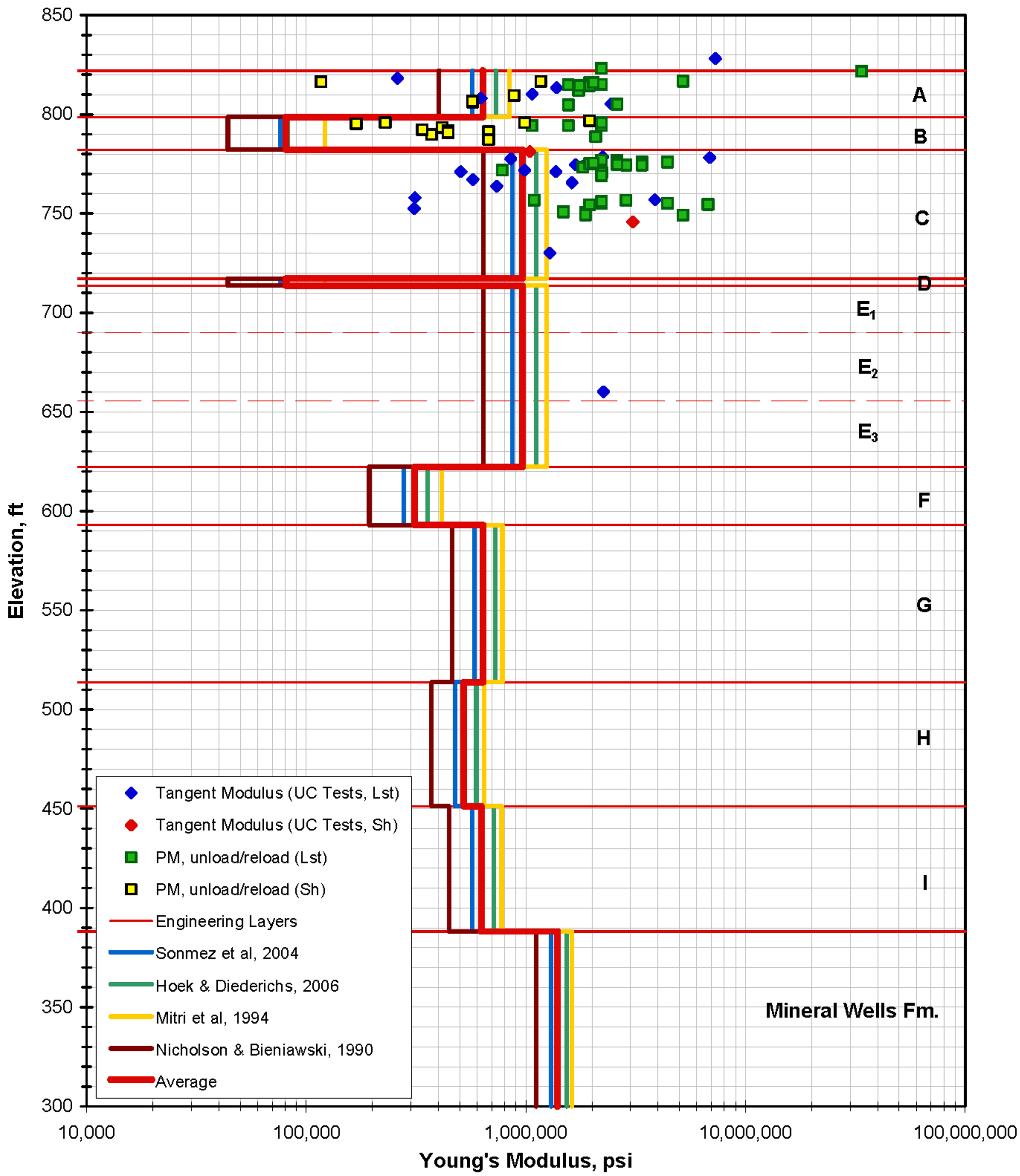

Figure 2.5.4-245 Estimated Range of Rock Mass Modulus (E_{rm})

Chapter 3

Chapter 3 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00638	3.3.1.2	3.3-1	Clarification	Add "CPNPP Units 3 and 4 do not have site-specific seismic category II buildings and structures".	0
CTS-00600	3.7.1	3.7-3	Editorial correction	Change "is" to "has been".	0
MAP-03-001	3.7.4.2 3.7.5	3.7-12 3.7-14	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.7(15)	0
MAP-03-002	3.7.4.5 3.7.5	3.7-12 3.7-13 3.7-14	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.7(18)	0
CTS-00532	Table 3.7.2-1R	3.7-17 3.7-18	Editorial correction	Revise LMN to highlight changes.	0
MAP-03-003	3.8.1.4.1.3 3.8.6	3.8-1 3.8-13 3.8-14	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.8(1)	0
MAP-03-004	3.8.1.5.1.2 3.8.1.5.2.2 3.8.6	3.8-1 3.8-1 3.8-14	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.8(2)	0
CTS-00602	3.8.1	3.8-2	Clarification	Change "Chapter 2" to "Subsection 2.5.4".	0
MAP-03-005	3.8.1.6 3.8.6	3.8-2 3.8-14	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.8(4)	0
MAP-03-006	3.8.1.6 3.8.6	3.8-2 3.8-14	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.8(5)	0
MAP-03-007	3.8.1.6 3.8.6	3.8-2 3.8-14	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.8(6)	0
MAP-03-008	3.8.1.6 3.8.6	3.8-3 3.8-14	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.8(8)	0
MAP-03-009	3.8.1.6 3.8.6	3.8-3 3.8-14	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.8(9)	0

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
MAP-03-010	3.8.1.6 3.8.6	3.8-3 3.8-14	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.8(12)	0
MAP-03-011	3.8.1.6 3.8.6	3.8-3 3.8-14	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.8(13)	0
CTS-00607	3.8.4.1.3.2	3.8-6 3.8-7	Editorial correction	Change “the ESW pump houses” to “UHS ESW pump house”.	0
MAP-03-012	3.8.4.7	3.8-11	Revision of COL 3.8(22) Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Change “Monitoring of seismic category I structures is required to be performed” to “a site-specific program for monitoring and maintenance of seismic category I structures is performed”.	0
CTS-00603	Table 3.9-202	3.8-18	Consistent with DCD Rev.1	Change unit and number in the table.	0
CTS-00604	3.9.3.4.2.5	3.9-2	Editorial correction	Clarify wording.	0
CTS-00531	3.9.3.4.2.5	3.9-2	Editorial correction	Change “are” to “is”.	0
CTS-00605	Table 3.9-201	3.9-5	Editorial correction	Change COL item number.	0
MAP-03-014	3.10 3.10.7	3.10-1 3.10-3	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.10(10)	0
CTS-00606	3.11	3.11-1	Clarification	Replace EQ program implementation dates with milestones.	0
CTS-00639	3.11.5	3.11.3	Editorial correction	Change “Table 3D-201 by completion of [Later]” to “the Equipment EQ Technical Report (Reference 3.11.3)”.	0
MAP-03-015	3.13.1.2.3 3.13.3	3.13-1 3.13-2	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.13(1)	0
MAP-03-016	3.13.1.2.5 3.13.3	3.13-1 3.13-2	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 3.13(2)	0

Chapter 4

Chapter 4 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R

Chapter 5

Chapter 5 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00528	5.2.1.2	5.2-1	Editorial correction	Include words about RG 1.84.	0
CTS-00675	5.2.1.2	5.2-1	Editorial correction	Add "Units 3 and 4" after Comanche Peak Nuclear Power Plant. Delete a period in LMN	0
RCOL2_05.03-1	5.3.2.3	5.3-3	Responses to RAI No. 2 Luminant Letter TXNB-09010 Dated 5/1/2009	Add clarification about the timing of submitting PTS evaluation using the as–procured reactor vessel material properties.	-

Chapter 6

Chapter 6 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00518 CTS-00644	6.4.4	6-i 6.4-1 6.4-3 1.8-43	To reflect resolution of acceptance review issue	Include dose evaluation in the control room due to a post-accident release from the other US-APWR unit or existing CPNPP unit.	0
	6.4.4		Editorial correction	Add Subsection “6.4.4.2” in Table 1.8-201 and Subsection 6.4.7.	0
CTS-00642	6.1	6.1-1	Update	All 6.1 COL Items have been deleted from the DCD. This FSAR section is now IBR with no departures or supplements.	0
MAP-06-001	6.1.1.2.2	6.1-2	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.1(1)	0
MAP-06-002	6.1.1.1	6.1-1 6.1-2	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.1(2)	0
MAP-06-003	6.1.1.2.1	6.1-1 6.1-2	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.1(3)	0
MAP-06-004	6.1.1.2.1	6.1-1 6.1-2	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.1(4)	0
MAP-06-005	6.1.2	6.1-2 6.1-3	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.1(5)	0
MAP-06-006	6.2.1.1.3.4 6.2.1.5.7	6.2-1 6.2-3	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.2(1)	0
MAP-06-007	6.2.2.3 Table 6.2.2-2R	6.2-1 6.2-4 6.2-6	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.2(9)	0
MAP-06-008	6.2.4.2	6.2-2 6.2-3	Deletion of COL item. Letter MHI Ref:UAP-	Delete COL 6.2(6)	0

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
			HF-08259, dated on Nov.7, 2008		
MAP-06-009	6.2.5.2	6.2-2 6.2-3	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.2(7)	0
DCD_06.02.06-2	6.2.6.1	6.2-3	DCD_RAI 06.02.06-2	Change “first sentence “ to “first and second sentences”.	0
CTS-00643	6.3	6.3-1	Update	All 6.3 COL Items have been deleted from the DCD. This FSAR section is now IBR with no departures or supplements.	0
MAP-06-011	6.3.2.8	6.3-1 6.3-2	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.3(3)	0
MAP-06-012	6.3.2.2.4	6.3-1 6.3-2	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.3(4)	0
MAP-06-013	6.3.2.4	6.3-1 6.3-2	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.3(6)	0
MAP-06-014	6.4.3 6.4.7	6.4-1 6.4-3	Revision of COL 6.4(2)	Revise COL Item to only discuss automatic actions and manual procedures for the MCR HVAC system in the event of postulated toxic gas release.	0
MAP-06-015	6.4.2.2.1	6.4-1 6.4-3	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.4(4)	0
CTS-00652	6.4.4.2 6.4.7	6.4-2 6.4-3	Re-evaluation of COL Item	Associate COL 6.4(2) with Subsection 6.4.4.2.	0
CTS-00653	6.4.4.2	6.4-3	Erratum	Change “5.2 ppm “ to “5.7 ppm”.	0
MAP-06-016	6.5.1.7	6.5-1	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 6.5(4)	0

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
MAP-06-018	6.6.8	6.6-1	Revision of COL 6.6(2)	Revise description to only identify the implementation milestone of the program.	0
CTS-00696	6.4.4.2	6.4-1	NRC Staff Reviewer Comment Incorporation from 03-23-25-09 Hazards Analysis Audit	Added pointer to Table 2.2-214 for toxic chemicals that do not meet RG 1.78 screening criteria.	1

Chapter 7

Chapter 7 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R

Chapter 8

Chapter 8 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00451	List of Figures, Figure 8.2-201	8-iii 8.2-23	Editorial correction	Add “Relevant Portions of” to the title of the Figure 8.2-201.	0
CTS-00640	8.2.1.2	8.2-3	Editorial correction	Change “Any” to “Both of any”.	0
CTS-00686	8.2.1.2.1.1	8.2-5	Editorial correction	Delete “from”.	0
CTS-00641	8.2.1.2.1.1	8.2-6	Erratum	Change “is” to “are”.	0
CTS-00477	8.2	8.2-6	Clarification	Change description of offsite power system.	0
CTS-00479	8.4	8.4-1	Editorial correction	Change section title in bold font.	0

Chapter 9

Chapter 9 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00586	9.2.1.2.1	9.2-1 9.2-2	Consistent with Subsection 9.4.5.2.6	Change “ESWP house” to “UHS ESW pump house”.	0
CTS-00608	9.4	9.4-7	Erratum	Change heating coil capacity of EFP (M/D) Area Air Handling Unit from “1 kW” to “2 kW”.	0
DCD_09.05.01-6	9.5.1.3 9.5.9	9.5-3 9.5-18	DCD_RAI 09.05.01-6	Add Subsection 9.5.1.3.	0
DCD_09.05.01-15	Table 9.5.1-1R	9.5-46	DCD_RAI 09.05.01-15	Add LMNs in Table 9.5.1-1R and Table 9.5.1.2R.	0
DCD_09.05.01-7	Table 9.5.1-1R	9.5-55	DCD_RAI 09.05.01-7	Add “see Subsection 9.5.1.3” to Table 9.5.1.1R.	0
DCD_09.05.01-5	Table 9.5.1-1R	9.5-56	DCD_RAI 09.05.01-5	Fill in Remarks on Table 9.5.1-1R.	0
DCD_09.05.01-15	Table 9.5.1-2R	9.5-112 9.5-113	DCD_RAI 09.05.01-15	Add LMNs in Table 9.5.1-1R and Table 9.5.1.2R.	0

Chapter 10

Chapter 10 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R

Chapter 11

Chapter 11 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00482	11.2.3.1	11.2-2	Editorial correction	Delete repeated phrase.	0
CTS-00481	Table11.2-14R	11.2-14	Editorial correction	Add “hr” in transit time.	0
MAP-11-001	11.3.3.3	11.3-2, 11.3-3	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 11.3(5)	0

Chapter 12

Chapter 12 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
DCD_12.01-2	12.1.3	12.1-2	Delete Outdated RG	Delete RG8.20, 8.26, and 8.32.	0
DCD_12.02-15	12.2.1.1.10	12.2-1	DCD_RAI 12.02-15	Add “40 CFR 190”.	0
CTS-00463	12.5	12.5-1	Clarification	Change description about entry into the interim waste storage building.	0

Chapter 13

Chapter 13 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00484	13.1	13.1-17 13.1-18	Editorial correction	Change location of “Table 13.1-201 (Sheet 5 of 5)”.	0
CTS-00486	13.5	13.5-4 13.5-7	Editorial correction	Delete reference 13.5-201.	0
CTS-00488	13AA Table of Contents	13AA-ii	Editorial correction	Modify dot lines in Table of Contents.	0

Chapter 14

Chapter 14 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00635	14.2.2	14.2-1	Editorial correction	Change "Replace the last paragraph" to "Replace the last sentence of the second paragraph". Change "Appendix 14AA provides a description ...." to " A description .... are reconciled in Appendix 14AA".	0
RCOL2_14.03-1	14.2.12 14.2.12.1 14.2.13 Table 14.2-201	14.2-3 14.2-7 14.2-8	Responses to RAI No. 1 Luminant Letter TXNB-09010 Dated 5/1/2009	Add new item to ensure verification that local offsite fire departments utilize hose threads or adapters capable of connecting with onsite hydrants, hose couplings, and standpipe risers.	-

Chapter 15

Chapter 15 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R

Chapter 16

Chapter 16 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R

Chapter 17

Chapter 17 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
CTS-00490	17.3	17.3-1	Editorial correction	Change description about quality assurance program.	0

Chapter 18

Chapter 18 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R

Chapter 19

Chapter 19 Tracking Report Revision List

Change ID No.	Section	FSAR Rev. 0 Page	Reason for change	Change Summary	Rev. of FSAR T/R
MAP-19-001	19.1.5.1.1	19.1-8 19.3-1	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 19.3(5)	0
MAP-19-002	19.2.5	19.2-1 19.3-1	Deletion of COL item. Letter MHI Ref:UAP-HF-08259, dated on Nov.7, 2008	Delete COL 19.3(6)	0
CTS-00491	ACRONYMS AND ABBREVIATIONS	19-v	Erratum	Change "Westuinghouse" to "Westinghouse".	0