Mar. 31 2009

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

Part 2, FSAR

Update Tracking Report

(Editorial Correction Version)

Revision 0

Revision History

Revision	Date	Update Description
0	03/31/2009	Original Issue Updated Chapters: Ch.1, 2, 3, 5, 6, 8, 9, 11, 13, 14, 17 and 19 Incorporated responses to following RAIs: -

Chapter 1

Chapter 1 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of 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-00518	1.8	1.8-43	Editorial correction	Add Subsection “6.4.4.2” in Table 1.8-201	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DCD_12.01-2	1.8	1.8-61	Delete Outdated RG	Delete reference to RG8.20, 8.26, and 8.32 from COL12.1(3).	0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
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

1.2.1.7.1 General Plant Arrangement

CP COL 1.8(1) Add the following text at the end of first paragraph in DCD Subsection 1.2.1.7.1.

In addition, the UHS is the major CPNPP Units 3 and 4 site-specific structure.

CP COL 1.2(1) Replace the first sentence of the second paragraph in DCD Subsection 1.2.1.7.1 with the following.

The outline and the arrangement of CPNPP Units 3 and 4 are shown in Figure 1.2-1R.

CP COL 1.8(1) Add the following text after the first sentence of the third paragraph in DCD Subsection 1.2.1.7.1.

The UHS is designed and constructed as a safety-related structure, to the requirements of seismic category I, as defined in RG 1.29.

CP COL 1.8(1) Replace the last sentence in DCD Subsection 1.2.1.7.1 with the following.

The general arrangement drawings for the CPNPP Units 3 and 4 are provided in Figures 1.2-2R through 1.2-51, as well as Figures 1.2-201 through 1.2-210.

CP SUP 1.2(1) The design plant grade in the DCD is 2’-7”, whereas the nominal plant grade elevation for CPNPP Units 3 and 4 is National Geodetic Vertical Datum of 1929 (NGVD 29) Elevation 822’-0”; therefore, DCD elevations are to be increased by 819’-5” to be actual site elevations. The nominal plant grade floor elevation for design is NGVD 29 Elevation 822’-0” and corresponds to DCD Elevation 2’-7”. The actual plant grade floor elevation varies to accommodate floor slope and layout requirements.

CP COL 1.8(1) Add the following new subsection after DCD Subsection 1.2.1.7.2.7.

1.2.1.7.2.8 Ultimate Heat Sink Related Structures

The ultimate heat sink related structures (UHSRS) are seismic category I structures that connect to the essential service water pipe tunnel (ESWPT).

Each UHSRS consists of a cooling tower enclosure, UHS essential service water (ESW) pump house and a UHS basin. CTS-00586

Each UHS ESW pump house contains ~~two~~one safety-related ~~ESW~~ pump~~s~~ and one UHS transfer pump. The UHS ESW pump house ventilation system maintains environmental conditions to UHS ESW pump house that meet the design requirements during normal, transient, and accident operating conditions, for the safe operation and orderly shutdown of the plant. CTS-00586

1.2.2 Combined License Information

CP COL 1.2(1) Replace the content of DCD Subsection 1.2.2 with the following.

1.2(1) *Site-specific site plan*

This COL item is addressed in Subsections 1.2.1.6 and 1.2.1.7.1 *and Figure 1.2-1R.*

Table 1.8-201 (Sheet 4 of 68)

Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale	
COL 3.1(1)	The COL Applicant is to provide a design that allows for the appropriate inspections and layout features of the ESWS.	3.1.4.16.1	A			
COL 3.2(1)	Deleted from the DCD.					
COL 3.2(2)	Deleted from the DCD.					
COL 3.2(3)	Deleted from the DCD.					
COL 3.2(4)	The COL Applicant is to identify the site-specific, safety-related systems and components ~~SSCs~~ that are designed to withstand the effects of earthquakes without loss of capability to perform their safety function; and those site-specific, safety-related fluid systems or portions thereof, as well as the applicable industry codes and standards for pressure-retaining components.	3.2.1.2 Table 3.2-201.	A			CTS-00534
COL 3.2(5)	The COL Applicant is to identify the equipment class and seismic category of the site-specific, safety-related and non safety-related fluid systems, components (including pressure retaining), and equipment as well as the applicable industry codes and standards.	3.2.2 Table 3.2-201	A			CTS-00534
COL 3.3(1)	The COL Applicant is responsible for verifying the site-specific basic wind speed is enveloped by the determinations in this section.	3.3.1.1	A			

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale
COL 3.5(2)	The COL Applicant is to commit to actions to maintain P1 within this acceptable limit as provided by turbine and rotor design features, material specifications and recommended inspections during preservice and inservice periods~~.~~ based on Technical Report, MUAP-070028-NP, Probability of Missile Generation from Low Pressure Turbines.	3.5.1.3.2		H	b
COL 3.5(3)	As described in DCD, Section 2.2, the COL Applicant is to establish the presence of potential hazards, except aircraft, which is reviewed in Subsection 3.5.1.6, and the effects of potential accidents in the vicinity of the site.	3.5.1.5	A		
COL 3.5(4)	It is the responsibility of the COL Applicant to verify the site interface parameters with respect to aircraft crashes and air transportation accidents as described in Section 2.2.	3.5.1.6	A		
COL 3.5(5)	The COL Applicant is responsible to evaluate site-specific hazards for external events that may produce missiles more energetic than tornado missiles, and assure that the design of seismic category I and II structures meet these loads.	3.5.2	A		
COL 3.5(6)	The COL Applicant is responsible to assess the orientation of the T/G of this and other unit(s) at multi-unit site for the probability of missile generation using the evaluation of Subsection 3.5.1.3.2.	3.5.1.3.1	A		

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale
COL 3.7(20)	The COL Applicant is to validate the site-independent seismic design of the standard plant for site-specific conditions, including geological, seismological, and geophysical characteristics, and to develop the site-specific GMRS as free-field outcrop motions on the uppermost in-situ competent material.	3.7 Appendix 3NN	A		
COL 3.7(21)	The COL Applicant is responsible for the seismic design of those seismic category I and seismic category II SSCs that are not part of the US-APWR standard plant.	3.7	A		
COL 3.7(22)	The COL Applicant is required to perform site-specific seismic analyses, including SSI analysis which considers seismic wave transmission incoherence and analysis of the CAV of the seismic input motion, in order to determine if high-frequency exceedances of the CSDRS could be transmitted to SSCs in the plant superstructure with potentially damaging effects.	3.7.1.1	A		
COL 3.7(23)	The COL Applicant is to verify that the results of the site-specific SSI analysis for the broadened ISRS and basement walls lateral soil pressures are enveloped by the US-APWR standard design.	3.7.2.4.1 Appendix 3NN	A		
COL 3.7(24)	The COL Applicant is to verify that the site-specific ratios V/A and AD/V^2~~2~~ (A, V, D, are PGA, ground velocity, and ground displacement, respectively) are consistent with characteristic values for the magnitude and distance of the appropriate controlling events defining the site-specific uniform hazard response spectra.	3.7.1.1	A		CTS-00536

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale
COL 3.8(15)	The COL Applicant is responsible for the seismic design of those seismic category I and seismic category II SSCs not part of the US-APWR standard plant, including the following non-standard seismic category I structures designed to the site-specific SSE: • ESWPT • UHSRS • PSFSVs	3.8.4	A		
COL 3.8(16)	Deleted from the DCD.				
COL 3.8(17)	Deleted from the DCD.				
COL 3.8(18)	Deleted from the DCD.				
COL 3.8(19)	The design and analysis of the ESWPT, UHSRS, and PSFSVs, and other site-specific structures are to be provided by the COL Applicant based on site-specific seismic criteria.	3.8.4.1.3 Figures 3.8-201 – 3.8-214	A		
COL 3.8(20)	The COL Applicant is to identify any applicable externally generated loads. Such site-specific loads include those induced by floods, potential non-terrorism related aircraft crashes, explosive hazards in proximity to the site, and projectiles and missiles generated from activities of nearby military installations.	3.8.4.3	A		
COL 3.8(21)	Deleted from the DCD.				

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale
COL 3.8(29)	The COL Applicant is to provide design and analysis procedures for the ESWPT, UHSRS, and PSFSVs.	3.8.4.4.3 Appendix 3KK Appendix 3LL Appendix 3MM	A		
COL 3.9(1)	The COL Applicant is to assure snubber functionality in harsh service conditions, including snubber materials (e.g., lubricants, hydraulic fluids, seals).	3.9.3.4.2.5	A		
COL 3.9(2)	The first COL Applicant~~, at the time of application,~~ is to commit to implement a pre-operational ~~provide results of the~~vibration assessment program and to prepare the final report consistent with guidance of RG 1.20 for a prototype. Subsequent COL Applicant need only provide information in accordance with the applicable portion of position C.3 of RG 1.20 for Non-Prototype internals.	3.9.2.4.1		H	b
COL 3.9(3)	Deleted from the DCD.				
COL 3.9(4)	Deleted from the DCD.				
COL 3.9(5)	Deleted from the DCD.				
COL 3.9(6)	The COL Applicant is to provide the program plan for IST of dynamic restraints in accordance with ASME OM Code.	3.9.6.4		H	b

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COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale	
COL 3.10(7)	Deleted from the DCD.					
COL 3.10(8)	For design of seismic category I and II SSCs that are not part of the standard plant, the COL Applicant can similarly eliminate the OBE, or optionally set the OBE higher than 1/3 SSE, provided the design of the non-standard plant's SSCs are analyzed for the chosen OBE.	3.10.1	A			
COL 3.10(9)	The COL applicant is to investigate if ~~S~~site-specific in-structure response spectra generated ~~by~~for the COL application may exceed the standard US-APWR design's in-structure response spectra in the high-frequency range. Accordingly, the COL applicant is to consider the functional performance of vibration-sensitive components, such as relays and other instrument and control devices whose output could be affected by high frequency excitation.~~, are also considered by the COL Applicant as described above.~~	3.10.2	A			CTS-00538 CTS-00538 CTS-00538
COL 3.10(10)	The COL Applicant is to establish an equipment seismic qualification program which addresses all requisite aspects of seismic and dynamic qualification of mechanical and electrical equipment.	3.10		H	b	
COL 3.11(1)	The COL Applicant is responsible for assembling and maintaining the environmental qualification document, which summarizes the qualification results for all equipment identified in Appendix 3D, for the life of the plant.	3.11	A			

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale
COL 6.1(6)	Deleted from the DCD.				
COL 6.2(1)	The COL applicant is responsible to provide best estimates of ~~these~~ heatsinks in the COL application, update the FSAR based on as-built information and confirm the values are bounded by the values in containment analyses.	6.2.1.1.3.4 6.2.1.5.7		H	a
COL 6.2(2)	Deleted from the DCD.				
COL 6.2(3)	Deleted from the DCD.				
COL 6.2(4)	Deleted from the DCD.				
COL 6.2(5)	Preparation of a cleanliness, housekeeping and foreign materials exclusion program is the responsibility of the COL applicant. This program addresses other debris sources such as latent debris inside containment. This program minimizes foreign materials in the containment.	6.2.2.3 Table 6.2.2-2R		H	b
COL 6.2(6)	As-built pipe run distances from outer containment isolation valve to the containment penetration are provided by the COL applicant.	6.2.4.2		H	a
COL 6.2(7)	The operating principle and accuracy of the combustible gas analyzers are provided by the COL applicant.	6.2.5.2		H	a
COL 6.2(8)	The COL applicant is responsible for the containment leakage rate testing program including, but not limited to, its preparation, exemptions, equipment, methods, procedures, conduct, limits, acceptance criteria, schedule, and reports.	6.2.6.1		H	b

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale	
COL 6.4(1)	The COL Applicant is responsible to provide details of specific toxic chemicals of mobile and stationary sources within the requirements of RG 1.78 and evaluate the control room habitability based on the recommendation of RG 1.78.	6.4.4.2	A			
COL 6.4(2)	The COL Applicant is responsible to prepare and implement normal, abnormal, and emergency operating procedures for the MCR HVAC system, to include the main control room emergency filtration system.	6.4.3 6.4.4.2		H	b	CTS-00518
COL 6.4(3)	Deleted from the DCD.					
COL 6.4(4)	The COL Applicant is responsible to determine the charcoal absorber weight, type and distribution.	6.4.2.2.1		H	a	
COL 6.4(5)	The number, locations, sensitivity, range, type, and design of the toxic gas detectors are COL items. Depending on proximity to nearby industrial, transportation, and military facilities, and the nature of the activities in the surrounding area, as well as specific chemicals onsite, the COL Applicant is responsible to specify the toxic gas detection requirements necessary to protect the CRE.	6.4.6	A			CTS-00539
COL 6.5(1)	Deleted from the DCD.					
COL 6.5(2)	Deleted from the DCD.					
COL 6.5(3)	Deleted from the DCD.					

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale
COL 10.3(1)	FAC monitoring program; The Combined License Applicant is to address preparation of a~~n~~ FAC monitoring program for carbon steel portions of the steam and power conversion systems that contain water or wet steam.	10.3.6.3	A		
COL 10.3(2)	Safety and relief valve information: The Combined License Applicant is to address the actual throat area of the MSSV.	10.3.2.3.2		H	a
COL 10.4(1)	Circulating Water System; The Combined License Applicant is to determine the site specific final system configuration and system design parameters for the CWS including makeup water and blowdown.	10.4.5	A		
COL 10.4(2)	Steam Generator Blowdown System; The Combined License applicant is to address the discharge to Waste Water System including site specific requirements.	10.4.8.1 10.4.8.2 10.4.8.5	A		
COL 10.4(3)	Deleted from the DCD.				
COL 10.4(4)	Deleted from the DCD.				
COL 10.4(5)	System Design for Steam Generator Drain; The Combined License applicant is to address the nitrogen or equivalent system design for Steam Generator Drain Mode. (This is dependent on Waste water system design)	10.4.8.2.2.4	A		

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COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale
COL 11.2(1)	The COL applicant is responsible for ensuring that mobile and temporary liquid radwaste processing equipment and its interconnection to plant systems conforms to regulatory requirements and guidance such as 10 CFR 50.34a (Ref. 11.2-5), 10 CFR 20.1406 (Ref. 11.2-7) and RG 1.143 (Ref. 11.2-3), respectively.	11.2.1.6	A		
COL 11.2(2)	Site-specific information of the LWMS, e.g., radioactive release points, effluent temperature, shape of flow orifices, etc., is provided in the COLA.	11.2.2 11.2.3.1	A		
COL 11.2(3)	The COL applicant is responsible for providing site-specific hydrogeological d~~e~~ata (such as contaminant migration time), and analysis to demonstrate that the potential groundwater contamination resulting from radioactive release due to liquid containing tank failure is bounded by the analysis discussed in Subsection 11.2.3.2.	11.2.3.2	A		
COL 11.2(4)	The COL applicant is to calculate doses to members of the public following the guidance of RG 1.109 (Ref 11.2-15) and RG 1.113 using site-specific parameters, and compares the doses due to the liquid effluents with the numerical design objectives of Appendix I to 10 CFR 50 (Ref 11.2-10) and compliance with requirements of 10 CFR 20.1302, 40 CFR 190.	11.2.3.1 Table 11.2-10R Table 11.2-11R Table 11.2-12R Table 11.2-13R Table 11.2-14R Table 11.2-15R	A		
COL 11.2(5)	The COL applicant is to perform a site-specific cost benefit analysis to demonstrate compliance with the regulatory requirements.	11.2.1.5	A		
COL 11.2(6)	The COL applicant is to provide piping and instrumentation diagrams (P&IDs).	11.2.2 Figure 11.2-201	A		

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale	
COL 11.5(5)	The COL applicant is to provide analytical procedures and sensitivity for selected radioanalytical methods and type of sampling media for site-specific matter.	11.5.2.6 11.5.2.8		H	a	
COL 11.5(6)	The COL applicant is to perform a site-specific cost benefit analysis to demonstrate compliance with the regulatory requirements.	11.5.2.11	A			
COL 12.1(1)	The COL Applicant is to demonstrate that the policy considerations regarding plant operations are compliance with RG 1.8, 8.8, and 8.10 (Subsection 12.1.1.3).	12.1.1.3.1 12.1.1.3.2 12.1.1.3.3	A			CTS-00542
COL 12.1(2)	Deleted from the DCD.					
COL 12.1(3)	The COL Applicant is to describe how the plant follows the guidance of RG 8.2, 8.4, 8.6, 8.7, 8.9, 8.13, 8.15, ~~8.20,~~ 8.25, ~~8.26~~ 8.27, 8.28, 8.29, ~~8.32,~~ 8.34, 8.35, 8.36, and 8.38.	12.1.3	A			DCD_12.01-2
COL 12.1(4)	Deleted from the DCD.					
COL 12.1(5)	The COL Applicant is to provide the operational radiation protection program for ensuring that occupational radiation exposures are ALARA.	12.5		H	b	
COL 12.2(1)	The COL Applicant is responsible for the use of any additional contained radiation sources that are not identified in subsection 12.2.1, including radiation sources used for instrument calibration or radiography.	12.2.1.1.10		H	a	

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale	
COL 13.1(5)	The COL Applicant is to develop the description of the general qualification requirements in terms of educational background and experience ~~COL requirements~~ for positions or classes of positions depicted in the organizational arrangement.	13.1.3	A			CTS-00543
COL 13.1(6)	The COL Applicant is to develop the organizational structure for the plant organization, its personnel responsibilities and authorities, and operating shift crews.	13.1.2 - 13.1.2.6 Table 13.1-203 Figures 13.1-202 - 204	A			
COL 13.1(7)	The COL Applicant is to develop the description of education, training, and experience requirements established for management, operating, technical, and maintenance positions for the operating organization.	13.1.3	A			
COL 13.2(1)	The COL Applicant is to develop the training program description.	13.2	A			
COL 13.2(2)	The COL Applicant is to develop training programs for reactor operators in accordance with NUREG-0800, Section 13.2.1.I.3 (Ref. 13.2-4)~~, develop training programs for reactor operators~~.	13.2	A			CTS-00543
COL 13.2(3)	The COL Applicant is to develop training programs for non-licensed plant staff ~~I~~in accordance with NUREG-0800, Section 13.2.2.I.3 (Ref. 13.2-4)~~, develop training programs for non-licensed plant staff~~.	13.2	A			CTS-00543
COL 13.2(4)	The COL Applicant is to develop training programs. These programs include a chart, which shows the schedule of each part of the training program for each functional group of employees in the organization in relation to the schedule for preoperational testing, expected fuel loading, and expected time for examinations prior to plant criticality for licensed operators.	13.2	A			

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale
COL 13.4(1)	The COL Applicant is to develop a description and schedule for the implementation of operational programs. The COL Applicant is to “fully describe” the operational programs as defined in SECY-05-0197 (Ref. 13.4-1) and provide commitments for the implementation of operational programs required by regulation. In some instances, programs may be implemented in phases. The COL Applicant is to include the phased implementation milestones in their submittal.	13.4 Table 13.4-201 FSAR sections referenced therein		H	b
COL 13.5(1)	The COL Applicant is to develop administrative procedures describing administrative controls over activities that are important to safety for the operation of a facility.	13.5-13.5.1.2		H	b
COL 13.5(2)	Deleted from the DCD.				
COL 13.5(3)	The COL Applicant is to develop procedures performed by licensed operators in the main control room. Operating procedures that are used by the operating organization to ensure routine operating, off-normal, and emergency activities are conducted in a safe manner are described. The plan includes the implementation of these procedures (Ref. 13.5-3).	13.5.2		H	b
COL 13.5(4)	The COL Applicant is to describe the different classifications of procedures the operators will use in the main control room and locally in the plant for operations, the operating organization responsible for maintaining the procedures, and the general format and content of the different classifications.	13.5.2 13.5.2.1	A		

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale	
COL 13.5(5)	The COL Applicant is to describe the program for developing operating procedures.	13.5.2	A			
COL 13.5(6)	The COL Applicant is to describe the program for developing and implementing emergency operating procedures.	13.5.2	A			
COL 13.5(7)	The COL Applicant is to describe the classifications of maintenance and other operating procedures, the operating organization group or groups responsible for following each class of procedure, and the general objectives and character of each class and subclass.	13.5.2.2	A			
COL 13.6(1)	The COL Applicant is to develop ~~the security assessment,~~and provide plant overall security plan~~, an~~ and implementation schedule for the security programs~~, and proposed inspection, test, analysis, and acceptance criteria for physical security hardware~~.	13.6 Table 13.4-201	A			CTS-00544
COL 13.7(1)	The COL Applicant is to develop the description of the operating and construction ~~(upon approval of revised 10 CFR 26)~~ plant fitness-for-duty programs.	13.7	A			CTS-00544

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Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale
COL 14.3(2)	The COL applicant provides proposed ITAAC for the facility's emergency planning not addressed in the DCD in accordance with RG 1.206 (Reference 14.3-1) as appropriate. [14.3.4.10]	14.3.4.10	A		
COL 14.3(3)	Deleted from the DCD.				
COL 15.0(1)	In the COLA, if the site-specific χ/Q values exceed DCD χ/Q values, then the COL Applicant is to demonstrate how the dose reference values in 10 CFR 50.34 and the control room dose limits in 10 CFR 50, Appendix A, General Design Criteria 19 are met for affected events using site-specific χ/Q values.	15.0.3.3	A		
COL 16.1(1)	Adoption of RMTS is to be confirmed and the relevant descriptions are to be fixed.	16.1.1.2 COLA Part 4, Section A	A		
COL 16.1(2)	Adoption of SFCP is to be confirmed and the relevant descriptions are to be fixed.	16.1.1.2 COLA Part 4, Section A	A		
~~COL 16.1_3(1)~~	~~Deleted from the DCD.~~				CTS-00545
COL 16.1_3.3.1(1)	The trip setpoints and allowable values in Table 3.3.1-1 are to be confirmed after completion of a plant specific setpoint study following selection of the plant specific instrumentation.	COLA Part 4, Section A		H	a

Table 1.8-201 (Sheet 62 of 68)

Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale
COL 16.1_3.3.2(1)	The trip setpoints ~~and~~, allowable values and time delay value in Table 3.3.2-1 are to be confirmed after completion of a plant specific setpoint study following selection of the plant specific instrumentation.	COLA Part 4, Section A	A	H	a
COL 16.1_3.3.5(1)	The trip setpoints and time delay values in SR 3.3.5.3 are to be confirmed after completion of a plant specific setpoint study following selection of the plant specific instrumentation.	COLA Part 4, Section A	A	H	a
COL 16.1_3.3.6(1)	The trip setpoints and allowable values in Table 3.3.6-1 are to be confirmed after completion of a plant specific setpoint study following selection of the plant specific instrumentation.	COLA Part 4, Section A		H	a
COL 16.1_3.4.17(1)	The site specific information for tube repair is to be provided.	COLA Part 4, Section A	A		
COL 16.1_3.7.9(1)	LCO 3.7.9 and associated Bases for the Ultimate Heat Sink based on plant specific design are to be developed.	COLA Part 4, Section A	A		
COL 16.1_3.7.10(1)	LCO 3.7.10 and associated Bases for hazardous chemical are to be confirmed by the evaluation with site-specific condition.	COLA Part 4, Section A	A		
COL 16.1_3.8.4(1)	The battery float current values in required action A.2 is to be confirmed after selection of the plant batteries.	COLA Part 4, Section A	A		
COL 16.1_3.8.5(1)	The battery float current values in required action A.2 is to be confirmed after selection of the plant batteries.	COLA Part 4, Section A	A		

CTS-00546

Table 1.8-201 (Sheet 65 of 68)

Resolution of Combined License Items for Chapters 1 - 19

COL Item No.	COL Item	FSAR Location	COL Applicant Item	COL Holder Item	Rationale
COL 17.4(1)	The COL Applicant shall be responsible for the development and implementation of the Phases II and III of the D-RAP. In the Phase II, the plant's site-specific information should be introduced to the D-RAP process and the site-specific SSCs should be combined with the US-APWR design SSCs into a list for the specific plant. In the Phase III, procurement, fabrication, construction, and test specifications for the SSCs within the scope of the RAP should ensure that significant assumptions, such as equipment reliability, are realistic and achievable. The QA requirements should be implemented during the procurement, fabrication, construction, and pre-operation testing of the SSCs within the scope of the RAP.	17.4.3 17.4.4 17.4.7 17.4.8 Table 17.4-201	A	H	b
COL 17.4(2)	The COL Applicant shall be responsible for the development and implementation of the O-RAP, in which the RAP activities should be integrated into the existing operational program (i.e., Maintenance Rule, surveillance testing, in-service inspection, in-service testing, and QA). The O-RAP should also include the process for providing corrective actions for design and operational errors that degrade nonsafety- related SSCs within the scope of the RAP.	17.4.3 17.4.4 17.4.5 17.4.7		H	b
COL 17.5(1)	The COL applicant shall develop and implement ~~the Design other than the Design Certification, construction and operational QAP that also covers the activities described in Section 17.5~~a Quality Assurance Program Description for site-specific design activities and for plant construction and operation.	17.0 17.1 17.2 17.3 17.5	A		
COL 17.6(1)	The COL applicant develops and implements the program for implementation of 10 CFR 50.65, the Maintenance Rule.	17.6		H	b

CTS-00526

Table 1.9-201 (Sheet 4 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
1.68	Initial Test Programs for Water-Cooled Nuclear Power Plants	Revision 3 March 2007	Conformance	14.2 Appendix 14A Appendix 14AA
1.76	Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants	Revision 1 March 2007	Conformance	2.3.1.2.3 3.3.2 3.5.1
1.78	Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release	Revision 1 December 2001	Conformance	2.2.3 6.4.4
1.82	Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident	Revision 3 November 2003	Conformance	6.2.2
1.83	In-service Inspection of Pressurized Water Reactor Steam Generator Tubes	Revision 1 July 1975	Not applicable (This RG is considered for withdrawal by NRC.)	N/A
1.84	Design, Fabrication, and Materials Code Case Acceptability, ASME Section III	Revision 34 October 2007	Conformance	3.12.2 4.5.1.1 4.5.2.1 ~~5.2.1.2~~ CTS-00530
1.86	Termination of Operating Licenses for Nuclear Reactors	Revision 0 June 1974	Not applicable (This RG is outside the scope of the FSAR.)	N/A
1.91	Evaluations of Explosions Postulated To Occur on Transportation Routes Near Nuclear Power Plants	Revision 1 February 1978	Conformance	2.2

CP COL 1.9(1)

Table 1.9-202

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

RG Number	RG Title	Revision/Date	COLA/FSAR Status	Corresponding Chapter/Section
4.7	General Site Suitability Criteria for Nuclear Power Stations	Revision 2 April 1998	Conformance	2.1 2.4.12 2.4.13 2.5.5
4.15	Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination) – Effluent Streams and the Environment	Revision 2 July 2007	Conformance with exceptions (QA requirements meet existing active radiological monitoring program for CPNPP Units 1 and 2.)	~~11.3~~ 11.5

CTS-00529

Table 1.9-203 (Sheet 2 of 3)

Comanche Peak Nuclear Power Plant Units 3 & 4 Conformance with Division 8 Regulatory Guides

RG Number	RG Title	Revision/Date	COLA FSAR Status	Corresponding Chapter/ Section	
8.9	Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program	Revision 1 July 1993	Conformance	12.1.3	
8.10	Operating Philosophy for Maintaining Occupational Radiation Exposures as Low as Is Reasonably Achievable	Revision 1-R May 1977	Conformance	12.1.1.3 12.2.1.1.10s	
8.13	Instruction Concerning Prenatal Radiation Exposure	Revision 3 June 1999	Conformance	12.1.3	
8.15	Acceptable Programs for Respiratory Protection	Revision 1 October 1999	Conformance	12.1.3	
~~8.20~~	~~Applications of Bioassay for I-125 and I-131~~	~~Revision 1 September 1979~~	~~Conformance~~	~~12.1.3~~	DCD_12.01-2
8.25	Air Sampling in the Workplace	Revision 1 June 1992	Conformance	12.1.3	
~~8.26~~	~~Applications of Bioassay for Fission and Activation Products~~	~~Revision 0 September 1980~~	~~Conformance~~	~~12.1.3~~	DCD_12.01-2
8.27	Radiation Protection Training for Personnel at Light-Water-Cooled Nuclear Power Plants	Revision 0 March 1981	Conformance	12.1.3	
8.28	Audible-Alarm Dosimeters	Revision 0 August 1981	Conformance	12.1.3	
8.29	Instruction Concerning Risks from Occupational Radiation Exposure	Revision 1 February 1996	Conformance	12.1.3	

Table 1.9-203 (Sheet 3 of 3)

Comanche Peak Nuclear Power Plant Units 3 & 4 Conformance with Division 8 Regulatory Guides

RG Number	RG Title	Revision/Date	COLA FSAR Status	Corresponding Chapter/ Section	
~~8.32~~	~~Criteria for Establishing a Tritium Bioassay Program~~	~~Revision 0 July 1988~~	~~Conformance~~	~~12.1.3~~	DCD_12.01-2
8.34	Monitoring Criteria and Methods To Calculate Occupational Radiation Doses	Revision 0 July 1992	Conformance	12.1.3	
8.35	Planned Special Exposures	Revision 0 June 1992	Conformance	12.1.3	
8.36	Radiation Dose to the Embryo/Fetus	Revision 0 July 1992	Conformance	12.1.3	
8.38	Control of Access to High and Very High Radiation Areas of Nuclear Plants	Revision 1 May 2006	Conformance	12.1.3 12.3.1.2.1.2	

Chapter 2

Chapter 2 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of T/R
CTS_00520	Table2.0-1R	2.0-2	Changes in DCD	Update table 2.0-1R to reflect changes in the ISG and to be consistent with the DCD.	0
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-00677	2.2.2.7.1	2.2-9	Erratum	Remove reference to 500d threshold related to RG 1.206 and replace with 500D^2 to be consistent with FSAR Chapter 3 and SRP. Remove the 4 paragraphs that relate to RG 1.206 thresholds of 1000d to be consistent with 1000D^2.	0
CTS-00677	2.2.2.7.1	2.2-24	Erratum	References cited in Subsection 2.2.2.7.1 were removed from the text and they are not cited elsewhere; therefore, the notations associated with this change are removed.	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-00647	2.3.1	2.3-20	Erratum	Change 53 inches to 35 inches; 43 inches to 27 inches; and 48 inches to 31 inches to be consistent with HMR-53.	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

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

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of T/R
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
CTS-00598	2.5.5	2.5-195	Editorial correction	Remove IBR statement.	0
CTS-00515	2.5.7	2.5-224	Editorial correction	Revise Subsection reflecting commitment to NRC.	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

Table 2.0-1R (Sheet 1 of 12)
Key Site Parameters

CP COL 2.1(1)	**Meteorology**				
CP COL 2.2(1)	**Parameter Description**	**Parameter Value**			
		DCD	**CPNPP 3 and 4**		
	Normal winter precipitation roof load	50 lb/ft^2	(11.7 lb/ft^2)	CTS-00520
CP COL 2.3(1) CP COL 2.3(2) CP COL 2.3(3)	Extreme winter precipitation roof load (100-year snowpack maximum snow weight including contribution portion of either extreme frozen winter precipitation event or extreme liquid winter precipitation event)~~Roof Snow Load (100-year snowpack maximum snow weight including contributing portion of 48-hour probable maximum winter precipitation [PMWP])~~	75 lb/ft^2	(37.8 lb/ft^2)	CTS-00520
CP COL 2.4(1)	~~Weight of 48-hr PMWP~~48-hr probable maximum winter precipitation (PMWP)	36 in~~50 lb/ft^2~~	31 in~~Awaiting interim NRC Staff guidance.~~	CTS-00520
CP COL 2.5(1)	Tornado maximum wind speed	230 mph	(230 mph)	
	Tornado maximum pressure drop	1.2 psi	(1.2 psi)	
	Tornado-generated missile spectrum and associated velocities	15 ft long schedule 40 steel pipe moving horizontally at 135 ft/s[a]	15 ft long schedule 40 steel pipe moving horizontally at 135 ft/s[a]	
		4000 lb automobile moving horizontally at 135 ft/s[a]	4000 lb automobile moving horizontally at 135 ft/s[a]	
		1 in diameter steel sphere moving horizontally at 26 ft/s[a]	1 in diameter steel sphere moving horizontally at 26 ft/s[a]	

Table 2.0-1R (Sheet 2 of 12)
Key Site Parameters

CP COL 2.1(1)
CP COL 2.2(1)
CP COL 2.3(1)
CP COL 2.3(2)
CP COL 2.3(3)
CP COL 2.4(1)
CP COL 2.5(1)

Ambient design air temperature (0% exceedance maximum)	115°F dry bulb, 80°F coincident wet bulb, 86°F non-coincident wet bulb, historical limit excluding peaks <2 hr	112°F dry bulb, 78°F coincident wet bulb, 83°F non-coincident wet bulb, historical limit excluding peaks <2 hr
Ambient design air temperature (1% exceedance minimum)	-10°F dry bulb	25°F dry bulb
Ambient design air temperature (0% exceedance minimum)	-40°F dry bulb, historical limit excluding peaks <2 hr	-0.5°F dry bulb, historical limit excluding peaks <2 hr
Atmospheric dispersion factors (χ/Q values) for on-site locations:		
Exclusion area boundary (EAB) 0-2 hrs	5.0×10^{-4} s/m^3	3.70×10^{-4} s/m^3
EAB annual average	1.6×10^{-5} s/m^3	5.5×10^{-6} s/m^3
Atmospheric dispersion factors (χ/Q values) for off-site locations:		
Low-population zone (LPZ) boundary		
0-8 hrs	2.1×10^{-4} s/m^3	2.29×10^{-5} s/m^3
8-24 hrs	1.3×10^{-4} s/m^3	1.49×10^{-5} s/m^3
1-4 days	6.9×10^{-5} s/m^3	6.34×10^{-6} s/m^3
4-30 days	2.8×10^{-5} s/m^3	2.01×10^{-6} s/m^3
Food production area annual average	5.0×10^{-6} s/m^3	Not calculated as a single value. Annual average ~~X~~ χ/Q values provided as a function of distance and direction out to a 50-mile distance.

CTS-00636

Table 2.0-1R (Sheet 12 of 12)
Key Site Parameters

CP COL 2.1(1) CP COL 2.2(1)	Subsurface stability – shear wave velocity for defining hard rock	8000 ft/s	The site does not meet the Vs for a hard rock site
CP COL 2.3(1) CP COL 2.3(2)	Subsurface stability – liquefaction potential	None (for seismic category I structures)	The site strata is not prone to liquefaction

CP COL 2.3(3) a) The specified missiles are assumed to have a vertical speed component equal to 2/3 of the horizontal speed.

CP COL 2.4(1) b) These dispersion factors are chosen as the maximum values at all intake points.

CP COL 2.5(1) c) These dispersion factors are used for a loss-of-coolant accident (LOCA) and a rod ejection accident.

d) These dispersion factors are used for a steam generator tube rupture, a steam system piping failure, a reactor coolant pump rotor seizure and a rod ejection accident.

e) These dispersion factors are used for a fuel handling accident occurring in the fuel storage and handling area.

f) These dispersion factors are used for a failure of small lines carrying primary coolant outside containment.

g) These dispersion factors are used for a fuel-handling accident inside the containment.

h) These dispersion factors are chosen as the maximum values at all inleak points.

i) These dispersion factors are used for a LOCA.

j) ~~X~~χ/Qs were conservatively determined using the distances from each release location to the closer of either the Electrical Room HVAC or the Control Room HVAC intake. For all release locations except the main steam line break, the Class 1E Electrical Room HVAC intakes are closer to the release points than the Control Room HVAC intakes. CTS-00636

k) These dispersion factors are used for a rod ejection accident.

(Reference 2.2-204). There have been no fatal aircraft accidents in the 5-mi radius of CPNPP in the last 20 yr. There have been four nonfatal accidents associated with Granbury in the last 10 years. (Reference 2.2-205)

Granbury Municipal Airport is the only public airport within 10 mi ~~that exceeds 500d operations a year, where “d” is the distance in miles from the airport to the site~~of the site. The reported average operations of 73 per day is well below the conservative threshold of 500D^2 operations per year, where the variable D represents the distance in miles from the sites. There are no airports within the region that exceed the 1000D^2 criterion.~~four public airports within the region that exceed 1000d operations per year: Cleburne Municipal Airport, Fort Worth Spinks Airport, Fort Worth Meacham International Airport, and Arlington Municipal Airport.~~ CTS-00677

~~Cleburne Municipal Airport is a public, noncommercial airport located 29 mi east of the site. As of 2007, the airport had approximately 32,850 aircraft operations per year (Reference 2.2-233). There have been no fatal airplane accidents in the Cleburne area in the last ten years. However, four nonfatal accidents have been reported during the same time period. (Reference 2.2-230)~~

~~Fort Worth Spinks Airport is a public, noncommercial airport located 33 mi northeast of the site. As of 2006, the airport had approximately 58,400 aircraft operations per year (Reference 2.2-235). There have been no fatal accidents in the Burleson area in the last 10 years. There have been two nonfatal accidents during the same time period (Reference 2.2-231).~~

~~Fort Worth Meacham International Airport is a public airport located 44 mi northeast of the site. As of 2007, the airport reported approximately 98,915 operations per year (Reference 2.2-234). There have been two fatal accidents associated with Fort Worth in the last 10 years. An additional 30 nonfatal accidents took place in the Fort Worth area during the same frame (Reference 2.2-229).~~

~~Arlington Municipal Airport is a public, noncommercial airport located 48 mi northeast of the site. As of 2006, the airport reported approximately 151,475 operations per year (Reference 2.2-236). There have been no fatal accidents associated with the Arlington area in the last 10 years. Three nonfatal accidents took place during the same time frame (Reference 2.2-232).~~

2.2.2.7.2 Airways

There are no airways that pass within 5 mi of CPNPP as shown in Figure 2.2-203. The centerlines of two low-altitude flight lines pass within 10 mi of CPNPP. These routes, also known as Victor air routes, are primarily flown by general aviation aircraft. The routes generally have a width of 8 nautical mi, and occupy the airspace between 18,000 ft and the floor of controlled airspace (700 ft to 1200 ft). Victor air route V18-94 tracks in an east-west manner and passes 9.7 mi south of

2.2-229 ~~National Transportation Safety Board (NTSB). 2008. "Aviation Accident Database Query – Fort Worth 1990 – 2008." Available URL: http://www.ntsb.gov/ntsb/query.asp. (Accessed July 26, 2008).~~ CTS-00677

2.2-230 ~~National Transportation Safety Board (NTSB). 2008. "Aviation Accident Database Query – Cleburne 1990 – 2008." Available URL: http://www.ntsb.gov/ntsb/query.asp. (Accessed July 26, 2008).~~

2.2-231 ~~National Transportation Safety Board (NTSB). 2008. "Aviation Accident Database Query – Burleson 1990 – 2008." Available URL: http://www.ntsb.gov/ntsb/query.asp. (Accessed July 26, 2008).~~

2.2-232 ~~National Transportation Safety Board (NTSB). 2008. "Aviation Accident Database Query – Arlington 1990 – 2008." Available URL: http://www.ntsb.gov/ntsb/query.asp. (Accessed July 26, 2008).~~

2.2-233 AirNav. 2008. "Cleburne Municipal Airport." Available URL: http://www.airnav.com/airport/FWS. (Accessed February 27, 2008).

2.2-234 ~~AirNav. 2008. "Fort Worth Meacham International Airport." Available URL: http://www.airnav.com/airport/FTW. (Accessed February 27, 2008).~~ CTS-00677

2.2-235 AirNav. 2008. "Fort Worth Spinks Airport." Available URL: http://www.airnav.com/airport/FWS. (Accessed July 27, 2008).

2.2-236 ~~AirNav. 2008. "Arlington Municipal Airport." Available URL: http://www.airnav.com/airport/GKY. (Accessed July 27, 2008).~~ CTS-00677

2.2-237 Somervell County Water District (SCWD). 2008. "Phase I – Wheeler Branch Dam and Paluxy River Channel." Available URL: http://scwd.us/?page_id=9. (Accessed July 25, 2008).

CP COL 2.2(1)

Table 2.2-203 (Sheet 2 of 4)
OSHA Permissible Exposure Limit (PEL) Z-1 Table for Industrial Facilities Within 5 mi of CPNPP

Facility	Substance	Limit (ppm)	Limit (mg/m^3)
DeCordova SES	Ammonia	50	35
	Carbon		3.5
	Carbon dioxide	5000	9000
	Ethylene glycol	(C) 0.2	(C) 1
	Hydrogen chloride	(C) 5	(C) 7
	Mineral oil mist		5
	Sodium hydroxide		2
	Sulfuric acid		1
CPNPP Units 1 ~~&~~and 2	Acetic acid	10	25
	Acetone (2-Propanone)	1000	2400
	Antimony		0.5
	Arsenic, inorganic compounds		0.01
	Barium (soluble compounds)		0.5
	1,2-benzenedicarboxylic acid dibutyl ester (dibutyl phthalate)		5
	n-Butyl-acetate	150	710
	n-Butyl alcohol	100	300
	2-Butoxyethanol	50	240
	Calcium carbonate (respirable fraction)		5
	Calcium oxide		5
	Carbon		3.5
	Carbon dioxide	5000	9000
	Carbon monoxide	50	55
	Chromium metal and insol. salts (as Cr)		0.5
	Copper (fume)		1
	Copper (total dust)		1
	Cryolite (as F)		2.5
	Diacetone alcohol	50	240
	Dichlorodifluoromethane	1000	4950

CTS-00637

CP COL 2.2(1)

Table 2.2-206
OSHA Permissible Exposure Limit (PEL) Z-2 Table for Industrial Facilities Within 5 mi of CPNPP

Facility	Substance	Time Weighted Average (8-hr shift)	Acceptable Ceiling Concentration	Acceptable Maximum Peak above Acceptable Ceiling Concentration (8-hr shift)	
				Concentration	Maximum Duration (min)
Wolf Hollow 1, LP	Benzene	10 ppm	25 ppm	50 ppm	10
	Methylene chloride	25 ppm			
	Toluene	200 ppm	300 ppm	500 ppm	10
CPNPP Units 1 ~~&~~and 2	Benzene	10 ppm	25 ppm	50 ppm	10
	Methylene chloride	25 ppm			
	Mercury		$1\ mg/10m^3$		
	Toluene	200 ppm	300 ppm	500 ppm	10

CTS-00637

(Reference 2.2-207)
(Reference 2.2-227)

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 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).

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 CTS-00647
occurs as liquid. As stated in the US-APWR DCD Subsection 3.4.1.2, If PMWP were to occur, US-APWR safety-related systems and components would not be jeopardized. US-APWR seismic category I building roofs are designed as a drainage system capable of handling the PMWP. The US-APWR DCD also states

CP COL 2.3(1)

Table 2.3-206 (Sheet 2 of 2)
Hurricane Landfalls in Texas

1899 – 2006				
1980	AUG	Allen	3	TX 3
1983	AUG	Alicia	3	TX 3
1986	JUN	Bonnie	1	TX 1
1989	AUG	Chantal	1	TX 1
1989	OCT	Jerry	1	TX 1
1999	AUG	Bret	3	TX 3
2003	AUG	Claudette	1	TX 1
2005	SEP	Rita	5	TX ~~5~~3

CTS-00587

Notes:

1. Data are from "Atlantic Tropical Storms And Hurricanes Affecting The United States:1899 – 2002," NOAA Technical Memorandum NWS SR-206 (Updated through 2002).
2. No tropical storms struck Texas in 2006 (see http://www.nhc.noaa.gov/2006atlan.shtml).
3. Data for 2004 and 2005 from the National Hurricane Center http://www.nhc.noaa.gov/2003claudette.shtml? and http://www.nhc.noaa.gov/pdf/TCR-AL182005_Rita.pdf

CP COL 2.3(3)

Table 2.3-342 (Sheet 1 of 2)
χ/Q and D/Q Values for Normal Releases

No Decay, Undepleted and Depleted, at Each Receptor Location

CTS-00636

Type of Location	Sector	Distance (mi)	Distance (meters)	~~X~~ χ/Q (m^3) No Decay Undepleted	~~X~~ χ/Q (m^3) No Decay Depleted	D/Q (m^{-2})
EAB	S	0.37	600	1.70E-06	1.50E-06	2.30E-08
EAB	SSW	0.37	600	1.30E-06	1.20E-06	1.50E-08
EAB	SW	0.37	600	1.00E-06	9.40E-07	1.10E-08
EAB	WSW	0.37	600	9.80E-07	9.00E-07	9.10E-09
EAB	W	0.37	600	1.40E-06	1.30E-06	1.10E-08
EAB	WNW	0.37	600	2.20E-06	2.00E-06	1.70E-08
EAB	NW	0.37	600	4.40E-06	4.10E-06	3.80E-08
EAB	NNW	0.37	600	5.50E-06	5.10E-06	5.50E-08
EAB	N	0.37	600	3.90E-06	3.60E-06	4.90E-08
EAB	NNE	0.37	600	3.50E-06	3.20E-06	1.90E-08
EAB	NE	0.37	600	3.10E-06	2.80E-06	1.20E-08
EAB	ENE	0.37	600	2.40E-06	2.20E-06	9.00E-09
EAB	E	0.37	600	1.30E-06	1.20E-06	4.00E-09
EAB	ESE	0.37	600	1.70E-06	1.60E-06	7.50E-09
EAB	SE	0.37	600	2.20E-06	2.00E-06	1.40E-08
EAB	SSE	0.37	600	1.30E-06	1.20E-06	1.90E-08
Residence	S	1.09	1753	3.50E-07	3.10E-07	3.90E-09
Residence	SSW	0.79	1276	4.40E-07	3.90E-07	4.50E-09
Residence	SW	0.79	1276	3.30E-07	3.00E-07	3.10E-09
Residence	WSW	1.16	1869	1.80E-07	1.60E-07	1.40E-09

CP COL 2.3(3)

Table 2.3-342 (Sheet 2 of 2)
χ/Q and D/Q Values for Normal Releases

No Decay, Undepleted and Depleted, at Each Receptor Location

CTS-00636

Type of Location	Sector	Distance (mi)	Distance (meters)	~~X~~ χ/Q (m^3) No Decay Undepleted	~~X~~ χ/Q (m^3) No Decay Depleted	D/Q (m^{-2})
Residence	W	1.16	1869	2.60E-07	2.20E-07	1.60E-09
Residence	WNW	2.26	3645	1.60E-07	1.30E-07	8.00E-10
Residence	NW	2.18	3515	3.30E-07	2.70E-07	1.90E-09
Residence	NNW	2.18	3515	4.10E-07	3.40E-07	2.80E-09
Residence	N	1.99	3202	3.20E-07	2.60E-07	2.90E-09
Residence	NNE	1.99	3202	2.70E-07	2.30E-07	1.20E-09
Residence	NE	2.39	3853	1.80E-07	1.50E-07	5.20E-10
Residence	ENE	2.4	3863	1.30E-07	1.10E-07	3.90E-10
Residence	E	2.76	4449	6.10E-08	4.90E-08	1.40E-10
Residence	ESE	2.43	3903	9.80E-08	8.00E-08	3.20E-10
Residence	SE	1.95	3146	1.80E-07	1.50E-07	8.70E-10
Residence	SSE	1.83	2942	1.20E-07	1.00E-07	1.30E-09
Garden	ENE	2.86	4609	1.10E-07	8.50E-08	2.90E-10
Garden	E	2.86	4609	5.80E-08	4.60E-08	1.30E-10

2.4.1 Hydrologic Description

CP COL 2.4(1) Replace the content of DCD Subsection 2.4.1 with the following.

This subsection describes regional and site hydrological conditions, specifically surface water and groundwater characteristics. Information provided in this subsection includes descriptions of the site and features, hydrosphere, hydrologic characteristics, drainage, dams and reservoirs, proposed water management changes, and surface water users.

2.4.1.1 Site and Facilities

Comanche Peak Nuclear Power Plant (CPNPP) Units 3 and 4 are located on the western end of a peninsula formed by the southern shore of Squaw Creek Reservoir (SCR) and the CPNPP Units 1 and 2 Safe Shutdown Impoundment, approximately 0.49 mi west-northwest of CPNPP Units 1 and 2 in Somervell County, Texas. The CPNPP site is located in Somervell and Hood Counties, Texas approximately 5.2 mi north-northwest of the town of Glen Rose, Texas (Figure 2.1-202).

CPNPP Units 3 and 4 are located approximately 0.49 mi west-northwest of CPNPP Units 1 and 2 as shown in Figure 2.1-201 and utilize mechanical draft cooling towers for circulating and service water system cooling. Cooling water comes from Lake Granbury located approximately 7.13 mi north-northeast of the CPNPP site.

Maximum relief in the CPNPP site area is approximately 220 ft, with elevations ranging from 640 ft to 860 ft above sea level, with slopes that are typically steep, ranging from 15 to 30 degrees or more, and generally exhibiting a stair-stepped appearance. Rock outcrops of limestone and claystone comprise approximately 40 to 60 percent of these slopes. The remaining areas, including the higher flat-topped plateau remnants, are mantled by a thin cover of soil, which at the surface generally consists of silt and sand (Reference 2.4-201). The standard plant ~~grade~~floor evaluation of the safety-related facilities is established at 823 ft above msl. The center of the nonsafety-related mechanical draft cooling towers is located about 1,800 ft to the northwest of the CPNPP Unit 3 and 4 center point at a grade elevation of 850 ft msl (Figure 2.1-201). Locations and topographic profiles showing the relationship between the CPNPP site, SCR, and Lake Granbury are illustrated on Figures 2.4.1-201 and 2.4.1-202. Grading and drainage improvements are illustrated on Figure 2.4.2-202. CTS-00590

Lake Granbury, the source of cooling water for the cooling tower system, is discussed in detail in Subsection 2.4.1.2. Cooling water is expected to be withdrawn by an intake structure located approximately 1.31 mi upstream from the DeCordova Bend dam. The cooling water is pumped to the CPNPP Units 3 and 4 cooling system through two pipelines, and the blowdown water from the cooling water system is discharged through two separate pipelines back to Lake Granbury about 1.14 mi downstream from the intake structure. Figure 2.4.1-203 depicts the location of the intake and discharge structures on Lake Granbury. Emergency safe shutdown of the reactor does not rely on an external source of cooling water.

The individual plant arrangement is comprised of five principal building structures; the reactor building, auxiliary building, emergency power source building, access building, and turbine building. The two unit configuration employs a single radwaste building located between the two units. The reactor building, power source buildings, power source fuel storage vaults, essential service water pipe tunnel and ultimate heat sink related structures are designed to seismic ~~C~~category I ~~seismic~~ requirements and contain safety-related equipment for accident mitigation. The nuclear island consists of the reactor building including pre-stressed concrete containment vessel and containment internal structure, auxiliary building, access building, and power source buildings. The foundation for the nuclear island is an independent base mat which supports each building. Floor elevation of the nuclear island is set 1 ft above the plant grade of 822 ft msl with the embedded depth of the nuclear island base mat at approximately 784 ft msl. The locations of these safety-related components are shown on Figure 2.1-201. The elevation for all facilities and accesses are listed in Table 2.4.1-201. CTS-00591

The majority of the natural surface runoff surrounding the CPNPP Unit 3 and 4 site area flows in a northerly direction into SCR. At the location of the power plant facilities, the surface drainage is directed to the yard holding pond and Probable Maximum Precipitation (PMP) ditch. Runoff collected in the yard holding pond and PMP ditch is expected to drain by overflow weirs or sheet flow into SCR. A small amount of surface runoff on the northwest side of the power plant facilities is anticipated to flow along the natural gap and piping grade towards SCR. A description of the site grading and earthwork is presented in Subsection 2.4.2.3.

A bathymetric survey was conducted in April, 2007 in the vicinity of the intake and discharge structures on Lake Granbury (Reference 2.4-202). Figure 2.4.1-204 shows the locations of waypoints used for temperature measurements, and Table 2.4.1-202 provides measurement data. Figure 2.4.1-205 depicts water depth obtained from the bathymetric survey within the portions of Lake Granbury adjacent to the intake and discharge structures. Water temperatures were taken at the surface then at 10 feet increments to a depth of 50 feet where allowable due to total depth at that location. The data reveal an approximate 8°F difference in water temperature between surface and bottom measurements.

Soil characteristics are discussed in Subsection 2.5.4. Site vicinity maps are provided in Section 2.1.

2.4.1.2 Hydrosphere

The Brazos River Basin has the largest drainage area of all basins between the Rio Grande and the Red River in Texas. Total basin drainage area is approximately 45,700 sq mi, of which approximately 43,000 sq mi are in Texas, the remainder, in New Mexico. (Reference 2.4-203) The Brazos River Basin crosses through three distinct physiographic provinces: the Great Plains, Central

Luminant, and Wheeler Branch Reservoir by the Somervell County Water District. Table 2.4.1-203 provides information on dam and reservoir specifications for these impoundments.

The U.S. Army Corps of Engineers (USACE) maintains water flow rates on its website (Reference 2.4-207) for each day of the year for the major impoundments on the Brazos River, including Possum Kingdom Lake, Lake Granbury, and Lake Whitney.

Reservoir yields for the years 2000 and 2060 were obtained from the 2006 Brazos G Regional Water Plan (Reference 2.4-208). The firm yield is the greatest amount a reservoir could have supplied without shortage during a repeat of historical hydrologic conditions. Safe yield is defined as the amount of water that can be diverted from a reservoir during a repeat of the worst drought of record while still maintaining a reserve capacity equal to a 1-yr supply. Utilization of safe yield versus firm yield is a common practice in west Texas. Safe yield provides additional assurance of supply in an area where water resource alternatives are limited. Reservoir yields were limited to authorized diversions, and the period of record for the firm yield analyses was for the years 1940 through 1997.

2.4.1.2.1 Brazos River and Lake Granbury

Principal streams that enter the 145-mi segment of the Brazos River between Morris-Sheppard Dam on Possum Kingdom Lake and DeCordova Bend Dam include Palo Pinto and Rock Creeks. Along this segment, the Brazos River has a slope of 0.04 percent, and a gradient of 2.117 ft/mi. The additional catchment area between the two dams is about 2140 sq mi, all of which contribute to flow in the Brazos River (Reference 2.4-201). Approximate lengths and slopes of these streams are presented in Table 2.4.1-204.

The principal tributaries of the Brazos River above the Morris-Sheppard Dam that impounds Possum Kingdom Lake are the Salt, Double Mountain, and Clear forks of the Brazos River (Figure 2.4.1-209). The catchment area above Morris-Sheppard Dam (Figure 2.4.1-207) is about 22,550 sq mi, of which about 9240 sq mi are probably non-contributing. Of the contributing area, nearly half is in the Clear Fork Basin (Reference 2.4-201). CTS-00661

There are six intermittent streams that flow into Lake Granbury within a 6-mi radius of the Units 3 and 4 intake and discharge structures upstream of the DeCordova Bend Dam (Figure 2.4.1-210). These streams include Lusk Branch, Walnut Creek, Contrary Creek, Rough Creek, Lambert Branch, and Rucker Creek. Approximate lengths and slopes of these streams are presented in Table 2.4.1-205.

Water Rights Permit No. 2111, issued July 24, 1964, authorized the BRA to construct and maintain a dam and reservoir (Lake Granbury) on the Brazos River, to impound and not exceed 155,000 ac-ft of water. The BRA was permitted to divert and use not to exceed 10,000 ac-ft/yr of water for municipal purposes, 70,000 ac-ft/yr for industrial purposes, 20,000 ac-ft/yr for irrigation and 350,000 ac-ft/yr for hydroelectric power generation. Several amendments were made to Permit 2111 in the following years. On September 28, 1966, the authorization to divert 350,000 ac-ft/yr of water for hydroelectric power generation was deleted and on September 13, 1979 the impounded waters of Lake Granbury was approved for recreational purposes. A change in water use resulted in another amendment to the Permit that was approved on November 25, 1980. It allowed the permittee to use 500 ac-ft of the 20,000 ac-ft of water designated for irrigation to be used for mining purposes.

The Certificate of Adjudication, No. 12-5156, was issued to the BRA on December 14, 1987. It grants the BRA the right to impound and use the waters of Lake Granbury as previously described along with several "Special Conditions" concerning the "Systems Operations Order." The priority rights of Lake Granbury also fall under the order of Certificate of Adjudication 5167 for the purpose of system operation as authorized by Commission Order of July 23, 1964, as amended and as modified, by the Commission's final determination of all claims of water rights in the Brazos River Basin and the San Jacinto-Brazos Coastal Basin maintained by the BRA, the Fort Bend County W.C.I.D. No. 1 and the Galveston County Water Authority on June 26,1985 (Reference 2.4-209).

A review of USGS reservoir gauge data indicates the surface water elevation at Lake Granbury is kept at approximately 692.5 ft above msl (Reference 2.4-210). Graphs of daily reservoir elevation and storage from October 2002 to September 2007 for Lake Granbury are shown on Figure 2.4.1-211. Constant water level at Lake Granbury is maintained by an open spillway and retention time has been estimated at 260 days (Reference 2.4-211). Yield analysis for Lake Granbury indicates a firm yield of 64,712 ac-ft in 2000 and 63,212 ac-ft in 2060 (Reference 2.4-208).

The results of the 2003 TWDB Volumetric Survey indicate Lake Granbury has a volume of 129,011 ac-ft, and extends across 7945 surface ac at the conservation pool elevation of 693.0 ft above msl. (Reference 2.4-209) The 693.0 conservation pool elevation equals the elevation of the top of the gates for DeCordova Bend Dam and represents maximum storage capacity. (Reference 2.4-263)The revised TWDB 1994 survey report (1993 field survey) found 7949 surface ac and a total volume of 131,593 ac-ft. (Reference 2.4-209) CTS-00662 CTS-00662 CTS-00662

Comparison of the revised 1993 field survey to the current 2003 TWDB Volumetric Survey of Lake Granbury show little or no change in surface area and a 2 percent reduction in total volume at the top of the conservation pool. Most of this reduction appears to be in the area of continued deltaic accretion in the upper reaches of Lake Granbury where the Brazos River enters the main body of the reservoir. (Reference 2.4-209)

2.4.1.2.2 Squaw Creek and Squaw Creek Reservoir

SCR, the cooling water source for CPNPP Units 1 and 2 is located on Squaw Creek in Hood and Somervell Counties, approximately 4.3 mi north of the creek's confluence with the Paluxy River (Reference 2.4-201). At the conservation pool elevation (775.0 ft above msl), the lake has approximately 36 mi of shoreline and is 5 mi long. At the dam site the reservoir has a drainage area of 64 sq mi. Squaw Creek Dam and Reservoir are owned and operated by Luminant.

There are six intermittent streams that flow into the SCR within a 6-mi radius of CPNPP Units 3 and 4 upstream of the Squaw Creek Dam (Figure 2.4.1-210). These streams include Squaw Creek, Panter Branch, Lollar Branch, Panther Branch, Million Branch, and an unnamed stream branch. Approximate lengths and slopes of these streams are presented in Table 2.4.1-205.

The results of the 1997 TWDB Volumetric Survey indicate SCR has a volume of 151,418 ac-ft, and extends across 3297 surface ac at the conservation pool elevation of 775.0 ft above msl. Within the lake, the survey determined that the Squaw Creek safe shutdown impoundment (SSI) held 701 ac-ft, spread over a surface area of 53 ac. (Reference 2.4-212)

Yield analysis for SCR indicates a firm yield of 8830 ac-ft/yr in 2000 and 8710 ac-ft/yr in 2060 (Reference 2.4-208).

2.4.1.2.3 Water Control Structures

2.4.1.2.3.1 New Water Control Structures

Lake Granbury is bounded by two existing dams; DeCordova Bend Dam is located approximately 1.31 mi downstream of the CPNPP intake structures and Morris Sheppard Dam is located approximately 145 river miles upstream from the DeCordova Bend Dam. Both of these dams are owned and operated by the BRA and are primarily used for water supply, with secondary uses that include recreation, flood control, cooling, and power generation. No additional water control structures are planned or required for the facility.

2.4.1.2.3.2 ~~Water Intake Pumping Station~~Makeup Water Intake Structure CTS-00592

The ~~Intake Pumping Station~~Makeup Water Intake Structure is a reinforced concrete box-type structure housing the ~~cooling tower make-up pumps~~makeup water pumps, makeup water jockey pump, strainers, valves and associated piping. There is no safety-related equipment in the Circulating Water System, nor does loss of its normal operating capability adversely affect any safety-related components.

The intake structure is located approximately 1.31 mi upstream from the DeCordova Bend Dam. The blowdown water from the Circulating Water System is discharged through a separate pipeline back to Lake Granbury about 1.14 mi downstream from the intake structure

The bottom of the intake structure is at elevation 666.0 ft msl. Under agreement with Luminant, the BRA maintains a minimum pool elevation of 675 ft msl. The operating deck is at elevation 700.0 ft msl, which is below the DeCordova Bend Dam maximum elevation of 706 ft msl. The structure houses 5 pumps sized to adequately supply the required Circulating Water System flow of 32,700 gpm per unit. Service water is bled off the Circulating Water System flow and is expected to provide one hundred percent of the required make-up to the Service Water System under normal operating conditions and during periods of peak demand.

Screens provide course screening of floating and suspended debris, and prevent aquatic life from entering the structure. All screens are the single flow through automatic cleaning type. Two screens are provided for each of the two supply loops at the inlet to the intake structure. Each of the two screens on each loop has sufficient capacity to screen the total water required for one loop. The intake screens are sized so that the thru-screen flow velocity is less than 0.15 mps (0.5 fps). If fouling occurs, the screens are cleaned by air burst backwash.

Due to the depth and location of the intake structures on Lake Granbury, it is not anticipated that maintenance de-silting to remove sediment is necessary.

2.4.1.2.3.3 DeCordova Bend Dam

DeCordova Bend Dam impounds Lake Granbury on the Brazos River approximately 145 stream mi southeast of Morris Sheppard Dam and approximately 7.5 mi southeast of Granbury, at mile BRM 542.5. The lake was built by the BRA for the conservation of water for irrigation, municipal, and industrial uses and was completed in 1969. Lake Granbury and associated DeCordova Bend Dam are owned by the BRA. (Reference 2.4-267) Lake Granbury inundates approximately 33 mi of the original Brazos river bed (Reference 2.4-213) and has a ~~contributing~~ drainage area of ~~16,113~~25,679 sq mi (Reference 2.4-267). CTS-00663 CTS-00663 CTS-00664 CTS-00665

Ambursen Engineering Corp. of Houston designed the dam and the H. B. Zachry Company was the contractor. Construction began in December, 1966 and deliberate impoundment commenced September 15, 1969. The earth-rolled embankment is 2200 ft long, with a maximum height of 84 ft at elevation 706.5 ft msl. The service spillway is a gate-controlled ogee crest. There are 16 tainter gates, each 36 ft long by 35 ft high that have a crest elevation of 658.0 ft above msl. Outlet works consist of two 84 in by 96 in openings, motor-controlled by sluice gates with invert elevations at 652.0 and 640.0 ft above msl. (Reference 2.4-213)

DeCordova Bend Dam is expected to overtop during the Probable Maximum Flood event (described in further detail in Subsection 2.4.2). No seismic rating criteria have been published.

The USACE historical database of ice jams was reviewed for the region. See Subsection 2.4.7 for additional discussion. Due to the climate in the region, ice effects are not a concern for low water considerations.

2.4.11.4 Future Controls

According to the FSAR for Comanche Peak Steam Electric Station Units 1 and 2, an initial study by the Brazos River Authority identified three possible sites between Possum Kingdom Reservoir and Lake Granbury for potential control structures. Additionally, there is a possible site between DeCordova Bend Dam and Whitney Dam for a control structure. Issuance by the Texas Water Rights Commission of the permit to build and operate SCR precludes any significant development and control upstream in the Squaw Creek watershed. (Reference 2.4-214) Although the development of future controls on the Brazos River is possible, there are no safety-related facilities that could be affected.

2.4.11.5 Plant Requirements

Makeup water ~~to the cooling water system flow~~ is supplied by the intake as described in Subsection 2.4.1.2.3.2. The intake structure includes necessary intake screens, pumps, etc. to convey the makeup water to the cooling water system flow. Intake screen locations consider the Lake Granbury minimum level. There are no safety-related plant requirements provided by Lake Granbury. CTS-00593

The maximum expected Lake Granbury intake flow rate is approximately 65,400 gpm for the CPNPP Units 3 and 4. The maximum expected Lake Granbury intake flow includes a circulating water system (CWS) Cooling Tower makeup flow rate of 31,200 gpm per unit for Units 3 and 4, an ESWS Cooling Tower makeup flow rate of 274 gpm per unit for Units 3 and 4 and miscellaneous plant use such as make up water flow to raw water storage tanks. Water use and annual mean flow are discussed in Subsection 2.4.1.2. Although the Texas Water Code requires a permit for water use, there are no specific limitations set by state regulations. Water use from the Brazos River and Lake Granbury is administered by the Brazos River Authority.

Low-flow frequency analysis was performed in accordance with USGS Bulletin 17B using the Log-Pearson Type III distribution method. The USGS gage (08090800) on the Brazos River located near Dennis, Texas between Morris Sheppard Dam and De Cordova Bend Dam was used to analyze the current regulated conditions of the Brazos River at the intake. Table 2.4.11-204 provides a summary of low flow frequencies for selected durations and return periods.

The 30-day 100-yr drought flow rate for Brazos River near Dennis, TX is estimated to be 9.7 cfs. A 100-yr return period is defined as a 1 percent chance the event will occur during any one year. Therefore, the 30-day 100-yr drought flow rate has a 1 percent chance each year that the flow rate or less will occur for at least 30 consecutive days. The 30-day 100-yr drought flow rate is less than the maximum expected Lake Granbury intake flow rate of 146 cfs. Therefore, Units 3 and 4. Of the six wells tested, two were screened in the regolith, one was screened in an undifferentiated fill/regolith zone, and three were screened in the shallow bedrock zone. Hydraulic conductivity for the wells screened in the regolith or undifferentiated fill/regolith zone ranged from 2.93×10^{-5} cm/s to 5.00×10^{-4} cm/s. Hydraulic conductivity for the wells screened in the shallow bedrock ranged from 6.29×10^{-6} cm/s to 1.037×10^{-5} cm/s.

A step test and 72-hr pumping test were performed on aquifer pump test well RW-1 in April of 2007. To investigate groundwater communication with SCR, pump test well RW-1 was installed in an area of undifferentiated fill within a former drainage swale on the northeast portion of CPNPP Units 3 and 4. The step test was performed to determine the pumping rate for the 72-hr pumping test. Data for the step test and 72-hr pumping test were analyzed using the Cooper-Jacob Step Test and Theis Recovery Test methods. The results of the 72-hr pump test estimated hydraulic conductivity at 1.70×10^{-3} cm/s during pumping and 3.5×10^{-3} cm/s during recovery.

Groundwater elevations used in the groundwater velocity calculations for the subsurface materials (undifferentiated fill, regolith and bedrock or a combination thereof) were chosen based on proximity to the CPNPP Units 3 and 4 installation centerlines and distances to SCR. Monthly groundwater gradients, velocities, and travel times are presented in Table 2.4.12-211.

Soil distribution characteristics for radiological isotopes (i.e., Co_{60}, Cs_{137}, Fe_{55}, I_{129}, Ni_{63}, Pu_{239}, Tc_{99}, U_{235}) were determined from soil and water samples collected along the preferred groundwater flow path. This data is discussed in detail in Subsection 2.4.13 to assist in the development of transport calculations for fate and transport analyses in the event of accidental releases of effluents to groundwater.

2.4.12.3.1 Groundwater Pathways

Although the discussions of groundwater movement is a reasonable scenario for groundwater flow, it is assumed that the actual groundwater is subject to three-dimensional control structures (horizontal, vertical, and any secondary porosity that may be present) and does not have uniform flow across the site.

Two postulated groundwater pathway scenarios, Unit 3 to SCR (through the regolith and the undifferentiated fill) and Unit 4 to SCR (through the undifferentiated fill and regolith), represent the most conservative pathways from a two reactor site where groundwater flow is possible in different directions from each unit. Both flow paths use a conservative straight-line flow path approach, using the shortest distance and the highest measured hydraulic conductivity. A straight line flow path would be considered the most conservative as the actual groundwater pathways are expected to be tortuous, resulting in longer transport times, and hydraulic conductivities (K_h) of the fractures/joints would be ~~(or are) expected to be~~ lower than the highest measured on-site. The straight line distance CTS-00656 from Unit 3 to SCR is 530 ft and the straight line distance from Unit 4 to SCR is 607 ft. The steepest measured gradient for the undifferentiated fill material from Unit 3 to SCR is 0.104 ft/ft and from Unit 4 to SCR is 0.109 ft/ft. To calculate the travel time in the undifferentiated fill material from each of the units to SCR, the highest measured hydraulic conductivity of 5.00 X 10^{-4} cm/s was used. Table 2.4.12-211 provides the calculated travel times based on monthly measured gradients. These pathways are discussed further in 2.4.13. RCOL2_2.4.13-5

Based on the average effective porosity of 0.20 and the parameters stated above, the groundwater travel time from CPNPP Unit 3 to SCR in the undifferentiated fill/regolith is 720.9 days and the travel time in the undifferentiated fill/regolith from Unit 4 to SCR is 782.6 days.

The undifferentiated fill is expected to be removed ~~and the plant~~during construction to achieve a final plant grade elevation of 822 ft ~~would then be situated near~~msl approximately equivalent to the top of the Glen Rose Formation (shallow bedrock or B-zone). The foundation elevation is estimated to be a 782 ft msl and the basement elevation is estimated to be at 785 ft msl. Therefore, an alternative conceptual model of transport through the shallow bedrock limestone was developed using the straight-line pathway and Darcy's equation. Using the average porosity of limestone, 0.14, the highest hydraulic conductivity, 1.37 ~~X~~x 10^{-5} cm/s, and the steepest gradient measured from the monthly gauging events (Table 2.4.12-211), the travel time from Unit 3 to SCR through the bedrock ~~is~~was estimated to be 19,615.0 days and the travel time from Unit 4 to SCR through the bedrock ~~is~~was estimated to be 22,737.6 days. These pathways are discussed in Subsection 2.4.13. RCOL2_2.4.13-5 CTS-00657 RCOL2_2.4.13-5

The current soil and rock material comprising the hydrologic A-zone (undifferentiated fill and regolith) and B-zones (shallow bedrock) discussed in Subsection 2.4.12.2.4 will be removed for construction of plant foundations, resulting in the removal of the perched groundwater from the power block area. Post-construction surface water infiltration to the Glen Rose Formation limestone will be reduced with the construction of surface water impoundments and an improved drainage system throughout the CPNPP Units 3 and 4 site. The grading and drainage plan and placement of engineered fill material are designed to preclude surface water infiltration into the limestone on which the foundation will be constructed. RCOL2_2.4.13-4

Based on the excavation of the ~~site down to the plant grade of 822 ft and subsequent removal of virtually all soil material,~~perched zones in the A-zone and B-zones in power block area; the impermeable nature of the Glen Rose Formation, and the absence of any water wells producing from the Glen Rose Formation in the CPNPP Units 3 and 4 site area, impact to present and projected groundwater users is not anticipated. The ~~two~~ postulated groundwater pathway scenarios discussed in this subsection and further in Subsection 2.4.13, project SCR to be the nearest receptor. ~~If radionuclides were to reach SCR, their concentration is expected to be diluted by the volume of water contained in the reservoir and the impact to future water users is expected to be SMALL.~~ RCOL2_2.4.13-5

Evaluation of the accident effects of a contaminant release to groundwater from CPNPP Units 3 and 4 is discussed in detail in Subsection 2.4.13.

2.4.12.3.2 Nearby Groundwater Users

While no use of groundwater at the CPNPP site is planned, consideration is given for the movement of groundwater beneath the site because of pumping. Potable-use wells at CPNPP are completed in the Twin Mountains Formation, a confined aquifer below the impermeable Glen Rose Formation. Most domestic wells in the area are completed in the Twin Mountains Formation (Table 2.4.12-212). The on-site wells completed in the Twin Mountains Formation are not considered capable of reversing groundwater flow beneath the CPNPP Unit 3 and 4 site. There are no domestic or public water supply wells within a 0.5-mi. radius of the site that are completed in the Glen Rose Formation. (Figure 2.4.12-204). No off-site wells are considered capable of reversing groundwater flow beneath the site, or vice versa, based on the geographic positions of these wells (i.e., the distance of the domestic wells from the power block area and their completion in the Twin Mountain Formation).

2.4.12.4 Monitoring or Safeguard Requirements

Accident effects are discussed in Subsection 2.4.13 and the radiation protection program is discussed in Section 12.5. Additionally, analysis of the relationship of the CPNPP groundwater to seismicity and the potential for related soil liquefaction and the potential for undermining of safety-related structures is discussed in Section 2.5.

2.4.12.5 Site Characteristics for Subsurface Hydrostatic Loading

According to the Design Control Document (DCD) for the US-APWR, the design maximum groundwater elevation is 1 ft below plant grade. The CPNPP plant grade elevation is 822 ft msl; therefore, the design maximum groundwater elevation is 821 ft msl relative to the current elevation of the Glen Rose Formation. The Glen Rose Formation is an impermeable limestone that confines the groundwater in the underlying Twin Mountains Formation aquifer. Not all of the wells completed in the Glen Rose Formation were sampled; however, the wells that were sampled and purged, purged dry and water did not return for several days to weeks. All deep Glen Rose wells have been reported as “dry” or reported with less than 1-foot of water. This indicates the water gauged in the wells is a result of moisture from the rock and is not considered actual groundwater. The Twin Mountains Formation is at least 230 ft below the Glen Rose Formation; therefore, the installation and operation of a permanent dewatering system is not planned. ~~Dewatering during construction is expected to be required but, is not expected to be critical to the integrity of safety-related structures~~A dewatering system will not be required during construction. Normal construction practices will be employed to remove water from seepage and rainfall. As discussed in Subsection 2.5.4, ~~true~~ groundwater ~~table elevation~~ at the plant area is anticipated to be below the elevation of ~~about~~ 760 ft. and~~, in addition to the impermeable~~

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RCOL2_2.4.13-4

of chelating agents is used in the sampling system for analysis. The sampling drain, which contains only a small amount of chelating agents is directly sent to the dedicated chemical drain tank and treated separately. There are no chelating agents in the tank and therefore, no effect on the source used in the accidental release analysis. RCOL2_2.4.13-3

The source term concentrations considered for these tanks are identified in DCD Table 11.2-17 and show the radioactivity concentrations closest to the nearest potable water supply. The BAT is located in the northeast (NE) corner of the A/B (see DCD Figure 12.3-1). The A/B basemat elevation is at approximately 785 ft msl. The BAT elevation is expected to be at 798 ft msl. Ground level at the site is expected to be at 822 ft msl. The BAT contained the largest concentration and volume of radionuclides that was closest to the effluent concentration limits for Cs-134 and Cs-137, yet well below the 10 CFR 20, Appendix B limits. Isotope concentrations less than 1.0 x 10^{-3} in fraction of concentration limits are excluded from the evaluation. Since credit cannot be taken for liquid retention by unlined building foundations, it is assumed that 80 percent of the contents of each tank is released to the environment, consistent with the guidance in BTP 11-6, March 2007. In releasing the contents of one tank, it is assumed that 80 percent of the tank volume is discharged and the dilution factor of each tank is 4.4 x 10^{10} gallons. RCOL2_2.4.13-6b RCOL2_2.4.13-1

In performing the tank failure analysis, no credit is taken for the distribution of radiological liquid waste to the surrounding subsurface media and groundwater.~~, which is below grade. With the failure of a liquid tank inside the Auxiliary Building and subsequent liquid release to the environment, radionuclides enter the subgrade soils below the surrounding grade. A conservative model assumes the effluent liquid completely fills the soil pore space in an area large enough to contain the tank contents. Radionuclides are then released to the groundwater and transported to SCR where the volume of water contained in the reservoir is expected to dilute their concentration and eliminate impact to potential future water users. The overburden soils continually receive the average annual on-site precipitation. The precipitation that does not runoff or is lost to evapotranspiration infiltrates through the unsaturated zone and contributes to groundwater transport to SCR.~~ RCOL2_2.4.13-7

While groundwater functions as the transport media for fugitive radionuclides, interaction of individual radionuclides with the soil matrix delays their movement. The solid/liquid distribution coefficient, K~~d~~$_d$, is, by definition, an equilibrium constant that describes the process wherein a species (e.g., a radionuclide) is partitioned by adsorption between a solid phase (soil) and a liquid phase (groundwater). Soil properties affecting the distribution coefficient include the texture of soils (sand, loam, clay, or organic soils), the organic matter content of the soils, pH values, the soil solution ratio, the solution or pore water concentration, and the presence of competing cations and complexing agents. Because of its dependence on many soil properties, the value of the distribution coefficient for a specific radionuclide in soils can range over several orders of magnitude under different conditions. The measurement of distribution CTS-00659

2.4-260 Web Soil Survey Hood and Somerville Counties. U.S. Department of Agriculture. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

2.4-261 Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil. Environmental Assessment and Information Sciences Division Argonne National Laboratory. Argonne, Illinois. April 1993. http://web.ead.anl.gov/resrad/documents/data_collection.pdf. Accessed December 2007.

2.4-262 Driscoll, F.G. 1986, Groundwater and Wells, Johnson Div., St. Paul, MN.

2.4-263 U.S. Geological Survey, Water Data Report 2006, 08090900 Lake Granbury near Granbury TX, Website, http://web10capp.er.usgs.gov/imf/sites/adr06/pdfs/08090900.2006, Accessed November 2007. CTS-00666

2.4-264 Volumetric Survey Report of Possum Kingdom Lake, December 2004-January 2005 Survey. Texas Water Development Board. http://www.twdb.state.tx.us/home/index.asp. Access November 2007.

2.4-265 Volumetric Survey Report of Lake Whitney, June 2005 Survey. Texas Water Development Board. http://www.twdb.state.tx.us/home.asp. Accessed November 2007.

2.4-266 Somervell County Water District Wheeler Branch Reservoir Information. Freese and Nichols, Inc. http://clients.freese.com/somervell/index.asp. Accessed December 14, 2007.

2.4-267 Water Resources Data for the United States Water Year 2006. U.S. Geological Survey. http://www.web10capp.er.usgs.gov/adr06_lookup/search.jsp. Accessed November 2007.

2.4-268 Water System Data Report; Texas Commission on Environmental Quality. http://www10.tceq.state.tx.us/iwud/reports/index.cfm?fuseaction=RunWSDataSheetreport. Accessed November 11, 2008.

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Table 2.4.1-203 (Sheet 1 of 3)
Dam and Reservoir Information

Reservoir Name	Possum Kingdom Lake	Lake Palo Pinto ~~Lake~~	Lake Mineral Wells ~~Lake~~	Lake Granbury ~~Lake~~	Squaw Creek Reservoir	Wheeler Branch Reservoir	Lake Whitney ~~Lake~~	CTS-00654
Dam Name	Morris Sheppard Dam	Palo Pinto Creek Dam	Mineral Wells Dam	DeCordova Bend Dam	Squaw Creek Dam	Wheeler Branch Dam	Whitney Dam	
Owner	Brazos River Authority	Palo Pinto MWD No. 1	City of Mineral Wells	Brazos River Authority	TXU Generation Co. LP	Somervell County Water District	Corps of Engineers-SWF	
Dam Length (Feet)	2740	1255	1650	2200	4360	1750	17,695	
Dam Top Elevation (Feet ~~MSL~~msl)	1024	898	873.9	706.5	796.0	NR	584	CTS-00654
Elevation at Top of Flood Pool (Feet ~~MSL~~msl)	NA	NA	NA	NA	NA	NA	571	CTS-00654
Elevation at Top of Conservation Pool (Feet MSL)	1000	867	863	693	775	785	533	
Dead Pool Elevation (Feet ~~MSL~~msl)	874.8	835	nr	640	653	NR	448.83	CTS-00654
Elevation at Bottom of Lake (Feet ~~MSL~~msl)	870	815	817	628	648.2	NR	429	CTS-00654
Flood Pool Capacity (Acre-Feet)	NA	NA	NA	NA	NA	NA	2,000,204	
Conservation Pool Capacity Original (Acre-Feet)	~~724,700~~724,739	~~27,650~~44,100	6760	153,500	151,047	4,118	627,100	CTS-00655
Conservation Pool Storage Survey (Acre-Feet)	540,340	27,650	7065	129,011	151,418	NR	554,203	CTS-00655
Storage at Dead Pool Capacity (Acre-Feet)	236	~~1900~~500	NR	965	51	NR	~~4270~~859	CTS-00655
Surface Area at Top of Conservation Pool Original (Acre)	19,800	2498	646	8700	3228	180	23,560	
Surface Area at Top of Conservation Pool Survey (Acre)	~~17,624~~16,714	NR	440	~~8310~~7945	3297	NR	23,220	CTS-00655
Last Survey Date	Jun ~~1994~~2005	NR	Jul 1992	~~Jan 1994~~July 2003	May 1997	NR	June 2005	CTS-00655
Drainage Area (Square Miles)	~~13,310~~22,550	471	63	~~16,113~~25,679	64	NR	~~26,606~~27,189	CTS-00655

Table 2.4.1-203 (Sheet 2 of 3)
Dam and Reservoir Information

CP COL 2.4(1)

Reservoir Name	Possum Kingdom Lake	Lake Palo Pinto ~~Lake~~	Lake Mineral Wells ~~Lake~~	Lake Granbury ~~Lake~~	Squaw Creek Reservoir	Wheeler Branch Reservoir	Lake Whitney ~~Lake~~
Dam Name	Morris Sheppard Dam	Palo Pinto Creek Dam	Mineral Wells Dam	DeCordova Bend Dam	Squaw Creek Dam	Wheeler Branch Dam	Whitney Dam
Owner	Brazos River Authority	Palo Pinto MWD No. 1	City of Mineral Wells	Brazos River Authority	TXU Generation Co. LP	Somervell County Water District	Corps of Engineers-SWF
Main Purposes	water supply, hydroelectric, irrigation, Mining, Industrial	water supply	water supply	water supply, irrigation, industrial, mining	industrial, recreation	water supply	flood control, water supply, hydroelectric
Year of Completion	1941	1964	1920	1969	1977	2007	1951
Stream	Brazos River	Palo Pinto Creek	Rock Creek	Brazos River	Squaw Creek	Wheeler Branch	Brazos River
County	Palo Pinto	Palo Pinto	Parker	Hood	Somervell, Hood	Somervell	Hill, Bosque
Nearest Town	Graham	Mineral Wells	Mineral Wells	Granbury	Glen Rose	Glen Rose	Whitney
Direction to Nearest Town	11.3 miles NE	15 miles SW	4 miles E	8 miles NW	4 miles N	2 miles SSE	5.5 miles SW
Water Planning Region	G	G	G	G	G	G	G
Dam Central Latitude	32.87	32.6467	32.8167	32.3733	32.2883	NR	NR
Dam Central Longitude	-98.425	-98.2683	-98.0417	-97.6883	-97.76	NR	NR
Reservoir Gage	8088500	8090300	8090700	8090900	8091730	NR	8092500
Upstream USGS Streamflow Gage	8088000	NR	NR	8090800	8091730	NR	8091000
Downstream USGS Streamflow Gage	8088610	NR	NR	8091000	8091750	NR	8093100
Major Water Rights	C5155	C4031	C4039	C5156	C4097	NR	C5157

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NA - Not Applicable

NR - Not Reported

CP COL 2.4(1)

Table 2.4.1-203 (Sheet 3 of 3) Dam and Reservoir Information

Reservoir Name	Possum Kingdom Lake	Lake Palo Pinto ~~Lake~~	Lake Mineral Wells ~~Lake~~	Lake Granbury ~~-Lake~~	Squaw Creek Reservoir	Wheeler Branch Reservoir	Lake Whitney ~~-Lake~~
Dam Name	Morris Sheppard Dam	Palo Pinto Creek Dam	Mineral Wells Dam	DeCordova Bend Dam	Squaw Creek Dam	Wheeler Branch Dam	Whitney Dam
Owner	Brazos River Authority	Palo Pinto MWD No. 1	City of Mineral Wells	Brazos River Authority	TXU Generation Co. LP	Somervell County Water District	Corps of Engineers-SWF

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Sources:

~~(TWDB 2003)~~(Reference 2.4-206), (Reference 2.4-209), (Reference 2.4-212), (Reference 2.4-264), (Reference 2.4-265), (Reference 2.4-266) CTS-00589

~~(TWDB 2005)~~ CTS-00589

~~(TWDB 2006)~~ CTS-00589

~~(TWDB 2006b)~~ CTS-00589

~~(TWDB 2007b)~~ CTS-00589

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Table 2.4.1-206
Lake Granbury Municipal Water Systems

Public Water System	Use	Population Count	Average Daily Consumption
Oak Trail Shores	Municipal	~~8186~~6354	~~0.383~~0.362 Mgd
City of Granbury[(a)]	Municipal	See Note	See Note
Action Municipal Utility District[(a)]	Municipal	See Note	See Note
Johnson County Fresh Water Supply District No. 1[(a)]	Municipal	See Note	See Note
Johnson County Special Utilities District[(a)]	Municipal	See Note	See Note

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a) Treated Water Provided by the Lake Granbury Surface Water and Treatment System (SWATS)

Note: SWATS Total Population Count = 60,692, Total Average Daily Consumption = 5.360 million gallons per day (Mgd)

(Reference 2.4-215), (Reference 2.4-268) CTS-00588 indicate any significant zones of active dissolution. Some minor flexures on the order of less than 3 ft of vertical relief over less than 100 ft lateral distance were noted in limited exposures of the Glen Rose south of the SCR dam as discussed in Subsection 2.5.1.2.5.1. Healed joints in the Glen Rose limestone and overlying Paluxy were noted as being calcite-filled.

A review of the geotechnical borings drilled in the CPNPP Units 3 and 4 area indicates a thin, uniform weathering profile that mantles the site. Bedding below the weathered zone is horizontal, indicating no evidence of karst features. Minor vugs were noted in a few of the boring logs. No significant loss of drill fluid was noted in the geotechnical borings, indicating that no solution cavities were encountered. Results of in situ packer tests indicate hydraulic conductivities within the Glen Rose limestone beds are low. Petrographic analysis indicates that the limestone of the Glen Rose is tightly compacted, and no indications of secondary alteration were noted.

2.5.1.2.5.5 Groundwater

Withdrawal of groundwater from aquifers beneath the site does not pose a risk of subsidence at the current withdrawal rates. A discussion of groundwater conditions for the site is provided in Subsection 2.4.1. The strata underlying the site are cemented limestones and indurated shales of the Glen Rose Formation underlain by semi-indurated to indurated sandstones and silty sandstones of the Twin Mountains Formation. The uppermost potable aquifer beneath the site is within the Twin Mountains Formation. The groundwater table in the CPNPP Units 3 and 4 area, determined from monitoring wells, is about elevation 740 ft msl (about 82 ft below the yard grade elevation, 822 ft msl). The low compressibility of these materials and the lithified nature of the overlying Glen Rose Formation are not conducive to settlement caused by groundwater draw-down. CTS-00594

Perched water is noted within the Glen Rose Formation and may be encountered during excavation for CPNPP Units 3 and 4; however, the extent and volumes are anticipated to be low due to the low hydraulic conductivity of the Glen Rose Formation and the lack of extensive joints and fractures.

2.5.1.2.5.6 Reservoir Effects

No adverse effects due to the construction of man-made reservoirs in the CPNPP area, including SCR, Lake Granbury, and Lake Whitney, have been noted (Figure 2.5.1-218). The SCR is located immediately to the north of the CPNPP Units 3 and 4 site. Groundwater conditions are discussed in Subsection 2.4.1.

No reservoir-induced earthquakes have been noted since the construction of SCR and other large reservoirs in the site area. This absence may be attributed to the low hydraulic conductivity of the subsurface materials as well as to lack of faults or planes of weakness that may respond to increased pore fluid pressure from the downward migration of water from the reservoirs.

2.5.2 Vibratory Ground Motion

~~This subsection of the referenced DCD is incorporated with the following departures and/or supplements.~~ CTS-00595

CP SUP2.5(2) Add the following after the content of DCD Section 2.5.2.

This subsection provides a detailed description of vibratory ground motion assessments, specifically the criteria and methodology for establishing the Ground Motion Response Spectra (GMRS) and Foundation Input Response Spectra (FIRS) for the Comanche Peak Nuclear Power Plant Units 3 and 4 (CPNPP Units 3 and 4). The development of the GMRS for CPNPP Units 3 and 4 follows a methodology consistent with the approach recommended in Regulatory Guide (RG) 1.208 and, therefore, satisfies the requirements set forth in Section 100.23, "Geologic and Seismic Siting Criteria," of Title 10, Part 100, of the Code of Federal Regulations (10 CFR 100), "Reactor Site Criteria." This subsection begins with a review of the approach outlined in RG 1.208 and is followed by these subsections:

- Seismicity (Subsection 2.5.2.1)
- Geologic and Tectonic Characteristics of the Site and Region (Subsection 2.5.2.2)
- Correlation of Earthquake Activity with Seismic Sources (Subsection 2.5.2.3)
- PSHA and Controlling Earthquake (Subsection 2.5.2.4)
- Seismic Wave Transmission Characteristics of the Site (Subsection 2.5.2.5)
- Ground Motion and Site Response Analysis (Subsection 2.5.2.6).

RG 1.208 provides guidance on methods acceptable by the Nuclear Regulatory Commission (Reference 2.5-369) for satisfying the requirements of developing the site-specific GMRS, which in turn represents the first step in developing the Safe Shutdown Earthquake (SSE) ground motion levels as a characterization of the seismic hazard at CPNPP Units 3 and 4. The process outlined in RG 1.208 for determining the GMRS includes:

- The geological, geophysical, seismological, and geotechnical investigations of the site and site region, including the identification of seismic sources significant to seismic hazard at the site~~;~~. CTS-00599

- The procedures for performing a Probabilistic Seismic Hazard Analysis (PSHA) and deaggregating mean hazard~~;~~. CTS-00599
- Characterization of the seismic wave transmission characteristics of the site~~; and~~. CTS-00599
- Development of the performance-based site-specific earthquake ground motion.

RG 1.208 states that an acceptable starting point for developing probabilistic seismic hazards calculations for a Combined Operating License (COL) is a PSHA model that has been reviewed and accepted by the NRC. This COL application uses the accepted PSHA model developed by the Electric Power Research Institute Seismicity Owners Group (EPRI-SOG) in the 1980s (Reference 2.5-369) as the starting point for determining the GMRS for CPNPP Units 3 and 4. The EPRI-SOG PSHA model (Reference 2.5-369) was developed as part of a comprehensive study of seismic hazard at nuclear power plants in the Central and Eastern United States (CEUS). The study involved a comprehensive compilation of geological, geophysical, and seismological data for the CEUS that was used by six independent and multi-disciplinary Earth Science Teams (ESTs) of experts in geology, seismology, and geophysics to develop seismic source characterizations for the CEUS that explicitly incorporated uncertainty in source geometry, earthquake recurrence, and earthquake magnitude. The seismic sources developed in the EPRI-SOG model were then used in a PSHA of the ground motions at nuclear power plants in the United States (U.S.) (Reference 2.5-370). This COL application uses the seismicity, seismic source models, ground motion equations, and PSHA methodology of the EPRI-SOG study (References 2.5-369 and 2.5-370) as a starting point for the PSHA at CPNPP Units 3 and 4. A more detailed discussion of the suitability of the EPRI-SOG seismic sources is presented in Subsection 2.5.2.2.1.

Following the guidance of RG 1.208, a comprehensive review of new geological, geophysical, and seismological data developed following the EPRI-SOG study was conducted to determine the need for updating the EPRI-SOG source models for CPNPP Units 3 and 4. Post-EPRI-SOG site and regional geologic and geophysical data are discussed in Subsection 2.5.1, and post-EPRI-SOG site and regional seismological data are presented in Subsection 2.5.2.1. Additionally, post-EPRI-SOG seismic source characterizations for sources relevant to CPNPP Units 3 and 4 are reviewed in Subsection 2.5.2.2.2. This information is reviewed to update some EPRI-SOG source zones and develop new source characterizations for CPNPP Units 3 and 4 in Subsection 2.5.2.4.2. Only those new source characterizations determined through a screening study to be significant to hazard at CPNPP Units 3 and 4 are included in the final calculation for the GMRS. Subsection 2.5.2.5 also describes the use of updated ground motion equations and the use of Cumulative Absolute Velocity (CAV) filtering to limit the effects of low-magnitude, non-damaging earthquakes on the GMRS.

2.5.4 Stability of Subsurface Materials and Foundations

~~This subsection of the referenced DCD is incorporated by reference with the following departures and/or supplements.~~ CTS-00597

CP COL 2.5(1) Replace the content of DCD Subsection 2.5.4 with the following.

In conformance with Regulatory Guide (RG) 1.206, this subsection presents information on the properties and stability of surficial soils and underlying rock formations (geotechnical site characterization) that may affect the nuclear power plant facilities, under both static and dynamic conditions. Data evaluation and analyses are presented to demonstrate that the site is stable and free of significant geologic or geotechnical hazards under static or seismic conditions that could adversely affect stability and function of the Comanche Peak Nuclear Power Plant (CPNPP) Units 3 and 4 safety-related (seismic category I and II) plant components. Geophysical and geotechnical data integrated with the site geologic model and plant foundation layout show foundation interface conditions, and support development of site dynamic profiles for the Ground Motion Response Spectra (GMRS) and Foundation Input Response Spectra (FIRS) for seismic category I and other structures. Geotechnical analyses demonstrate that the site geotechnical and foundation conditions are enveloped by the US-APWR DCD Standard Design criteria, and that no unusually adverse geotechnical conditions will be encountered during plant construction.

A map showing locations of the CPNPP Units 3 and 4 relative to the existing CPNPP Units 1 and 2 is presented on Figure 2.5.4-201. Engineering geologic and geotechnical investigations and analyses were performed by William Lettis & Associates Inc. (Walnut Creek, California), Fugro West, Inc. (Tustin, California), and Fugro Consultants, Inc. (Houston, Texas).

The information presented in this subsection was developed using existing data from the investigation performed for the CPNPP Units 1 and 2 Final Safety Analysis Report (FSAR; Reference 2.5-201), as well as new data generated from field investigations for CPNPP Units 3 and 4, completed between late 2006 and mid 2007. Subsurface conditions of the site are characterized by geologic reconnaissance mapping, exploratory drilling and borehole testing, geophysical investigations, and laboratory tests conducted on soil and rock samples in compliance with NRC Regulatory Guides 1.132 and 1.138.

Figures 2.5.4-202 and 2.5.4-203 show exploration locations described in the following subsections. The geotechnical exploration, laboratory testing program and supporting analysis clearly demonstrate the geologic lateral and vertical variability within the CPNPP Units 3 and 4 footprint areas, and show that the site conforms to a relatively “uniform” site condition.

The following subsections discuss the subsurface conditions and the properties of subsurface materials. The subsurface is stratified into layers with distinctive properties defined from the field and laboratory data. These layers are correlated construction support, as described in Subsection 2.5.4.5, and backfilled after construction. The foundation subgrade for the UHS is extended into competent Glen Rose Formation engineering Layer C, removing any fill from under the structure footprint. Geotechnical inspection of the exposed subgrade during site grading verifies that competent bedrock formation is exposed.

Figure 2.5.4-213 shows contours defining the elevation of the top of sound rock, correlative with Glen Rose Formation engineering Layer A throughout the CPNPP Units 3 and 4 plant site. An irregular bedrock surface, developed by past erosion, exhibits an overall slope to the north and east towards SCR. Former topographic swales northeast of Unit 4 and east of Unit 3 were eroded approximately 10 ft to 25 ft into bedrock prior to later in-filling by undocumented fill and residual soil.

Variations in the elevation of the top of rock, about 15 ft to 25 ft, occur within the power block footprints. The top of rock typically occurs above plant grade elevation of 822 ft, resulting in exposure of a flat rock surface at yard grade over most of the power block area (Figure 2.5.4-215). The top of rock elevation is more variable in the UHS areas, with differential elevations of about 30 ft to 40 ft (Figure 2.5.4-213). Massive excavation only partly exposes Glen Rose Formation engineering Layer A rock within the UHS footprint areas. The top of rock remains below the elevation of plant yard grade under the northeast portions of the Units 3 and 4 UHS footprint areas, but is reached by deeper foundation excavations that extend into competent engineering Layer C limestone (Figures 2.5.4-210 and 2.5.4-211).

Elevation contours of the top of Glen Rose Formation engineering Layer C, supporting seismic category I and II structures, are shown on Figure 2.5.4-214. The contoured contact is a conformable bedding contact in the Glen Rose Formation that exhibits an overall gentle east to northeast dip of less than about 1 degree, consistent with the regional bedrock structure discussed in Subsection 2.5.1. This contact represents an essentially horizontal buried surface within the restricted power block footprint area. The average elevation of the top of engineering Layer C is ~~about 780 ft to~~approximately 782 ft below the Unit 3 and Unit 4 power block~~, and about 782 ft to 784 ft below the Unit 4 power block~~ (Figure 2.5.4-214). The Layer C contour map demonstrates the geometry of the foundation interface for plant structures, and shows that the foundation layer satisfies the US-APWR Key Site Parameters (DCD Table 2.0-1) criteria for maximum slopes of foundation bearing stratum of less than 20 degrees from horizontal. CTS-00667

2.5.4.4 Geophysical Surveys

CP COL 2.5(1) Replace the content of DCD Subsection 2.5.4.4 with the following.

Geophysical surveys included both down-hole and surface surveys using methods described in Subsection 2.5.4.2.1.7. The following subsections describe how each of the techniques were integrated and applied to characterization of the subsurface conditions.

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CP COL 2.5(1)

TABLE 2.5.1-201 (Sheet 1 of 2)
Radiocarbon Ages ~~from the Studies of Madole (1988), Crone and Luza (1990), and Swan et al. (1993)~~ Used to Constrain the Timing of Events on the Meers Fault

CTS-00668

Site	Sample	Radiocarbon Age (yrs B.P.)	Calibrated Age (cal yrs B.P.)
	Madole (1988)		
Browns Creek	DIC-3165	70 +/- 150	NA
Browns Creek	W-5533	310 +/- 150	NA
Browns Creek	W-5540	470 +/- 150	NA
Browns Creek	DIC-3166	13670 +/- 120	NA
Browns Creek	DIC-3169	1360 +/- 100	NA
Browns Creek	W-5543	1740 +/- 200	NA
Canyon Creek	DIC-3179	9880 +/- 160	NA
Canyon Creek	DIC-3170	12240 +/- 240	NA
Canyon Creek	DIC-3161	600 +/- 50	NA
Canyon Creek	DIC-3167	1280 +/- 140	NA
	Crone and Luza (1990)		
Canyon Creek	DIC-3183	1360 +/- 50	1290 +80/-110
Canyon Creek	DIC-3180	1660 +/- 50	1570 +/- 120
Canyon Creek	DIC-3266	1730 +/- 55	1646 +144/-126
Ponded Alluvium	PITT-0339	1480 +/- 35	1354 +64/-49
Ponded Alluvium	PITT-0340	1640 +/- 50	1539 +155/-129
Ponded Alluvium	PITT-0114	1865 +/- 25	1816 +60/-72
	Swan et al. (1993)		
NW Ponded Alluvium	PITT-0380	1270 +/- 25	1238 +44/-89
NW Ponded Alluvium	PITT-0381	1295 +/- 50	1265 +45/-180
NW Ponded Alluvium	PITT-0379	1565 +/- 45	1484 +76/-134
NW Ponded Alluvium	PITT-0378	1950 +/- 40	1912 +127/-92
SE Ponded Alluvium	PITT-0480	1120 +/- 60	1053 +117/-123
SE Ponded Alluvium	PITT-0489	1225 +/- 30	1167 +97/-102

CP COL 2.5(1)

TABLE 2.5.1-201 (Sheet 2 of 2)
Radiocarbon Ages ~~from the Studies of Madole (1988), Crone and Luza (1990), and Swan et al. (1993)~~ Used to Constrain the Timing of Events on the Meers Fault

CTS-00668

Site	Sample	Radiocarbon Age (yrs B.P.)	Calibrated Age (cal yrs B.P.)
SE Ponded Alluvium	PITT-0481	1445 +/- 45	1336 +74/-49
SE Ponded Alluvium	PITT-0479	1720 +/- 60	1669 +141/-149
SE Ponded Alluvium	PITT-0478	2105 +/- 55	2093 +216/-153
SE Ponded Alluvium	PITT-0477	3185 +/- 50	3397 +148/-48
SE Ponded Alluvium	PITT-0475	5180 +/- 60	5943 +228/-117
SE Ponded Alluvium	PITT-0476	5940 +/- 40	6836 +53/-113
SE Ponded Alluvium	PITT-0482	755 +/- 60	684 +96/-106
Valley Site	PITT-0375	1105 +/- 80	1296 +236/-84
Valley Site	PITT-0372	1380 +/- 60	1296 +94/-114
Valley Site	PITT-0369	1705 +/- 30	1610 +96/-110
Valley Site	PITT-0370	1990 +/- 45	1942 +113/-80
Valley Site	PITT-0373	2795 +/- 40	2918 +74/-125
Valley Site	AA-4093	865 +/- 95	777 +183/-13
Valley Site	PITT-0368	865 +/- 60	777 +183/-97

(Reference 2.5-283), (Reference 2.5-284), (Reference 2.5-285) CTS-00669

CP COL 2.5(1)

Table 2.5.1-202
Summary of Meers Fault Characterizations From Existing Literature

~~Summary of Meers fault characterizations from existing literature. Preferred values identified by the study authors are given when available; otherwise the range of possible values from the study is presented. NA indicates that a study did not address a topic.~~ CTS-00672

	Ramelli and others	Madole	Crone and Luza	Swan and others
Age of events				
Young Holocene	Within several thousand years	1280 years B.P. (uncalibrated C-14 age)	1200 to 1300 cal. years B.P.	1300 to 1400 cal. years B.P.
Old Holocene	NA	NA	NA	2100 to 2900 cal. years B.P.
Pre-Holocene	NA	NA	Greater than 100,000 years B.P.	Greater than 200,000 to 500,000 years B.P.
Style of faulting	Left oblique slip with lateral to vertical ratio of 2:1 to 4:1	NA	Left oblique slip with lateral to vertical ratio of 1.6:1 to 3.3:1	Left oblique slip with lateral to vertical ratio of 1.3:1
Length of surface rupture	37 km	NA	26 to 37 km	26 to 37 km
Event displacement	NA	NA	3.1 to 5.9 m	Average 1.75 to 3 m; maximum 3.5 to 5.25 m
Slip rate				
Holocene	NA	NA	NA	1 to 5 mm/yr
Quaternary	NA	NA	NA	10^{-4} to 10^{-5} mm/yr
Clustered behavior	NA	NA	NA	Yes, cannot assume out of cluster
Event magnitude	Ms 6.75 to 7.25	NA	Approximately Ms 7	Ms 6.75 to 7.25

CP COL 2.5(1)

Table 2.5.1-203
Summary of Experts' Responses to Questions Regarding the Meers Fault

~~Summary of experts' responses to questions regarding the Meers fault. NA indicates that an expert did not answer the question. Mrs. Hansen and Dr. Swan responses were recorded together.~~ CTS-00673

Question	Keith Kelson	Kathryn Hansen & Dr. Frank Swan	Dr. Anthony Crone	Alan Ramelli	Dr. Ken Luza
Active	Yes	Yes	Yes	Yes	Yes
Line source	Yes	Yes	Yes	Yes	Yes
Mmax	Take from Kelson and Swan (1990) and Swan et al. (1993)	Take from Swan et al. (1993)	Take from Crone and Luza (1990)	Take from Ramelli and Slemmons (1990) and Ramelli et al. (1987)	Recalled a magnitude 6, but wasn't sure.
Mmax methodology	Fault magnitude regressions	Fault magnitude regressions	Take from Crone and Luza (1990)	Fault magnitude regressions, but thinks these will underestimate magnitude	Fault magnitude regressions
Recurrence model	Characteristic with clustered behavior	Characteristic model	NA	Characteristic with clustered behavior	NA
In cluster	Likely	Likely	Difficult to judge	Difficult to judge	No. Only thinks fault has one Holocene event and long (>100,000 year) return period
Recurrence methodology	Paleoseismic data from trenching studies	Paleoseismic data from trenching studies	NA	NA	Use data from Madole (1988)

NOTES: CTS-00673

1. Preferred values identified by the study authors are given when available; otherwise the range of possible values from the study is presented.
2. NA - indicates that the study did not address a topic.

(Reference 2.5-271), (Reference 2.5-283), (Reference 2.5-284), (Reference 2.5-285), (Reference 2.5-286), (Reference 2.5-287), (Reference 2.5-277)

CP COL 2.5(1)

Table 2.5.1-205 (Sheet 5 of 5)
Time of Event, Location of Event, Best Estimate Body-Wave Magnitude (Emb), Estimate of Standard Deviation of Magnitude (Smb), Uniform Magnitude (Rmb), and Source Catalog

Year	Mon	Day	Hr	Min	Sec	Lat	Lon	Emb	Smb	Rmb	Cat
2002	10	20	2	18	14.06	34.2140	-96.1810	3.60	0.10	3.61	OGS
2003	4	7	10	2	12.51	33.8920	-97.6950	3.01	0.41	3.20	ANSS
2003	9	24	15	2	9.09	35.2770	-101.7420	3.33	0.41	3.53	ANSS
2004	4	22	16	13	2.25	34.8040	-97.6770	3.01	0.41	3.20	ANSS
2004	6	8	0	15	8.38	34.0410	-97.3070	3.70	0.10	3.71	OGS
2004	6	8	0	15	9.99	34.23	-97.25	3.50	0.10	3.51	PDE
2004	6	10	12	30	9.86	34.2360	-97.2670	3.01	0.41	3.20	ANSS
2004	11	22	23	42	13.45	34.8640	-97.6720	3.09	0.41	3.28	ANSS
2004	11	30	23	59	34.00	36.9400	-93.8900	3.01	0.41	3.20	ANSS
2005	2	6	15	59	14.48	34.2380	-95.2380	3.50	0.10	3.51	OGS
2005	4	3	14	39	16.97	28.3930	-100.3050	3.50	0.41	3.69	ANSS
2005	4	22	5	17	4.09	34.1790	-95.1920	3.09	0.41	3.28	ANSS
2006	2	18	5	49	41.45	35.6720	-101.7940	3.50	0.41	3.69	ANSS
2006	3	28	23	55	11.49	35.3630	-101.8710	3.09	0.41	3.28	ANSS
2006	4	5	18	46	23.14	34.0690	-97.3140	3.09	0.41	3.28	ANSS
2006	4	8	18	8	35.23	31.9540	-101.4190	3.01	0.41	3.20	ANSS
2006	10	6	22	13	16.78	34.12	-97.62	3.50	0.10	3.51	PDEW

(Reference 2.5-335), (Reference 2.5-369) CTS-00670

CP COL 2.5(1)

Table 2.5.1-206 (Sheet 2 of 2)
Summary of Bechtel Group Seismic Source Zones

Source	Description	Distance[a] (km)	Distance[a] (mi)	Pa[b]	M_{max} (m_b) and Wts.[c]	Smoothing Options and Wts.[d]	Contributes to 99% of Hazard[e]
55	S.E. Oklahoma	235	146	0.15	5.4 [0.1] 5.7 [0.4] 6.0 [0.4] 6.6 [0.1]	1 [0.33] 2 [0.34] 4 [0.33]	No

a) Shortest distance between CPNPP 3 & 4 and source zone.

b) Probability of activity (EPRI, 1989a).

c) Maximum earthquake magnitude (M_{max}) in body-wave magnitude (m_b) and weighting (Wts.) (EPRI, 1989a).

d) Smoothing options (EPRI, 1989a):
1 = constant a, constant b, no b prior;
2 = low smoothing on a, high smoothing on b, no b prior;
3 = low smoothing on a, low smoothing on b, no b prior;
4 = low smoothing on a, low smoothing on b, weak b prior of 1.05;
Weights on magnitude intervals are [1.0, 1.0, 1.0, 1.0, 1.0, 1.0, 1.0].

e) Whether or not the source contributes to 99% of the hazard at CPSES Units 1 & 2.

(Reference 2.5-369), (Reference 2.5-335) | CTS-00671

CP COL 2.5(1)

Table 2.5.2-227 (Sheet 6 of 6)
Dynamic Properties of Subsurface Rock Materials

Deep Site Profile [2]	Atoka Sand	150.0	-	1890.0	1.0	1.0	945.0	3780.0	1.0	-	0.5
	Smithwick	150.0	-	1000.0	1.0	1.0	500.0	2000.0	1.0	-	0.5
	Big Saline[12]	150.0	-	3400.0	1.0	1.0	1700.0	6800.0	1.0	-	0.5
	Marble Falls	150.0	-	3580.0	1.0	1.0	1790.0	7160.0	0.8	-	0.4
	Barnett	150.0	-	1960.0	1.0	1.0	980.0	3920.0	1.0	-	0.5
	Ellenburger	150.0	-	3850.0	1.0	1.0	1925.0	7700.0	0.8	-	0.4

Notes:

1 Shallow Site Profile derived from site specific data ~~(Reference TXUT-001-FSAR-2.5-CALC-003 and TXUT-001-FSAR-2.5-CALC-004)~~. CTS-00674

2 Deep Velocity Profile derived from regional wells ~~(Reference TXUT-001-PR-007)~~. CTS-00674

3 Depth calculated from the difference between Yard Grade (822 ft MSL (Mean Sea Level)) and the average elevation of top of layer.

4 The selected Variability for Velocity is +/-25% for shallow profile, +/-50% for the compacted fill, +/-31% for deep profile, and +/-500 fps for fill concrete.

5 Yard Grade is the elevation to which the site will be cut = 822 ft MSL.

6 Foundation Unit is the top of Layer C on which all critical structures will be founded (either directly or backfilled with concrete).

7 Max and Min elevation tops not available for deep site profile, which yielded only one estimate for the top each horizon.

8 Poisson's Ratio for Shallow Site Profile calculated from Vs and Vp suspension measurements. Deep Site Profile values estimated from deep regional well Vp data.

9 Unit weight values for Layers A through G estimated based on results of the laboratory tests. Values for Layers H, I and Strawn (MW) estimated from FSAR Table 2.5.4-5G and based on lithology.

10 G_{max} calculated based on suspension Vs or estimated Vs for Deep Site Profile Materials.

11 Low Strain Damping Ratio in Shear estimated from lithology for Shallow Site Profile through discussion with Dr. Ken Stokoe. Deep Site Profile values based on comparison of Vs and lithology of shallow site layers.

12 Standard deviation in elevation of the top of Big Saline and top Atoka estimated from average standard deviation for other layer elevations.

13 Damping Ratio in unconstrained compression, D_c should be taken as $0.5D_s$ with a maximum value of 5%.

14 Recommended minimum C_v (shear modulus variation factor) values are based on +/-25% variation in V_s or Min values recommended by DCD (0.5 if test data are available or 1.0 if test data are not available), whichever is higher.

Chapter 3

Chapter 3 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of 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	Delete COL item.	0
MAP-03-002	3.7.4.5 3.7.5	3.7-12 3.7-13 3.7-14	Deletion of COL item	Delete COL item.	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	Deletion of COL item	Delete COL item.	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	Delete COL item.	0
CTS-00607	3.8.4.1.3.2	3.8-6 3.8-7	Editorial correction	Change “ESWS” to “UHS ESW”, and “transfer pump” to “UHS transfer pump”.	0
CTS-00603	Table 3.8-202	3.8-18	Consistent with DCD Rev.1	Change unit and number in the table.	0
CTS-00604 CTS-00531	3.9.3.4.2.5	3.9-2	Editorial correction	Clarify wording.	0
CTS-00605	Table 3.9-201	3.9-5	Editorial correction	Change COL item number.	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

3.3 WIND AND TORNADO LOADINGS

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

3.3.1.1 Design Wind Velocity and Recurrence Interval

CP COL 3.3(1) Replace the last sentence of the second paragraph in DCD Subsection 3.3.1.1 with the following.

The site-specific basic wind speed of 90 mph corresponds to a 3-second gust at 33 ft. above ground for exposure category C, with the same recurrence interval as described above, and is therefore enveloped by the basic wind speed used for the design of the standard plant. Site-specific structures, systems, and components (SSCs) are designed using the site-specific basic wind speed of 90 mph, or higher.

3.3.1.2 Determination of Applied Forces

CP COL 3.3(4) Replace the last paragraph in DCD Subsection 3.3.1.2 with the following.

Specific descriptions of wind load design method and importance factor for US-APWR site-specific plant structures are as follows:

- The UHSRS (seismic category I) are analyzed using method 2 of American Society of Civil Engineers (ASCE)/Structural Engineering Institute (SEI) 7-05 (Reference 3.3-1) and an importance factor of 1.15.
- The exposed portions of the ESWPT (seismic category I) and power source fuel storage vaults (PSFSVs) (seismic category I) are analyzed using method 1 of ASCE/SEI 7-05 (Reference 3.3-1) and an importance factor of 1.15.

CPNPP Units 3 and 4 do not have site-specific seismic category II buildings and structures. CTS-00638

3.3.2.2.2 Tornado Atmospheric Forces

CP COL 3.3(5) Replace the last paragraph in DCD Subsection 3.3.2.2.2 with the following.

The 5 percent damping site-specific horizontal response spectra accelerations for all frequencies, at all FIRS locations, are less than those of the 5 percent damping minimum response spectra tied to the shape of the CSDRS and anchored at 0.1 g, as demonstrated in Figure 3.7-201. Similarly, the 5 percent damping site-specific vertical response spectra, which are developed from the horizontal response spectra using vertical/horizontal response spectral ratios appropriate for the site, are less than the 5 percent damping minimum vertical response spectra tied to the shape of the CSDRS and anchored at 0.1g. The nominal site-specific response spectra described above are less than the minimum required response spectra, and are therefore not used for site-specific design. Instead, the site-specific FIRS are defined as the shape of the CSDRS anchored at 0.1g, in order to comply with the intent of Appendix S (IV)(a)(1)(i) of 10 CFR 50 (Reference 3.7-7). By definition, the site-specific FIRS are automatically enveloped by the CSDRS given in Figures 3.7.1-1 and 3.7.1-2 for standard plant seismic category I structures. The site-specific FIRS (CSDRS anchored at 0.1 g) are used for the design of seismic category I and II SSCs that are not part of the US-APWR standard plant.

The site-specific FIRS are presented in Figures 3.7-202 and 3.7-203 for the horizontal and vertical FIRS, respectively. Tabulated values of the corresponding spectral accelerations for each of the spectral control points are presented in Tables 3.7-201 and 3.7-202 for the horizontal and vertical FIRS, respectively.

CP COL 3.7(2) Replace the seventeenth paragraph in DCD Subsection 3.7.1.1 with the following.

The site-specific verification analysis of US-APWR standard plant seismic category I structures ~~is~~has been performed considering SSI effects and using the site-specific FIRS as described in Subsection 3.7.2.4.1. CTS-00600

CP COL 3.7(13) Replace the first and second sentences of the nineteenth paragraph in DCD Subsection 3.7.1.1 with the following.

For CPNPP Units 3 and 4, the value of the operating-basis earthquake (OBE) ground motion that serves as the basis for defining the criteria for shutdown of the plant is 1/3 of the site-specific FIRS shown in Figures 3.7-202 and 3.7-203. Option A is maintained for site-specific seismic category I structures; therefore, OBE is not a site-specific seismic design case.

CP COL 3.7(24) Replace the first sentence of the next-to-last paragraph in DCD Subsection 3.7.1.1 with the following.

In development of the site-specific GMRS, as provided in Subsection 2.5.2, the site-specific ratios V/A and AD/V^2 (A, V, D, are PGA, ground velocity, and ground displacement, respectively) are verified to be consistent with values characteristic for the magnitude and distance of the appropriate controlling events defining the site-specific uniform hazard response spectra.

CP COL 3.7(30) Replace the last paragraph in DCD Subsection 3.7.1.1.with the following seismic responses measured at the R/B and PS/B foundation locations.

- Structure-to-structure interactions, which could potentially influence the measured seismic response levels, will not occur because the R/B and PS/B are both founded on the same very stiff limestone layer and are separated by expansion joints which prevent seismic interaction.

~~3.7.4.2 Location and Description of Instrumentation~~ MAP-03-001

~~CP COL 3.7(15)~~ ~~Replace the first sentence of the fourth paragraph in DCD Subsection 3.7.4.2 with the following.~~

~~A time-history analyzer/recorder which has the capability to provide pre-event recording time of 3 seconds minimum and post-event recording time of 5 seconds minimum, and to record at least 25 minutes of sensed motion, will be selected and installed in Unit 3 at least 12 months prior to first fuel load.~~

3.7.4.3 Control Room Operator Notification

CP COL 3.7(14) Replace the third sentence of the paragraph in DCD Subsection 3.7.4.3 with the following.

For CPNPP Units 3 and 4, the anticipated seismic response is essentially the same since both units are founded at the same elevation and on the same subgrade with the same stratigraphies, and have the same backfill conditions (including fill concrete) as previously described in Subsection 3.7.1.3 and Chapter 2. Only Unit 3 will be equipped with seismic monitoring instrumentation; however, the main control room (MCR) for both units will be provided with annunciation upon triggering of the instrumentation.

~~3.7.4.5 Instrument Surveillance (Including Calibration and Testing)~~ MAP-03-002

~~STD COL 3.7(18)~~ ~~Replace the fourth paragraph in DCD Subsection 3.7.4.5 with the following.~~

~~A site-specific seismic instrumentation program that includes an instrument surveillance program as well as calibration and testing procedures, and site-specific maintenance and repair procedures that maximize the number of~~

~~instruments in service during plant operation and shutdown, will be established at least 12 months prior to first fuel load.~~ MAP-03-002

3.7.4.6 Program Implementation

CP COL 3.7(19) Replace the paragraph in DCD Subsection 3.7.4.6 with the following.

The seismic instrumentation implementation plan for CPNPP Units 3 and 4 will be established at least 12 months prior to first fuel load.

3.7.5 Combined License Information

Replace the content of DCD Subsection 3.7.5 with the following.

CP COL 3.7(1) ***3.7(1)*** *Site-specific PGA*

This COL item is addressed in Subsection 3.7.1.1*.*

CP COL 3.7(2) ***3.7(2)*** *Analysis of Site-specific FIRS and Site-independent CSDRS*

This COL item is addressed in Subsection 3.7.1.1*.*

CP COL 3.7(3) ***3.7(3)*** *Analytical models for site-specific buildings and structures*

This COL item is addressed in Subsection 3.7.2.3.1*, and Appendices 3KK, 3LL, and 3MM*

CP COL 3.7(4) ***3.7(4)*** *Damping values for site-specific ISRS*

This COL item is addressed in Subsection 3.7.1.2*.*

CP COL 3.7(5) ***3.7(5)*** *Horizontal FIRS, Vertical FIS, and Minimum Response Spectra*

This COL item is addressed in Subsection 3.7.1.1 , Tables 3.7-201*,* 3.7-202*, and* Figures 3.7-201*,* 3.7-202*, and* 3.7-203*.*

CP COL 3.7(6) ***3.7(6)*** *Site-specific GMRS and FIRS*

This COL item is addressed in Section 3.7 *and* Figure 3.7-201*.*

CP COL 3.7(7) ***3.7(7)*** *Allowable dynamic bearing capacity*

This COL item is addressed in Subsection 3.7.1.3*,* Table 3.7-203*, and* Table 3.8-202*.*

CP COL 3.7(8) ***3.7(8)*** *Strain-dependent variation of material dynamic properties*

This COL item is addressed in Subsection 3.7.2.4.1*.*

CP COL 3.7(9) ***3.7(9)*** *Failure or collapse of non-seismic category I structures*

This COL item is addressed in Subsection 3.7.2.8*.*

CP COL 3.7(10) ***3.7(10)*** *Structure-to-structure interaction*

This COL item is addressed in Subsection 3.7.2.8*.*

CP COL 3.7(11) ***3.7(11)*** *Mass and frequencies of cranes*

This COL item is addressed in Subsection 3.7.2.3.4*.*

CP COL 3.7(12) ***3.7(12)*** *Liquid-retaining metal tanks*

This COL item is addressed in Subsection 3.7.3.9 *and* Appendix 3MM*.*

CP COL 3.7(13) ***3.7(13)*** *Value of OBE to define criteria for shutdown*

This COL item is addressed in Subsection 3.7.1.1*.*

CP COL 3.7(14) ***3.7(14)*** *Seismic instrumentation at multiple-unit site*

This COL item is addressed in Subsection 3.7.4.3*.*

~~CP COL 3.7(15)~~ ~~***3.7(15)*** *Time-history analyzer/recorder capabilities*~~ MAP-03-001

~~*This COL item is addressed in Subsection 3.7.4.2.*~~

CP COL 3.7(16) ***3.7(16)*** *Seismic monitors and need for free-field motion sensors*

The COL item is addressed in Subsection 3.7.4.1*.*

3.7(17) *Deleted from the DCD.*

~~STD COL 3.7(18)~~ ~~***3.7(18)*** *Site-specific instrument surveillance program*~~ MAP-03-002

~~*This COL item is addressed in Subsection 3.7.4.5.*~~

CP COL 3.7(19) ***3.7(19)*** *Site-specific details of seismic instrumentation implementation plan*

This COL item is addressed in Subsection 3.7.4.6*.*

CP COL 3.7(20) ***3.7(20)*** *Standard plant for site-specific conditions*

This COL item is addressed in Subsection 3.7 *and* Appendix 3NN*.*

CP COL 3.7(21) ***3.7(21)*** *Seismic design of non-standard plant SSCs*

This COL item is addressed in Subsection 3.7*.*

CP COL 3.7(22) ***3.7(22)*** *High seismic areas*

This COL item is addressed in Subsection 3.7.1.1

Table 3.7.2-1R

Summary of Dynamic Analysis and Combination Techniques (Sheet 1 of 2)

~~CP COL 3.7(29)~~ CTS-00532

	Model	Analysis Method	Program	Three Components Combination (for Purposes of Dynamic Analysis)	Modal Combination	
	Three-dimensional R/B-PCCV-containment internal structure Lumped Mass Stick Model (4)	Direct Integration Time History Analysis	ANSYS	square root sum of the squares (SRSS)	N/A	
	Three-dimensional R/B-PCCV-containment internal structure FE Model (1)	Time History Analysis in Frequency Domain	NASTRAN	N/A (1)	N/A	
CP COL 3.7(29)	Three-dimensional R/B-PCCV-containment internal structure SSI Model	Time History Analysis in Frequency Domain using sub-structuring technique	SASSI	N/A (5)	N/A	CTS-00532
	Three-dimensional reactor coolant loop (RCL) Piping FE Model (2)	Direct Integration Time History Analysis	ANSYS	SRSS	N/A	
	Three-dimensional PS/Bs Lumped Mass Stick Models (3)	Direct Integration Time History Analysis	ANSYS	SRSS	N/A	
	Three-dimensional RCL-R/B-PCCV-containment internal structure Lumped Mass Stick Model	Direct Integration Time History Analysis	ANSYS	SRSS	N/A	
CP COL 3.7(29)	Three-dimensional UHSRS FE model (6)	Response Spectra Analysis	ANSYS	Newmark 100-40-40	Lindley-Yow method	CTS-00532
CP COL 3.7(29)	Three-dimensional UHSRS SSI model	Time History Analysis in Frequency Domain using sub-structuring technique	SASSI	SRSS	N/A	CTS-00532
CP COL 3.7(29)	Three-dimensional ESWPT FE models	Modal Analysis	ANSYS	N/A(7)	N/A	CTS-00532
CP COL 3.7(29)	Three-dimensional ESWPT SSI models	Time History Analysis in Frequency Domain using sub-structuring technique	SASSI	SRSS	N/A	CTS-00532
CP COL 3.7(29)	Three-dimensional PSFSV FE model	Modal Analysis	ANSYS	N/A(7)	N/A	CTS-00532
CP COL 3.7(29)	Three-dimensional PSFSV SSI model	Time History Analysis in Frequency Domain using sub-structuring technique	SASSI	SRSS	N/A	CTS-00532

Table 3.7.2-1R

Summary of Dynamic Analysis and Combination Techniques (Sheet 2 of 2)

~~CP COL 3.7(29)~~ CTS-00532

Notes:

1) The FE model for the R/B-PCCV-containment internal structure on their common basemat is used only for validation of the dynamic lumped mass stick models and for static analysis for design of structural members and components as addressed in Section 3.8.
2) The FE model for the RCL is addressed in a Technical Report (Reference 3.7-18).
3) The lumped mass stick models for the PS/Bs are addressed in a Technical Report (Reference 3.7-33).
4) Three-dimensional RCL-R/B-PCCV-containment internal structure lumped mass stick models are addressed in a Technical Report (Reference 3.7-18).
5) CP COL 3.7(29) SASSI analysis of the R/B-PCCV-containment internal structure on their common basemat is used only for validation of the dynamic lumped mass stick modeling approach with respect to capturing site-specific effects. CTS-00532
6) CP COL 3.7(29) Response spectra analysis is performed to obtain response under seismic design loads for UHSRS and is described further in Appendix KK. The seismic response obtained from the response spectra analysis envelopes the results of SASSI analysis of UHSRS. CTS-00532
7) CP COL 3.7(29) The modal analysis performed on ANSYS FE models of ESWPTs and PSFSVs are used only for the validation of SASSI models. CTS-00532

3.8 DESIGN OF CATEGORY I STRUCTURES

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

~~3.8.1.4.1.3 Variation of Physical Material Properties~~ MAP-03-003

~~STD COL 3.8(1)~~ ~~Replace the last sentence in DCD Subsection 3.8.1.4.1.3 with the following.~~

~~Reconciliation evaluations of the as-built materials properties with the design physical properties of materials will be completed 12 months prior to the containment system turnover for testing.~~

~~3.8.1.5.1.2 Prestressing System~~ MAP-03-004

~~STD COL 3.8(2~~) ~~Replace the last sentence of the last paragraph in DCD Subsection 3.8.1.5.1.2 with the following.~~

~~Prestress friction losses of the tendons due to wobble and curvature coefficients used in the analysis will be reconciled with the site-specific tendon system corrosion protection coatings present at the time of prestressing.~~

~~3.8.1.5.2.2 Prestressing System~~

~~STD COL 3.8(2)~~ ~~Replace the last sentence of the last paragraph in DCD Subsection 3.8.1.5.2.2 with the following.~~

~~Prestress friction losses of the tendons due to wobble and curvature coefficients used in the analysis will be reconciled with the site-specific tendon system corrosion protection coatings present at the time of prestressing.~~

3.8.1.6 Material, Quality Control, and Special Construction Techniques

3.8.5.1.3.3 PSFSVs

PSFSVs are underground structures supported by a monolithic reinforced concrete basemat. The basemat is a 6’-6” thick concrete slab with top and bottom reinforcement in each direction arranged in a rectangular grid.

The bottom of the basemat is at elevation 782 ft., and is founded directly on limestone. Shear keys are provided which extend into the limestone as shown in Figures 3.8-213 and 3.8-214.

3.8.5.4.4 Analyses of Settlement

CP COL Replace the last sentence of the first paragraph in DCD Subsection 3.8.5.4.4 with the following.

As discussed in Section 2.5.4.10.2, maximum and differential CPNPP settlements of all the major seismic category I buildings and structures at the CPNPP Units 3 and 4 site, including R/B, PS/Bs, ESWPT, UHSRS, and PSFSVs are less than ½ inch, including long-term settlements.

3.8.5.5 Structural Acceptance Criteria

CP COL Replace the second sentence of the first paragraph in DCD Subsection 3.8.5.5 with the following.

All major seismic category I buildings and structures at the CPNPP Units 3 and 4 site, including R/B, PS/Bs, ESWPT, UHSRS, and PSFSVs, are founded either directly on a limestone layer or structural concrete fill which is placed directly on the limestone. The ultimate bearing capacity of the limestone is 146,000 psf. Table 3.8-202 shows the actual bearing pressure during static and seismic load cases with minimum factor of safety.

3.8.6 Combined License Information

Replace the content of DCD Subsection 3.8.6 with the following.

~~STD COL 3.8(1)~~ ***3.8(1)*** *Deleted from the DCD.*~~*Reconciliation evaluations using as-built properties*~~ MAP-03-003

~~*This COL item is addressed in* Subsection 3.8.1.4.1.3.~~

~~STD COL 3.8(2)~~ ***3.8(2)*** *Deleted from the DCD.~~Consistency of wobble and curvature coefficients~~* MAP-03-004

~~*This COL item is addressed in* Subsections 3.8.1.5.1.2, *and* 3.8.1.5.2.2.~~

STD COL 3.8(3) ***3.8(3)*** *Material changes for PCCV*

This COL item is addressed in Subsection 3.8.1.6.

~~STD COL 3.8(4)~~ ***3.8(4)*** *Deleted from the DCD.~~Concrete ingredients~~* MAP-03-005

~~*This COL item is addressed in* Subsection 3.8.1.6.~~

~~STD COL 3.8(5)~~ ***3.8(5)*** *Deleted from the DCD.~~Concrete creep and shrinkage parameters~~* MAP-03-006

~~*This COL item is addressed in* Subsection 3.8.1.6.~~

~~STD COL 3.8(6)~~ ***3.8(6)*** *Deleted from the DCD.~~Specification of concrete production~~* MAP-03-007

~~*This COL item is addressed in* Subsection 3.8.1.6.~~

CP COL 3.8(7) ***3.8(7)*** *Aggressivity of ground water/soil*

This COL item is addressed in Subsection 3.8.1.6.

~~STD COL 3.8(8)~~ ***3.8(8)*** *Deleted from the DCD.~~Liner plate specification~~* MAP-03-008

~~*This COL item is addressed in* Subsection 3.8.1.6.~~

~~STD COL 3.8(9)~~ ***3.8(9)*** *Deleted from the DCD.~~PCCV airlocks and equipment hatch specification~~* MAP-03-009

~~*This COL item is addressed in* Subsection 3.8.1.6.~~

CP COL 3.8(10) ***3.8(10)*** *Alternate wire prestressing system*

This COL item is addressed in Subsection 3.8.1.6.

3.8(11) *Deleted from the DCD.*

~~STD COL 3.8(12)~~ ***3.8(12)*** *Deleted from the DCD.~~Prestressing system specification~~* MAP-03-010

~~*This COL item is addressed in* Subsection 3.8.1.6.~~

~~STD COL 3.8(13)~~ ***3.8(13)*** *Deleted from the DCD.~~Reinforcing steel specification~~* MAP-03-011

~~*This COL item is addressed in* Subsection 3.8.1.6.~~

STD COL 3.8(14) ***3.8(14)*** *PCCV testing and ISI*

This COL item is addressed in Subsection 3.8.1.7.

CP COL 3.7(7)
CP COL 3.8(25)

Table 3.8-202

Summary of Bearing Pressures and Factor of Safety

Building	Bearing Pressures (~~ksf~~lb/ft²)		Ultimate Bearing Capacity (~~ksf~~lb/ft²)	Available Factor of Safety	
	Static Case	Seismic Case(1),(2)		Static Case	Seismic Case
R/B	~~11.3~~11,300	~~18.9~~18,900	~~146.00~~146,000	~~12.9~~12,900	~~7.7~~7,700
T/B	~~5.9~~5,900	~~7.4~~7,400	~~146.00~~146,000	~~24.7~~24,700	~~19.7~~19,700
A/B	~~6.6~~6,600	~~10.8~~10,800	~~146.00~~146,000	~~22.1~~22,100	~~13.5~~13,500
PS/Bs	~~4.3~~4,300	~~7.4~~7,400	~~146.00~~146,000	~~34~~34,000	~~19.7~~19,700
PSFSVs	~~2.9~~2,900~~(3)~~	~~5.1~~5,100~~(3)~~	~~146.00~~146,000	~~50.3~~50,300	~~28.6~~28,600
UHSRS	~~4.5~~4,500~~(4)~~	~~16.2~~16,200~~(4)~~	~~146.00~~146,000	~~32.4~~32,400	~~9.0~~9,000
ESWPT	~~3.6~~3,600~~(5)~~	~~12.4~~12,400~~(5)~~	~~146.00~~146,000	~~40.6~~40,600	~~11.8~~11,800

CTS-00603
CTS-00603
CTS-00603

Notes:

1) All seismic case bearing pressures are based on the site-specific FIRS with 0.1 g PGA as described in Subsection 3.7.1.
2) Seismic case bearing pressures shown above include static bearing pressures.
3) The pressure shown includes bearing pressure due to full fuel oil tanks.
4) The pressure shown includes bearing pressure due to full reservoirs.
5) The maximum bearing pressures occur underneath the portion of the ESWPT supporting the air intake missile shields adjacent to the UHSRS.

3.8.4.1.3.2 UHSRS

The UHSRS consists of a cooling tower enclosure; ~~the ESWS~~UHS ESW pump house~~s~~, and ~~the~~ UHS basin. All of them are reinforced concrete structures, described below. CTS-00607

UHS Basin - There are four basins for each unit and each reinforced concrete basin has one cooling tower with two cells. Each basin rests on a separate foundation, is square in shape, constructed of reinforced concrete, and separated from the adjacent basin by a minimum 4 inch expansion joint. Each basin serves as a reservoir for the ESWS. An ~~ESWS~~UHS ESW pump house is located at the south-west corner of each basin. Adjacent to the pump house on the east side of the basin are cooling tower enclosures supported by UHS basin walls. The ESWPT runs east-west along the south exterior wall of the UHS basin, and is separated by a minimum 4 inch expansion joint. CTS-00607

Each basin is divided into two parts, as shown on Figure 3.8-206. The larger section of the basin shares the pump house and one cooling tower cell enclosure. The other cooling tower cell enclosure is in the smaller segment of the basin. A reinforced concrete wall, running east-west, separates the cooling tower enclosure basin area from rest of the basin. This wall is provided with slots to maintain the continuity of the reservoir.

See Figure 3.8-206 for general arrangement, layout, and dimensions of the UHSRS.

~~ESWS~~UHS ESW pump house - The pump house is an integral part of the UHS basin supported by UHS basin exterior and interior walls. Each pump house contains one ESW pump and one UHS transfer pump with associated auxiliaries. The pump bay (lowest portion of the pump house required for the pump suction) is deeper than the rest of the UHS basin. A reinforced concrete wall, running east-west, divides the pump house basin from rest of the UHS basin. This wall is provided with slots for flow of water. Two baffle walls (running east-west) are provided inside the pump house basin, before the pump bay. These baffle walls are provided with slots to maintain the flow of water and are staggered to prevent trajectory of postulated direct or deflected design basis tornado missiles. CTS-00607 CTS-00607

The operating floor of the pump house is a reinforced concrete slab spanning east-west and supported by UHS basin exterior and interior walls. The operating floor supports the ESWS pump, UHS transfer pump, and motors. The roof of the pump house is a reinforced concrete slab spanning north-south and supported by reinforced concrete beams. To allow access to the ESWS pump/motor, a removable reinforced concrete cover is provided in an opening in the roof of the pump house. CTS-00607

UHS cooling tower enclosures - Each UHS basin has one cooling tower with two cells. Each cell is enclosed by reinforced concrete structures that house the equipment required to cool the water for ESWS. The reinforced concrete wall running north-south separates the two cell enclosures. The enclosures are an integral part of the UHS basin supported by the basin interior and exterior walls on the basemat foundation. A reinforced concrete wall, running east-west, separates the cell enclosure portion of the basin from the rest of the UHS basin. An east-west wall is provided with openings at the basemat to maintain the continuity of the UHS basin. Air intakes are located at the north and south faces of the enclosure and configured to protect the safety-related substructures and components from tornado missiles. The north side air intake is an integral part of the cooling tower enclosure, whereas the south side air intake is an integral part of the ESWPT, and is supported by reinforced concrete piers which are supported by the ESWPT walls and basemat.

Each cooling tower cell enclosure is equipped with a fan and associated equipment to cool the water. Equipment includes header pipe, spray nozzles, and drift eliminators with associated reinforced concrete beams supported by the exterior walls of the enclosure. The fan and motor are supported by reinforced concrete deck above the drift eliminators. A circular opening is provided in the deck for the fan, and the deck is supported by enclosure walls and a deep upside circular concrete beam around the fan opening. The fan is supported by a north-south concrete beam at the center of enclosure. For air circulation and to protect the fan and motor from tornado missiles, a circular opening is provided at the roof of the enclosure (centered on the fan) with a reinforced concrete slab and heavy steel grating between the roof and the deck.

For details see Figures 3.8-207 through 3.8-211 for the UHS basin, ~~ESWS~~UHS ESW pump house and cooling tower enclosures. CTS-00607

3.8.4.1.3.3 PSFSVs

The PSFSVs are underground reinforced concrete structures required to house the safety-related and non safety-related fuel oil tanks. There is one vault for each PS/B. The vault contains two safety-related and one non safety-related oil tanks. Each tank is contained in a separate compartment. Compartments are separated by reinforced concrete walls. A common mat supports the tanks and the rest of the vault. The PSFSV roof slab is sloped to facilitate drainage. The highest point of the roof slab is slightly above grade. Bollards and a concrete curb are provided to prevent vehicular traffic on the roof.

Access to each vault is provided by a reinforced concrete tunnel from the applicable PS/B. Each tank compartment has a separate pipe/access tunnel, which is an integral part of the ESWPT.

For vault details see Figures 3.8-212 through 3.8-214.

3.8.4.1.3.4 Other Site-Specific Structures

Site-specific seismic category I yard piping and conduits are routed within reinforced concrete duct banks (solid) or reinforced concrete chases (hollow). The duct banks and chases have shallow embedments and are buried partially or wholly below grade within structurally engineered and compacted backfill that extends down to top of limestone at nominal elevation 782 ft. The duct banks and pipe chases are constructed in segments, which are separated from each other

The design specification for snubbers installed in harsh service conditions (e.g., high humidity, temperature, radiation levels) ~~assures that snubber functionality including snubber materials (e.g., lubricants, hydraulic fluids, seals), are~~is evaluated for the projected life of the snubber to assure that snubber functionality including snubber materials (e.g., lubricants, hydraulic fluids, seals). CTS-00604 CTS-00531

3.9.6 Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints

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STD COL 3.9(8) Replace the second sentence of the third paragraph in DCD Subsection 3.9.6 with the following.

The edition and addenda used for the inservice testing (IST) program for pumps, valves, and dynamic restraints is administratively controlled as part of the operational program procedures. The preservice test program is implemented as described in Section 13.4. The requirements of functional testing for pumps, valves, and dynamic restraints will be in accordance with the IST program plan outlined 12 months prior to fuel load.

3.9.6.2 IST Program for Pumps

CP COL 3.9(11) Replace the third paragraph in DCD Subsection 3.9.6.2 with the following.

The site-specific safety-related pump IST parameters and frequency is provided in Table 3.9-202.

3.9.6.3 IST Program for Valves

STD COL 3.9(12) Replace the fifth paragraph in DCD Subsection 3.9.6.3 with the following.

The type of testing and frequency of site-specific valves subject to IST in accordance with the ASME Code is provided in Table 3.9-203.

STD COL 3.9(7) Replace the last sentence of the eleventh paragraph in DCD Subsection 3.9.6.3 with the following.

~~CP COL 3.9(12)~~

CP COL 3.9(10)

Table 3.9-201

List of Site-Specific Active Pumps

CTS-00605

Pump	System	ASME Class	Normal Operation Mode	Post LOCA Mode	Basis
A-UHS Transfer Pump	UHS	3	ON/OFF	ON/OFF	Required For Transferring Water Between Basins
B-UHS Transfer Pump	UHS	3	ON/OFF	ON/OFF	Required For Transferring Water Between Basins
C-UHS Transfer Pump	UHS	3	ON/OFF	ON/OFF	Required For Transferring Water Between Basins
D-UHS Transfer Pump	UHS	3	ON/OFF	ON/OFF	Required For Transferring Water Between Basins

3.11 ENVIRONMENTAL QUALIFICATION OF MECHANICAL AND ELECTRICAL EQUIPMENT

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

CP COL 3.11(3) Replace the last sentence of the fifth paragraph in DCD Section 3.11 with the following.

The CPNPP Units 3 and 4 EQ Program implementation ~~schedule is~~milestones are as follows~~*~~: CTS-00606

Activity	~~Date~~Milestone	
Formulate Units 3 and 4 EQ Program	~~2008-2009~~COLA Submittal	CTS-00606
~~Designate Applicant EQ Program Coordinator~~	~~2009~~	CTS-00606
~~Assist Reactor Vendor/Architect-Engineer/Constructor EQ Program~~	~~2009-2012~~	CTS-00606
~~Assign Applicant EQ Staff to project site~~	~~2013~~	CTS-00606
Assist with Reactor Vendor/Architect-Engineer/Constructor EQ Program	~~2013-2016~~ Combined License	CTS-00606
Assume EQ Responsibilities for Unit 3	~~2017~~Unit 3 Fuel Load	CTS-00606
Assume EQ Responsibilities for Unit 4	~~2019~~Unit 4 Fuel Load	CTS-00606

~~* Dependent on actual project schedule~~ CTS-00606

CP COL 3.11(1) Replace the first sentence of the sixth paragraph in DCD Section 3.11 with the following.

CPNPP Units 3 and 4, at time of license issuance, assumes full responsibility for the EQ program, assembles, and maintains the EQ records for the life of the plant to fulfill the records retention requirements delineated in 10 CFR 50.49 (Reference 3.11-2) and in compliance with the quality assurance program (QAP) described in Chapter 17.

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responsibility for the EQ program at time of license issuance. The EQ records are maintained for the life of plant to fulfill the records retention requirements delineated in 10 CFR 50.49 (Reference 3.11-2) and in compliance with the QAP described in Chapter 17.

3.11.4 Loss of Ventilation

CP COL 3.11(6) Replace the second paragraph in DCD Subsection 3.11.4 with the following.

Site-specific electrical and mechanical equipment (including instrumentation and control and certain accident monitoring equipment), subject to environmental stress associated with loss of ventilation or other environmental control systems including heat tracing, heating, and air conditioning, is qualified using an equivalent qualification process to that delineated for the US-APWR standard plant.

3.11.5 Estimated Chemical and Radiation Environment

CP COL 3.11(7) Replace paragraph in DCD, Subsection 3.11.5 with the following.

Chemical and radiation environmental requirements for site-specific electrical and mechanical equipment (including instrumentation and control and certain accident monitoring equipment) are to be included in ~~Table 3D-201 by completion of [Later]~~the Equipment EQ Technical Report (Reference 3.11-3). This equipment is qualified using an equivalent qualification process to that delineated for the US-APWR standard plant. CTS-00639

3.11.6 Qualification of Mechanical Equipment

CP COL 3.11(8) Replace the second paragraph in DCD, Subsection 3.11.6 with the following.

Site-specific mechanical equipment requirements are to be included in Table 3D-201 by completion of detailed design. This equipment is qualified using an equivalent qualification process to that delineated for the US-APWR standard plant.

3.11.7 Combined License Information

CP COL 3.11(1) Replace the content of DCD Subsection 3.11.7 with the following.

3.11(1) *Environmental qualification document assembly and maintenance*

Chapter 4

Chapter 4 Tracking Report Revision List

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

Chapter 5

Chapter 5 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of 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

5.2 INTEGRITY OF REACTOR COOLANT PRESSURE BOUNDARY

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

5.2.1.2 Compliance with Applicable Code Cases

Replace the third paragraph in DCD Subsection 5.2.1.2 with the following.

CP ~~-~~COL 5.2(1)
CP COL 5.2(2)
CP COL 5.2(3)

Comanche Peak Nuclear Power Plant (CPNPP) Units 3 and 4 uses no Code Cases listed in Regulatory Guide (RG) 1.84 beyond those listed in the referenced DCD. The use of Code Cases including those listed in ~~Regulatory Guide (~~RG~~)~~ 1.147 is identified in the inservice inspection (ISI) program (Subsection 5.2.4 and Section 6.6). The use of Code Cases including those listed in RG 1.192 is identified in the inservice testing (IST) program (Subsection 3.9.6 and 5.2.4). CTS-00675 CTS-00528

5.2.2.4 Equipment and Component Description

STD COL 5.2(10) Replace the last paragraph in DCD Subsection 5.2.2.4 with the following.

The actual throat area for the pressurizer safety valves and the containment spray / residual heat removal (CS/RHR) pump suction relief valves will be determined at the procurement stage.

5.2.4.1 Inservice Inspection and Testing Program

STD COL 5.2(4) Replace the first sentence of the fourth paragraph in DCD Subsection 5.2.4.1 with the following.

The implementation milestones for the ISI program and the IST program are provided in Table 13.4-201"

Add the following text after the first sentence of the fifth paragraph in DCD Subsection 5.2.4.1.

Chapter 6

Chapter 6 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of T/R
CTS-00653	6.4.4.2	6.4-3	Erratum	Change “5.2 ppm “ to “5.7 ppm”.	0

Values of IDLH for various chemicals are found in NUREG/CR-6624 (Reference 6.4-201).

The most limiting case, or the one that leads to the highest control room concentration relative to the IDLH, is the tanker truck release of chlorine on Highway FM 56, at a distance of closest approach to CPNPP Units 3 and 4 MCR intake of 1.4 miles. Chlorine is used for this case because it is one of the most hazardous Department of Transportation approved chemicals, and bounds other chemicals by toxicity, dispersibility, and quantity that may use public transportation such as Highway FM 56. Using the methodology prescribed by RG 1.78, the concentration remains below ~~5.2~~5.7 ppm at equilibrium in the MCR. This concentration (~~5.2~~5.7ppm) is less than the IDLH concentration for chlorine (10 ppm). The concentration at the MCR HVAC intakes, that is the concentration of outside, will exceed the IDLH (10 ppm) at about 2.5 minutes, remain elevated until approximately 7 minutes, and then start decreasing slowly on a scale based on the volume and ventilation rates in the MCR. CTS-00653

RG 1.78 states that it is expected that a control room operator will don a respirator and protective clothing, or take other mitigating action within two minutes after detection. The concentration in the MCR reaches the human detection threshold for chlorine (3.5 ppm) at approximately 9 minutes and reaches the maximum concentration (~~5.2~~5.7 ppm) in approximately 13 minutes. Also during a toxic gas emergency, the control room operators have the option of manually actuating the emergency isolation mode of the MCR HVAC System. CTS-00653

6.4.6 Instrumentation Requirement

CP COL 6.4(5) Replace the last paragraph in DCD Subsection 6.4.6 with the following.

Instrumentation to detect and alarm a hazardous chemical release in the vicinity of CPNPP Units 3 and 4, and to automatically isolate the control room envelope (CRE) from such releases is not required based on analyses described in Subsection 6.4.4.2. No hazardous chemicals concentrations in the MCR exceeded the IDLH criteria of RG 1.78.

6.4.7 Combined License Information

Replace the content of DCD Subsection 6.4.7 with the following.

CP COL 6.4(1) ***6.4(1)*** *Toxic chemicals of mobile and stationary sources and evaluation of the control room habitability*

Chapter 7

Chapter 7 Tracking Report Revision List

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

Chapter 8

Chapter 8 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of 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-00479	8.4	8.4-1	Editorial correction	Change section title in bold font.	0

LIST OF FIGURES

transmission lines. During unit startup, shutdown, maintenance, and during all postulated accident conditions, offsite electric power can be supplied to each unit site from the plant switching station through two physically independent transmission tie lines. One of these two transmission tie lines connects to the high-voltage side of the MT via a 345 kV circuit breaker. The other transmission tie line connects to two 345 kV circuit breakers at the unit switchyard, one circuit breaker is for RAT1 and RAT3, and the other circuit breaker is for RAT2 and RAT4. Both of ~~A~~any two outgoing transmission lines between the plant switching station and the remote offsite switching stations adequately maintain the voltage within ±5 percent of 345 kV at the high voltage side terminals of the MTs and RATs, while supplying full auxiliary loads of both units for all normal, abnormal and postulated accident conditions. CTS-00640

CP COL 8.2(4)
CP COL 8.2(5)

Add the following information after the last sentence of the second paragraph in DCD Subsection 8.2.1.2.

Neither the grid stability analysis in Subsection 8.2.2.2 nor the failure modes and effects analysis (FMEA) in Subsection 8.2.1.2.1.1 identified the non-safety related offsite power system as risk-significant during all modes of plant operation.

CP COL 8.2(10)

Replace the last sentence of the fifteenth paragraph in DCD Subsection 8.2.1.2 with the following.

In case of a sudden pressure relay operation, the transformer is isolated.

CP COL 8.2(4)
CP COL 8.2(5)

Replace the first and second sentence of the eighteenth paragraph in DCD Subsection 8.2.1.2 with the following.

The MT and the unit auxiliary transformers (UATs) are located in the transformer yard adjacent to the alternate PPS unit switchyard. The RATs are all located in the transformer yard adjacent to the normal PPS unit switchyard. The RATs are separated from the MTs and UATs by three-hour rated fire barriers. Minimum one-hour rated fire barriers are provided between all transformers. Figures 8.2-207 and 8.2-208 show physical layout of equipment in the Unit 3 and Unit 4 unit switchyards/transformer yards, respectively. Cables associated with the normal and alternate PPS between unit switchyard and the electrical room in the T/B are routed in separate underground duct bank. Normal and alternate PPS cables are physically separated which minimizes the chance of simultaneous failure. The underground duct bank for these circuits is sealed to prevent degradation in tubes with standard 345 kV spacing. All of the circuit breakers have a disconnect switch on each side to allow isolation or removal of a circuit breaker without affecting availability of each transmission line. The one line diagram and the physical layout drawing of the plant switching station are shown in Figures 8.2-205 and 8.2-206, respectively.

In order to avoid crossings of the 345 kV lines out of the plant switching station, a section of the two main buses is lengthened to allow several of the existing circuits to pass through (fly-over) the plant switching station. The section of bus is approximately 300 ft. long to allow space for the fly-over circuits. The fly-over circuits are double dead-ended between the two main buses to avoid a scenario that would allow a single failure of one of the lines to trip both of the main buses. Standard 345 kV substation dead ends are utilized for these terminations. The lines that pass through the station are the 345 kV CPNPP Units 1 and 2 – Parker 345 kV switching station line, the 345 kV CPNPP Units 1 and 2 – Comanche Switch line and the 138 kV CPNPP Units 1 and 2 – Stephenville line.

CP COL 8.2(3)
CP COL 8.2(8)

The plant switching station has two 25 ft. X 65 ft. control buildings. These buildings house the primary and backup line relaying panels, voltage transformer and current transformer indoor junction boxes, supervisory control and data acquisition (SCADA) unit, digital fault recorder (DFR) unit, batteries and battery chargers and all ac and dc panels. Each building houses a single set of batteries and battery charger in its own battery room separate from the relay panel room. One building houses dc source #1 and the other houses dc source #2. To reduce the cable lengths of the dc supplies in one control building to panels in the other control building, a set of fused cables are brought from the dc source in each control building to the dc box in the relay panel room of the other control building. This allows for short cable runs to the relay panels in the other control building, while keeping the batteries in different buildings. A SCADA unit is installed in each control building, with the data circuit bridged between the two units. This prevents ~~from~~ bringing all of the SCADA cable to one building. A similar design is used on the DFR, but the station switcher is used to connect both DFRs to one phone line. Each building has its own heating, ventilation, and air conditioning (HVAC) system, portable fire extinguishers, and eyewash stations. CTS-00686

CP COL 8.2(7)

A fiber optic shield wire is installed on each of the four 345 kV tie lines between the plant switching station and the unit switchyards. These fibers are used for relay protection and for sending generator information to Oncor. Oncor has no direct control of any of the 345 kV circuit breakers located at the unit switchyards.

Each transmission line and the plant switching station buses are provided with primary and backup relay protection schemes. Each transmission line is protected by pilot protection using a directional comparison blocking scheme.

(SRI)

CP COL 8.2(1)

Figure 8.2-201 Relevant Portions of Oncor Transmission System Configuration

CTS-00451

8.4 STATION BLACKOUT

CTS-00479

This section of the referenced DCD is incorporated by reference with no departures or supplements.

Chapter 9

Chapter 9 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of 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

9.2 WATER SYSTEMS

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

9.2.1.2.1 General Description

CP COL 9.2(7) Replace the first sentence of the first paragraph in DCD Subsection 9.2.1.2.1 with the following.

Figure 9.2.1-1R shows the piping and instrumentation diagrams (P&IDs) of the essential service water system (ESWS).

CP COL 9.2(8) Replace the sixth paragraph in DCD Subsection 9.2.1.2.1 with the following.

Chemicals are added to the basin to control corrosion, scaling, and biological growth. The water chemistry is managed through a Chemistry Control Program such as following a standard Langelier Saturation Index. The chemical injection system is described in Subsection 10.4.5.

CP COL 9.2(7) Replace the seventh paragraph in DCD Subsection 9.2.1.2.1 with the following.

Blowdown is used to maintain acceptable water chemistry composition. This is accomplished by tapping each essential service water pump (ESWP) discharge header. Additional description about blowdown is discussed in Subsection 9.2.5.

CP COL 9.5(2) Add the following text after the last paragraph in DCD Subsection 9.2.1.2.1.

Each of the essential service water (ESW) lines in the reactor building (R/B) and in the ~~ESWP~~UHS ESW pump house is tapped to supply water to the fire protection water supply system (FSS), if required, after the safe-shutdown earthquake (SSE). Manually operated locked closed valves are provided in each of the tapped connections to draw water for the FSS. CTS-00586

9.2.1.2.2 Component Description

CP COL 9.2(6) Replace the sentence in DCD Subsection 9.2.1.2.2 with the following.

Table 9.2.1-1R shows the design parameters of the major components in the system.

9.2.1.2.2.1 ESWPs

CP COL 9.2(6) Replace the second sentence of the third paragraph in DCD Subsection 9.2.1.2.2.1 with the following.

Total dynamic head of the ESWP is 220 feet. Available net positive suction head (NPSH) with the lowest expected water level (after 30 days of accident mitigation) in the basin is approximately 40 feet.

9.2.1.3 Safety Evaluation

CP COL 9.2(1) Replace the eleventh paragraph in DCD Subsection 9.2.1.3 with the following.

Design of the basin provides adequate submergence of the pumps to assure the NPSH for the pumps. The basin is divided into two levels. One is approximately 12 feet lower than the other, and directly above it is installed the ESWP. The ESWP is designed to operate with the lowest expected water level (after 30 days of accident mitigation). The basins have sufficient water inventory to assure adequate cooling and NPSH for 30 days without makeup. This is discussed further in Subsection 9.2.5.

CP COL 9.2(2) Replace the twelfth paragraph in DCD Subsection 9.2.1.3 with the following.

The lowest ambient temperature anticipated at the site does not result in the freezing of the ESW in the basin or the piping for the following reasons:

- The basins are located below grade and thus ground temperature maintains water from freezing.
- In the operating trains, water is continuously circulated which helps to prevent freezing. Ultimate heat sink (UHS) transfer pumps can be used to circulate water from the idle basins.
- ~~ESWP~~UHS ESW pump house ventilation system maintains pre determined minimum temperature in the pump house areas. This is further described in Subsection 9.4. CTS-00586
- Any exposed essential piping that may be filled with water while the pump is not operating is heat traced.

For the thermal overpressure protection of the component cooling water heat exchanger ESW side, the valves located at the component cooling water heat exchanger ESW side inlet and outlet lines are administratively locked open valves. These locked open valves assure protection from the thermal overpressurization due to the erroneous valve operation coincident with the heat input from the component cooling water (CCW) side to ESW side.

CP COL 9.2(7) Replace the last paragraph in DCD Subsection 9.2.1.3 with the following.

CP COL 9.4(4)

Table 9.4-201 (Sheet 1 of 2)

Equipment Design Data

Main Control Room Air Handling Unit	
Heating Coil Capacity	37 kW
Auxiliary Building Air Handling Unit	
Cooling Coil Capacity	9,200,000 Btu/hr
Heating Coil Capacity	4,750,000 Btu/hr (Steam)
Non-Class 1E Electrical Room Air Handling Unit	
Cooling Coil Capacity	1,520,000 Btu/hr
Heating Coil Capacity	Non heating
Main Steam / Feedwater Piping Area Air Handling Unit	
Cooling Coil Capacity	450,000 Btu/hr
Heating Coil Capacity	8 kW
Technical Support Center Air Handling Unit	
Cooling Coil Capacity	550,000 Btu/hr
Heating Coil Capacity	30 kW
Class 1E Electrical Room Air Handling unit	
Heating Coil Capacity	90 kW - Train A, B 101 kW - Train C, D
Safeguard Component Area Air Handling Unit	
Heating Coil Capacity	21 kW
Emergency Feedwater Pump (M/D) Area Air Handling Unit	
Heating Coil Capacity	~~1~~2 kW
Emergency Feedwater Pump (T/D) Area Air Handling Unit	
Heating Coil Capacity	4.5 kW

CTS-00608

Chapter 10

Chapter 10 Tracking Report Revision List

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

Chapter 11

Chapter 11 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of 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

Figure 11.2-201, Sheets 1 through 9 illustrate the piping and process equipment, instrumentation and controls for Comanche Peak Nuclear Power Plant (CPNPP) Units 3 and 4 LWMS.

The treated liquid effluent is discharged to Squaw Creek Reservoir via CPNPP Units 1 and 2 circulating water return line with provision to divert a portion of the flow to an evaporation pond. The shape of the flow orifices and other technical details will be developed in the detail design phase. Subsection 11.2.3.1 discusses the design of the evaporation pond and return line connections.

11.2.3.1 Radioactive Effluent Releases and Dose Calculation in Normal Operation

CP COL 11.2(4) Replace the second and third sentences of the second paragraph in DCD Subsection 11.2.3.1 with the following.

The parameters used by the PWR-GALE Code are provided in Table 11.2-9, and the calculated effluents are provided in Table 11.2-10R. The calculated effluents for the maximum releases are provided in Table 11.2-11R. On this site-specific application, handling of contaminated laundry is contracted to off-site services. Therefore, the detergent waste effluent need not be considered.

CP COL 11.2(2)
CP COL 11.2(4) Replace the last four paragraphs in DCD Subsection 11.2.3.1 with the following.

The calculated effluent concentrations using annual release rates are then compared against the concentration limits of 10 CFR 20 Appendix B (see Tables 11.2-12R and 11.2-13R.).

Once it is confirmed that the treated effluent meets discharge requirements, the effluent is released into Squaw Creek Reservoir via the CPNPP Units 1 and 2 circulating water return line. The liquid effluent is maintained at ambient temperature, as it is stored inside the auxiliary building (A/B) waste monitoring tanks. Currently, Squaw Creek Reservoir has a tritium concentration limit of 30,000 pCi/L (Reference 11.2-201). Based on an analysis, the tritium concentration in Squaw Creek Reservoir~~, the tritium concentration in Squaw Creek Reservoir~~ is anticipated to be within the tritium limit due to the local rainfall, evaporation, and spillover (control release) from Squaw Creek Reservoir to Squaw Creek. However, during the maximum tritium generation condition (i.e., all four units operating at full power), the tritium concentration could be exceeded. A portion of the liquid effluent from CPNPP Units 3 and 4 discharge header can be diverted to an evaporation pond located within the site boundary. Under this maximum tritium generation condition, and maintaining a 20 percent margin below the offsite dose calculation manual (ODCM) limit, up to half of liquid effluent is diverted into the evaporation pond. In the event that both CPNPP Units 1 and 2 CTS-00482

CP COL 11.2(4)

Table 11.2-14R (Sheet 1 of 2)
Input Parameters for the LADTAP II Code

Parameter	Value
Midpoint of Plant Life(yr)	30
Circulating Water System discharge rate (gpm)	247,500
Water type selection	Freshwater
Reconcentration model index	1 (Complete mix)
Discharge rate to receiving water(ft^3/sec)	1.5(1) 45.4(2)
Total impoundment volume(ft^3)	6.3E+09
Shore-width factor	0.2 (Squaw Creek) 0.3(Whitney Reservoir)
Dilution factor -Squaw Creek(3)	1.0
Dilution factor - Brazos River(4)	822.7(1) 27.2(2)
Dilution factor - Whitney Reservoir(5)	1645.4 (1) 54.4 (2)
Transit time – Squaw Creek (hr)	7.3
Transit time – Brazos River (hr)	66
Transit time – Whitney Reservoir (hr)	77
Irrigation rate(Liter/m^2-month)	74.6
Animal considered for milk pathway	Cow
Fraction of animal feed not contaminated	0
Fraction of animal water not contaminated	0
Source terms	Table 11.2-10R
Source term multiplier	1
50 mile population	3,493,553
Total Production within 50 miles(kg/yr,L/yr)	Leafy Vegetable : 25,000 kg/yr Vegetable : 5,270,000 kg/yr Milk : 943,000 L/yr Meat : 281,000 kg/yr
Annual local harvest for sports harvest fishing(kg/yr)	324,375
Annual local harvest for commercial fishing harvest(kg/yr)	None
Annual local harvest for sports invertebrate harvest (kg/yr)	None
Annual local harvest for commercial invertebrate harvest (kg/yr)	None

CTS-00481

Note:
1. The conditions for maximum individual dose calculation.
2. The conditions for population dose calculation.
3. The water of Squaw Creek is considered following evaluations.
   - Dose from fish (Maximum individual dose)
   - Dose from shoreline (Maximum individual dose)
4. The water of Brazos River is considered following evaluation.
   - Dose from drinking water in Cleburne (Maximum individual dose and population dose)
   - Dose from irrigation water (Maximum individual dose and population dose)
   - Dose from sports fishing (Population dose)
5. The water of Whitney Reservoir is considered following evaluation.
   - Dose from drinking water in Whitney (Population dose)
   - Dose from shoreline, swimming and boating (Population dose)

Chapter 12

Chapter 12 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of T/R
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Chapter 13

Chapter 13 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of 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

Table 13.1-201 (Sheet 4 of 5)

Staffing Plan for CPNPP Units 3 and 4 (1)

			Estimated Numbers of Full Time Equivalents			
Nuclear Function	**Function Position (ANS-3.1-1993 section)**	**CPNPP Units 3 and 4 Position**	**Design Review Phase**	**Construction Phase**	**Preoperational Phase**	**Operational Phase**
Maintenance	Manager (4.2.3)	Director, Maintenance	1	1	1	1
	Supervisor (4.4.7)	Maintenance Plant Support Mgr.		1	3	3
	Supervisor	Maint. Support (Procedures)		6	1	1
	Specialist	Maintenance Specialist		1	6	6
	Manager	Manager, Work Control/Outages			1	1
	Coordinator	Outage Coordinator			3	3
	Scheduler	Outage Scheduler			3	3
	Supervisor	Work Control Supervisor			1	1
	Scheduler	Work Control Scheduler		1	3	3
	Manager (4.2.3)	Director, Maintenance		1	1	1
	Supervisor (4.4.7)	Maintenance Plant Support Mgr.		1	3	3
	Supervisor	I&C Supervisor		1	8	4
	I&C Tech. (4.5.3.3)	I&C Technician (2)		5	35	25
	Supervisor	Mechanical Supervisor		1	2	2
	Mechanical Tech. (4.5.7.2)	Mechanical Technician (2)		5	45	35
	Supervisor	Electrical Supervisor		2	2	2
	Electrical Tech. (4.5.7.1)	Electrical Technician (2)		5	35	25

CTS-00484

CTS-00484

Table 13.1-201 (Sheet 5 of 5)

Staffing Plan for CPNPP Units 3 and 4 (1)

			Estimated Numbers of Full Time Equivalents			
Nuclear Function	**Function Position (ANS-3.1-1993 section)**	**CPNPP Units 3 and 4 Position**	**Design Review Phase**	**Construction Phase**	**Preoperational Phase**	**Operational Phase**
Nuclear Fuel Services	Manager (4.2.4)	Nuclear Fuel Services Manager (STARS FUELCO)		0.5	0.5	0.5
Fire Protection	Supervisor (RG 1.189)	Fire Protection Supervisor	0.5	1	1	1
Emergency Preparedness	Functional Manager (4.3)	Emergency Planning Manager EP Coordinator		1 2	1 2	1 2
Security Security	Functional Manager (4.3) Supervisor (4.4) Security Officer (NA)	Security Manager Security Supervisor (2) Security Officer		1 3 (Withheld)	1 5 (Withheld)	1 5 (Withheld)
Preoperational and Startup Testing	Manager (NA) Preop. Test Engr. (4.4.11) Startup Test Engr. (4.4.12)	Startup Manager Preoperational Test Engineer (2) Startup Test Engineer (2)		1 20 5	1 20 20	1 5
		TOTALS	**20.75**	**173.55**	**494.6**	**412.1**

Note (1): Each entry in this table for the number of individuals assigned to a function during a project phase (i.e., the numerical entries in the four right-hand columns, labeled Design Review Phase, Construction Phase, Preoperational Phase, and Operational Phase) reflects the sum of resources required for the two units. For resources not expected to spend all of their time on CPNPP Units 3 and 4, the entries are fractional. Contractor Support may be utilized as required to fill positions other than Licensed Shift Operations staff.

Note (2): For operations personnel assigned on a shift basis, the staffing numbers are based on the assumption of a total of five (5) operating crews to cover the shift requirements for each unit. Numbers are also based on the assumption of simultaneous full power operation of both units, using separate control rooms for CPNPP Unit 3 and Unit 4.

- Abnormal Condition Procedures - These procedures specify operator actions for restoring an operating variable to its normal controlled value when it departs from its normal range, or restoring normal operating conditions following a transient. Such actions are invoked following an operator observation or an annunciator alarm indicating a condition that, if not corrected, could degenerate into a condition requiring action under an Emergency Operating Procedure.

- Emergency Operating Procedures (EOPs) – These procedures direct actions necessary for the operators to mitigate the consequences of transients and accidents that cause plant parameters to exceed reactor protection system or engineering safety feature actuation setpoints.

  The Procedure Generation Package (PGP) will be developed and provided to the NRC at least three months prior to commencing formal operator training. The PGP will include Generic Technical Guidelines, a Writer's Guide, a description of the program for validation of the EOPs and a brief description of the training program for the EOPs (~~Reference 13.5-201~~See NUREG-0737, Supplement 1). CTS-00486

  The EOPs are symptom-based with clearly specified entry and exit conditions. Transitions between and within the normal operating, alarm response, and abnormal operating procedures and the EOPs are appropriately laid out, well defined, and easy to follow (See Section 18.8). The use of human factored, functionally oriented, EOPs will improve human reliability and the ability to mitigate the consequence of a broad range of initiating events and subsequent multiple failures or operator errors, without the need to diagnose specific events.

- Alarm Response Procedures – These procedures guide operator actions for responding to plant alarms.

13.5.2.2 Maintenance and Other Operating Procedures

STD COL 13.5(7) Replace the content of DCD Subsection 13.5.2.2 with the following.

The following maintenance and other operating procedures are classified as General Plant Procedures:

- Plant Radiation Protection Procedures - Detailed written and approved procedures and instructions are used to ensure that occupational radiation exposure is maintained ALARA. It is the responsibility of the Radiation and Industrial Safety Manager to prepare and maintain the plant radiation protection procedures and instructions. Careful administrative control of the use of these procedures and instructions ensures that a sound health physics philosophy becomes an integral part of station operation and maintenance.

~~13.5.4 References~~

CTS-00486

~~Add the following references after the last reference in DCD Subsection 13.5.4.~~

~~13.5-201 U.S. Nuclear Regulatory Commission, Supplement 1, Clarification of TMI Action Plan Requirements. NUREG-0737, Washington, DC, January 1980.~~

APPENDIX 13AA DESIGN, CONSTRUCTION AND PRE-OPERATIONAL ACTIVITIES

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Chapter 14

Chapter 14 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of 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

14.2 INITIAL PLANT TEST PROGRAM

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

14.2.1 Summary of Test Program and Objectives

STD COL 14.2(1) Replace the last two paragraphs in DCD Subsection 14.2.1 with the following.

The initial test program (ITP) described in this chapter addresses both US-APWR and site-specific systems and components. The test program includes administrative controls for testing components and systems, which are described in this chapter.

14.2.2 Organization and Staffing

CP COL 14.2(2) Replace the last sentence of the second paragraph in DCD Subsection 14.2.2 with the following. CTS-00635

~~Appendix 14AA provides a~~A description of the organizations responsible for all phases of the ITP, and a description of the administrative controls that assure that experienced and qualified supervisory personnel and other principal participants are responsible for managing, developing, and conducting the ITP are reconciled in Appendix 14AA. CTS-00635 CTS-00635

14.2.3 Test Procedures

CP COL 14.2(3) Replace the last two paragraphs in DCD Subsection 14.2.3 with the following.

The process used to develop test specifications and test procedures is described in Appendix 14AA. Table 13.4-201 provides the milestone for the implementation of the ITP.

14.2.4 Conduct of Test Program

Chapter 15

Chapter 15 Tracking Report Revision List

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

Chapter 16

Chapter 16 Tracking Report Revision List

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

Chapter 17

Chapter 17 Tracking Report Revision List

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

17.3 QUALITY ASSURANCE PROGRAM

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

CP COL 17.5(1) Replace the last paragraph in DCD Section 17.3 with the following.

Luminant is responsible for the establishment and implementation of the QAP for the design, construction, and operation of Comanche Peak Nuclear Power Plant (CPNPP) Units 3 and 4. Luminant may delegate, and has delegated to others, the work of establishing and executing the QAP, or any parts thereof, but retains responsibility for the QAP.

QA for the preparation and review of the Combined License (COL) application (COLA) and for CPNPP Units 3 and 4 activities, up through issuance of the COL, is governed by the Luminant “NuBuild Quality Assurance Project Plan” (NuBuild QAPP). The NuBuild QAPP describes the processes and procedures to be used in the implementation, control, and oversight of activities related to CPNPP Units 3 and 4 by invoking elements of the existing U.S. Nuclear Regulatory Commission (NRC) approved QAP for CPNPP Units 1 and 2. Utilizing established procedures and manuals from the CPNPP Units 1 and 2 QAP, the NuBuild QAPP provides for the application of 10 CFR 50 Appendix B criteria to CPNPP Units 3 and 4 activities.

Luminant contracted with Mitsubishi Nuclear Energy Systems, Inc. (MNES) to develop the COLA, including conducting site characterization activities. The process for collecting, reviewing and analyzing the necessary data for site characterization was performed under the MNES QAP and is described in the MNES Quality Assurance Program Description(QAPD), SQ-QD-070001. Although the NuBuild QAPP and the NRC approved QAP for CPNPP Units 1 and 2 are based on the guidance of American National Standards Institute/American Society of Mechanical Engineers(ANSI/ASME) N45.2-1971, "Quality Assurance Program Requirements for Nuclear Facilities" and its applicable daughter standards, Luminant has imposed on MNES, a QAP based on ASME NQA-1-1994, "Quality Assurance Requirements for Nuclear Facility Applications" and Nuclear Energy Institute (NEI) 06-14A “Quality Assurance Program Description” (Reference 17.3-201). Luminant oversight of COLA development~~ activities by MNES is provided through reviewing the MNES QAPD, conducting QA audits, surveillances after QA audits, and participating in project management activities, engineering, procurement, and construction after first COLA development~~, engineering, procurement, and construction activities by MNES is provided through reviewing the MNES QAPD, conducting QA audits and surveilliances, and participating in project management activities. CTS-00490

Upon issuance of the COL and as the project progresses, the QAP will transition from the NuBuild QAPP to implementation by the “Comanche Peak Nuclear

Chapter 18

Chapter 18 Tracking Report Revision List

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Chapter 19

Chapter 19 Tracking Report Revision List

Change ID No.	Section	Page	Reason for change	Change Summary	Rev. of T/R
CTS-00491	ACRONYMS AND ABBREVIATIONS	19-v	Erratum	Change “Westuinghouse” to “Westinghouse”.	0

ACRONYMS AND ABBREVIATIONS (Continued)

UHS	ultimate heat sink
WOG	West~~u~~inghouse Owners Group

CTS-00491