July 8, 2010

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

Part 3

Environmental Report Revision 1

Update Tracking Report

Revision 5

Revision History

Revision	Date	Update Description
-	11/20/2009	COLA Revision 1 Transmittal See Luminant Letter no. TXNB-09074 Date 11/20/2009
0	12/7/2009	Updated Chapters: Ch. 9
1	1/13/2010	Updated Chapters: Ch. 7
2	1/19/2010	Updated Chapters: Ch. 7
-	11/11/2009	Updated Chapters: Ch. 2 See Luminant Letter no. TXNB-09020 Date 11/11/2009 Incorporated responses to following RAIs: No. 72
-	12/18/2009	Updated Chapters: Ch. 2, 3, 4, 5, 6, 9 See Luminant Letter no. TXNB-09087 Date 12/18/2009 Incorporated responses to following RAIs: ER Supplemental Response
3	3/2/2010	Updated Chapters: Ch. 2, 4, 5, 6
-	2/24/2010	Updated Chapters: Ch. 1, 2, 3, 4, 5 See Luminant Letter no. TXNB-10013 Date 2/24/2010 Incorporated responses to following RAIs: No. GEN-07, GEN-08, HYD-27, GEN-11, HYD-29

-	3/19/2010	Updated Chapters: Ch. 3 See Luminant Letter no. TXNB-10023 Date 3/19/2010 Incorporated responses to following RAIs: No. GEN-07 Supplemental
4	5/5/2010	Updated Chapters: Ch. 2, 7, 10
-	6/25/2010	Updated Chapters: Ch. 5 See Luminant Letter no. TXNB-10048 Date 6/25/2010 Incorporated responses to following RAIs: No. 157
5	7/8/2010	Updated Chapters: Ch. 2, 5

Chapter 1

Chapter 1 Tracking Report Revision List

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
RAI GEN-08	Figure 1.1-5	-	Response to RAI No. GEN-08 Luminant Letter no. TXNB-10013 Date 2/24/2010	Revised text, Table, and Figure to show that the proposed transmission line will run adjacent to the existing lines, adding an additional ROW of 160ft.	-

*Page numbers for the attached marked-up pages may differ from the revision 1 page numbers due to text additions and deletions. When the page numbers for the attached pages do differ, the page number for the attached page is shown in brackets.

Chapter 2

Chapter 2 Tracking Report Revision List

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
RCOL2_02.03.04-3	2.7.3.2	2.7-28	Response to RAI No. 72 Luminant Letter no.TXNB-09063 Date 11/11/2009	Revised to clarify the years of data used in the accident x/Q.	-
RAI GEN-03 RAI HYD-23 RAI LU-03	2.3.2.2	2.3-43	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised water withdraw values to coincide with the conceptual design.	-
RAI GEN-03 RAI HYD-23 RAI LU-03	Table 2.3-39	2.3-164	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised the “Average Water Discharge to Lake Granbury CPNPP Units 3 and 4 with BDTF” to be consistent with the conceptual design.	-
CTS-01105	2.2.1.2	2.2-3	Access change to SCR.	Revised text to reflect that SCR is located within site boundary and opened for recreational uses.	3
CTS-01105	2.3.2.2.2	2.3-42	Access change to SCR.	Revised text to reflect to the change from “closed to the public and is not used for recreation or navigation” to “open to the public for full recreational use but access will be controlled.”	3
CTS-01105	2.4.1.1.5.5	2.4-22	Access change to SCR	Revised text to reflect to the change from “Although SCR is closed to the public for recreational fishing” to “SCR will be open to the public for full recreational use, including boating; however, access will be controlled.”	3
CTS-01105	2.4.2.2	2.4-26	Access change to SCR.	Revised text to state that SCR will be reopened to the public for full recreational uses but will have controlled access.	3

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
CTS-01105	2.4.2.5.2	2.4-31	Access change to SCR	Deleted text stating that SCR has been closed to the public.	3
CTS-01105	2.4.2.5.3	2.4-31	Access change to SCR	Deleted text stating that recreational fishing does not occur in SCR.	3
CTS-01105	Table 2.4-11	2.4-56 2.4-57	Access change to SCR	Revised table to include Squaw Creek Park and Squaw Creek Reservoir.	3
CTS-01105	2.5.1.3	2.5-5	Access change to SCR	Revised text to reflect to the change from “is closed to the public” to “is open to members of the public via controlled access for recreational uses, such as boating fishing.” Additional text added to reflect the 100 boats expected at a maximum but not including special events.	3
CTS-01105	2.5.2.2.6	2.5-13	Access change to SCR	Revised text to reflect the change from “not accessible by the public” to “open the public for full recreational uses with controlled access”. Additional text added to reflect the 100 boats expected at a maximum but not including special events.	3
CTS-01105	2.5.2.5	2.5-16	Access change to SCR	Revised text to include Squaw Creek Reservoir information.	3
CTS-01105	2.5.5	2.5-40	Access change to SCR	Deleted text stating SCR is, “now closed to the public” and revised the location from 2 to 15.	3
RAI GEN-08	2.2.2 Table 2.2-4	2.2-5 2.2-13	Response to RAI No. GEN-08 Luminant Letter no. TXNB-10013 Date 2/24/2010	Revised text, Table, and Figure to show that the proposed transmission line will run adjacent to the existing lines, adding an additional ROW of 160ft.	-
RAI HYD-29	Table 2.3-26 (Sheet 2 of 3)	2.3-114	Response to RAI HYD-29 Luminant Letter No. TXNB-10013 Date 2/24/2010	Revised the copper screening number from 0.50700 to 0.027.	-

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
RAI HYD-29	Table 2.3-46 (Sheet 3 of 6)	2.3-173	Response to RAI HYD-29 Luminant Letter No. TXNB-10013 Date 2/24/2010	Revised the copper screening number from 0.50700 to 0.027.	-
CTS-01117	2.3.2.2	2.3-43	Correction to be consistent with previous change	Revised the expected time to drawdown Lake Granbury based on the revised consumptive water use value.	4
CTS-01117	Table 2.3-38	2.3-154 [2.3-155 through 2.3-163]	Correction to be consistent with previous change	Revised the consumptive water use values in Table 2.3-38.	4
CTS-01117	2.4.1.1.5.5	2.4-22	Correction to be consistent with previous change	Removed last sentence that stated “Boating is not permitted.”	4
CTS-01105	2.7.4.2	2.7-33	Access change to SCR	Revised text to reflect the inclusion of receptor locations on SCR.	5
CTS-01105	2.7.4.3	2.7-34	Access change to SCR	Revised text to reflect values related to the inclusion of SCR	5
CTS-01105	Table 2.7-120	2.7-196	Access change to SCR	Revised table to reflect the inclusion of SCR.	5
CTS-01105	Table 2.7-124 (Sheet 2 of 3) (Sheet 3 of 3)	2.7-205 [2.7-206]	Access change to SCR	Revised table to reflect the inclusion of SCR.	5
CTS-01105	Table 2.7-128	2.7-215 2.7-216 [2.7-217]	Access change to SCR	Revised table to reflect the inclusion of SCR and revised the “X/Q” to be the Greek chi symbol as expressed in the text.	5
CTS-01105	Table 2.7-130	2.7-218	Access change to SCR	Revised table to reflect the inclusion of SCR and removed the grid lines to be consistent with standard table formatting.	5
CTS-01105	Table 2.7-135 (Sheet 2 of 3) (Sheet 3 of 3)	2.7-232 [2.7-233]	Access change to SCR	Revised table to reflect the inclusion of SCR.	5

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
CTS-01105	Table 2.7-135	2.7-231 2.7-232 [2.7-233]	Errata	Standardize the formatting: changed the “X/Q” to be the Greek chi symbol as expressed in the text; and removed the grid lines to be consistent with table formatting.	5

*Page numbers for the attached marked-up pages may differ from the revision 1 page numbers due to text additions and deletions. When the page numbers for the attached pages do differ, the page number for the attached page is shown in brackets.

(centered on true north, north-northeast, northeast, etc.) and extending to a distance of 80 km (50 mi) from the station were determined. A set of data points were located within each sector at increments of 0.4 km (0.25 mi) to a distance of 1.6 km (1 mi) from the plant, at increments of 0.8 km (0.5 mi) from a distance of 1.6 km (1 mi) to 8 km (5 mi), at increments of 4 km (2.5 mi) from a distance of 8 km (5 mi) to 16 km (10 mi), and at increments of 8 km (5 mi) thereafter to a distance of 80 km (50 mi). Estimates of χ/Q (undecayed and undepleted; depleted for radioiodines) and D/Q radioiodines and particulates is provided at each of these grid points. Receptor locations representing recreational users of SCR were also evaluated. The limiting SCR receptor locations are given in Table 2.7-120. CTS-01105

The results of the analysis, based on five years of on-site data, are presented in Table 2.7-122, Table 2.7-123, Table 2.7-124, Table 2.7-125, Table 2.7-126, Table 2.7-127, and Table 2.7-128.

Annual average undecayed and undepleted dilution factors to a distance of 50 mi from the plant are shown in Table 2.7-122. The maximum value at the actual EAB is 5.5 x 10^{-6} s/m^3 and occurs north-northwest of the plant at a distance of 0.37 mi. There are no higher values beyond the site boundary because for ground level releases, concentrations monontonically decrease from the release point to all locations downwind. Annual average undecayed and undepleted dilution and deposition factors for special off-site receptor locations, including recreational users of SCR, are given in Table 2.7-124. CTS-01105

2.7.4.3 Evaporation Pond

An additional CPNPP Units 3 and 4 gaseous release source is the evaporation pond (EP). The purpose of the EP is to prevent tritium concentration in the Squaw Creek Reservoir (SCR) from exceeding the limit described in the existing CPNPP Offsite Dose Calculation Manual (ODCM), Revision 26, due to tritium discharge from Units 3 & 4. The EP decrease the level of tritium discharge into the SCR by accepting liquid wastes, including tritium, from the liquid waste management system (LWMS) and evaporating the liquid wastes by natural processes. The atmospheric transport and dispersion of radioactive materials, in the form of aerosols, vapors, or gases, released from the EP are discussed below.

The χ/Q and D/Q values for the evaporation pond are determined at points of potential maximum concentration, outside the site boundary, at points of maximum individual exposure and at points within a radial grid of sixteen 22.5° sectors extending to a distance of 50 miles. Radioactive decay and dry deposition are considered. The atmospheric dispersion calculation uses meteorological data collected at CPNPP for the five-year period beginning January 1, 2001 and ending December 31, 2006, excluding January 1 through December 31 of 2005.

The evaporation pond is located approximately 0.4 mi southwest of CPNPP Units 3 and 4 power blocks. Given the distance from the power block, the effects of building wake are conservatively neglected in the atmospheric dispersion analysis. Consistent with the guidance of Regulatory Guide 1.111, a ground level release mode is used. The release elevation of the EP is 0.0 m relative to the plant grade. The evaporation pond has a surface area of approximately one acre. Although the evaporation pond is a diffuse area source, in the atmospheric dispersion evaluation, it is assumed to be a point source. This assumption is conservative since for a given release rate, a ground level point source has a higher concentration than a ground level diffuse area source at the release location and locations downwind. Near ground level releases usually produce

concentrations that decrease from the release point to all locations downwind. Therefore, for distant receptors, the assumption of a point source results in conservatively high relative concentrations.

Distances from the center of the evaporation pond to the closest point on the EAB in each of the 16 compass directions are given in Table 2.7-129. The nearest receptor locations include residences or locations at which plants or animals that become food for the public may be exposed to either direct radiation or contamination. No milk or meat animals (cows or goats) were identified near the CPNPP based on the land use census presented in the CPNPP Annual Radiological Environmental Operating Report for 2006 (AREOR). For each of the 16 compass directions, the shortest distance from the center point of the evaporation pond to a receptor within a 45° angle centered on the compass direction was used. Because of this conservative methodology, the nearest garden is captured in both the ENE and E sectors instead of just the ENE sector (the direction relative to Units 1 & 2 given in the ODCM). The distances from the center point of the evaporation pond to the nearest receptor in each sector are given in Table 2.7-130. The XOQDOQ software (NUREG/CR-2919) was used to determine the EP atmospheric dispersion values.

From Table 2.7-~~248~~135, the highest χ/Q and D/Q values for the EAB occur in the south sector and are 5.2x10^{-5} s/m3 and 2.~~7~~3x10^{-7} m^{-2}, respectively. ~~The maximum χ/Q value is not bounded by the EAB (annual average) value of 1.6x10^{-5} s/m3 given in Table 2.0-1 of the US-APWR Design Control Document (DCD). Table 2.0-1 also gives an EAB (annual average) D/Q value of 4.0x10^{-8} m^{-2}. The maximum site D/Q value is also not bounded by the DCD value.~~ Table 2.7-131 gives the annual average χ/Q and D/Q values for no decay and no depletion. Table 2.7-132 gives the 2.26 day decay undepleted results. Table 2.7-133 gives the 8.00 day decay depleted results. Annual average D/Q values are given in Table 2.7-134. Atmospheric dispersion values for recreational users of SCR are given in Table 2.7-135.~~, undepleted, as well as 2.26 day decay, undepleted and 8.00 day decay, depleted.~~ CTS-01105

There are no meat animals identified in the area surrounding the CPNPP site. Therefore, it is assumed that the χ/Q and D/Q values at any location of meat animals within five miles of the plant would be bounded by values determined at other receptors, and no specific χ/Q or D/Q values are provided.

2.7.5 REFERENCES

(ALA 2004) Extreme Ice Thicknesses from Freezing Rain. American Lifelines Alliance, a public-private partnership between the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). September 2004. www.americanlifelinesalliance.org.

(Alessandro 1998) A Statistical Analysis of Strike Data from Real Installations Which Demonstrates Effective Protection of Structures Against Lightning. F. D'Alessandro. ERICO Lightning Technologies, Hobart, Australia, 1998.

(ASCE 2005) Minimum Design Loads for Buildings and Other Structures. American Society of Civil Engineers, ANSI/ASCE 7-05.

TABLE 2.7-120
OFF-SITE RECEPTOR LOCATIONS

Sector	Residence(1)	Garden	SCR(2)
S	5751		
SSW	4185		
SW	4185		
WSW	6132		
W	6132		
WNW	11959		517
NW	11532		517
NNW	11532		517
N	10504		517
NNE	10504		517
NE	12640		517
ENE	12675	15120	517
E	14598	15120	517
ESE	12804		517
SE	10320		
SSE	9653		

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~~NOTE:~~

1. Distances, in feet, from the center point between Units 3 ~~&~~and 4 to the nearest receptor (residence~~.~~ ~~or~~ garden or recreational use of SCR) in each sector.

2. SCR refers to Squaw Creek Reservoir.

TABLE 2.7-124 (Sheet 2 of 3)
χ/Q AND D/Q VALUES FOR NORMAL RELEASES

No Decay, Undepleted and Depleted, at Each Receptor Location

Type of Location	Sector	Distance (miles)	Distance (meters)	χ/Q (s/m^3) No Decay Undepleted	χ/Q (s/m^3) No Decay Depleted	D/Q (m^{-2})	
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	
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	
G~~ARDEN~~arden	ENE	2.86	4609	1.10E-07	8.50E-08	2.90E-10	CTS-01105
G~~ARDEN~~arden	E	2.86	4609	5.80E-08	4.60E-08	1.30E-10	
SCR	WNW	0.1	158	2.40E-05	2.30E-05	1.20E-07	
SCR	NW	0.1	158	4.80E-05	4.50E-05	2.70E-07	
SCR	NNW	0.1	158	6.00E-05	5.60E-05	3.90E-07	

TABLE 2.7-124 (Sheet 3 of 3)
χ/Q AND D/Q VALUES FOR NORMAL RELEASES

No Decay, Undepleted and Depleted, at Each Receptor Location

Type of Location	Sector	Distance (miles)	Distance (meters)	χ/Q (s/m^3) No Decay Undepleted	χ/Q (s/m^3) No Decay Depleted	D/Q (m^{-2})
SCR	N	0.1	158	4.30E-05	4.00E-05	3.40E-07
SCR	NNE	0.1	158	3.80E-05	3.60E-05	1.40E-07
SCR	NE	0.1	158	3.40E-05	3.10E-05	8.40E-08
SCR	ENE	0.1	158	2.60E-05	2.40E-05	6.40E-08
SCR	E	0.1	158	1.40E-05	1.30E-05	2.90E-08
SCR	ESE	0.1	158	1.90E-05	1.70E-05	5.30E-08

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Note:

SCR refers to Squaw Creek Reservoir.

TABLE 2.7-128 (Sheet 1 of 3)
~~X~~χ/Q AND D/Q VALUES FOR 2.26 AND 8 DAY DECAY HALF-LIVES

CTS-01105

Type of Location	Sector	Distance (miles)	Distance (meters)	~~X~~χ/Q (s/m^3) 2.26 Day Decay Undepleted	~~X~~χ/Q (s/m^3) 8.00 Day 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

TABLE 2.7-128 (Sheet 2 of 3)
~~X~~χ/Q AND D/Q VALUES FOR 2.26 AND 8 DAY DECAY HALF-LIVES

CTS-01105

Type of Location	Sector	Distance (miles)	Distance (meters)	~~X~~χ/Q (s/m^3) 2.26 Day Decay Undepleted	~~X~~χ/Q (s/m^3) 8.00 Day Decay Depleted	D/Q (m^{-2})
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
Residence	W	1.16	1869	2.60E-07	2.20E-07	1.60E-09
Residence	WNW	2.26	3645	1.50E-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	6.00E-08	4.90E-08	1.40E-10
Residence	ESE	2.43	3903	9.70E-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	5.70E-08	4.60E-08	1.30E-10

TABLE 2.7-128 (Sheet 3 of 3)
~~X~~χ/Q AND D/Q VALUES FOR 2.26 AND 8 DAY DECAY HALF-LIVES

CTS-01105

Type of Location	Sector	Distance (miles)	Distance (meters)	~~X~~χ/Q (s/m^3) 2.26 Day Decay Undepleted	~~X~~χ/Q (s/m^3) 8.00 Day Decay Depleted	D/Q (m^{-2})
SCR	WNW	0.1	158	2.40E-05	2.30E-05	1.20E-07
SCR	NW	0.1	158	4.80E-05	4.50E-05	2.70E-07
SCR	NNW	0.1	158	6.00E-05	5.60E-05	3.90E-07
SCR	N	0.1	158	4.30E-05	4.00E-05	3.40E-07
SCR	NNE	0.1	158	3.80E-05	3.60E-05	1.40E-07
SCR	NE	0.1	158	3.30E-05	3.10E-05	8.40E-08
SCR	ENE	0.1	158	2.60E-05	2.40E-05	6.40E-08
SCR	E	0.1	158	1.40E-05	1.30E-05	2.90E-08
SCR	ESE	0.1	158	1.80E-05	1.70E-05	5.30E-08

CTS-01105

Note:

SCR refers to Squaw Creek Reservoir.

TABLE 2.7-130 DISTANCES, IN METERS, FROM THE CENTER POINT OF THE EVAPORATION POND TO THE NEAREST RECEPTOR ~~(RESIDENCE OR GARDEN)~~ IN EACH SECTOR

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Sector	Nearest Residence	Nearest Garden	SCR
S	1073		
SSW	493		
SW	493		
WSW	493		
W	1328		
WNW	1328		
NW	3472		
NNW	3723		655
N	3927		655
NNE	3927		655
NE	4621		655
ENE	4621	5265	655
E	4680	5265	655
ESE	2995		655
SE	2565		
SSE	1073		

Note:

SCR refers to Squaw Creek Reservoir.

TABLE 2.7-135 (Sheet 1 of 3)
~~X~~χ/Q AND D/Q VALUES AT EACH RECEPTOR LOCATION

CTS-01105

Release	Direction	Dist. (mi)	~~X~~χ/Q (sec/m^3) No Decay, Undepleted	~~X~~χ/Q (sec/m^3) 2.26 Day Decay, Undepleted	~~X~~χ/Q (sec/m^3) 8 Day Decay, Depleted	D/Q (m^{-2})
EAB	S	0.08	5.20E-05	5.10E-05	5.00E-05	2.30E-07
EAB	SSW	0.08	4.10E-05	4.10E-05	4.10E-05	1.60E-07
EAB	SW	0.09	2.20E-05	2.20E-05	2.20E-05	8.50E-08
EAB	WSW	0.1	1.90E-05	1.90E-05	1.80E-05	6.60E-08
EAB	W	0.13	1.60E-05	1.60E-05	1.60E-05	5.30E-08
EAB	WNW	0.18	1.30E-05	1.30E-05	1.30E-05	4.90E-08
EAB	NW	0.3	1.10E-05	1.10E-05	1.00E-05	5.30E-08
EAB	NNW	0.51	5.30E-06	5.30E-06	4.80E-06	3.30E-08
EAB	N	0.75	1.90E-06	1.90E-06	1.70E-06	1.60E-08
EAB	NNE	0.89	1.30E-06	1.30E-06	1.10E-06	4.70E-09
EAB	NE	1.05	8.60E-07	8.50E-07	7.50E-07	2.10E-09
EAB	ENE	0.88	9.00E-07	8.90E-07	7.90E-07	2.20E-09
EAB	E	0.54	1.10E-06	1.10E-06	1.00E-06	2.20E-09
EAB	ESE	0.27	5.20E-06	5.20E-06	4.90E-06	1.20E-08
EAB	SE	0.16	1.70E-05	1.70E-05	1.70E-05	5.10E-08
EAB	SSE	0.11	1.80E-05	1.80E-05	1.80E-05	1.10E-07
Residence	S	0.67	9.70E-07	9.70E-07	8.70E-07	9.00E-09
Residence	SSW	0.31	3.10E-06	3.10E-06	2.90E-06	2.10E-08

TABLE 2.7-135 (Sheet 2 of 3)
~~X~~χ/Q AND D/Q VALUES AT EACH RECEPTOR LOCATION

CTS-01105

Release	Direction	Dist. (mi)	~~X~~χ/Q (sec/m^3) No Decay, Undepleted	~~X~~χ/Q (sec/m^3) 2.26 Day Decay, Undepleted	~~X~~χ/Q (sec/m^3) 8 Day Decay, Depleted	D/Q (m^{-2})
Residence	SW	0.31	2.30E-06	2.30E-06	2.10E-06	1.50E-08
Residence	WSW	0.31	2.20E-06	2.20E-06	2.10E-06	1.20E-08
Residence	W	0.83	5.50E-07	5.50E-07	4.90E-07	2.90E-09
Residence	WNW	0.83	9.00E-07	9.00E-07	8.00E-07	4.60E-09
Residence	NW	2.16	3.90E-07	3.90E-07	3.20E-07	2.00E-09
Residence	NNW	2.31	4.40E-07	4.30E-07	3.60E-07	2.60E-09
Residence	N	2.44	2.80E-07	2.70E-07	2.20E-07	2.00E-09
Residence	NNE	2.44	2.60E-07	2.60E-07	2.10E-07	8.20E-10
Residence	NE	2.87	1.90E-07	1.80E-07	1.50E-07	3.80E-10
Residence	ENE	2.87	1.50E-07	1.40E-07	1.20E-07	2.80E-10
Residence	E	2.91	7.60E-08	7.50E-08	6.00E-08	1.20E-10
Residence	ESE	1.86	2.00E-07	2.00E-07	1.60E-07	5.10E-10
Residence	SE	1.59	3.20E-07	3.20E-07	2.70E-07	1.20E-09
Residence	SSE	0.67	7.60E-07	7.60E-07	6.80E-07	7.30E-09
Garden	ENE	3.27	1.20E-07	1.20E-07	9.50E-08	2.20E-10
Garden	E	3.27	6.40E-08	6.30E-08	5.00E-08	1.00E-10
SCR	NNW	0.41	7.90E-06	7.90E-06	7.30E-06	4.80E-08
SCR	N	0.41	5.50E-06	5.50E-06	5.00E-06	4.20E-08

TABLE 2.7-135 (Sheet 3 of 3)
~~X~~χ/Q AND D/Q VALUES AT EACH RECEPTOR LOCATION

CTS-01105

Release	Direction	Dist. (mi)	~~X~~χ/Q (sec/m^3) No Decay, Undepleted	~~X~~χ/Q (sec/m^3) 2.26 Day Decay, Undepleted	~~X~~χ/Q (sec/m^3) 8 Day Decay, Depleted	D/Q (m^{-2})
SCR	NNE	0.41	5.10E-06	5.10E-06	4.60E-06	1.70E-08
SCR	NE	0.41	4.50E-06	4.50E-06	4.10E-06	1.00E-08
SCR	ENE	0.41	3.50E-06	3.50E-06	3.20E-06	7.80E-09
SCR	E	0.41	1.90E-06	1.90E-06	1.70E-06	3.50E-09
SCR	ESE	0.41	2.50E-06	2.50E-06	2.30E-06	6.50E-09

Note:

SCR refers to Squaw Creek Reservoir.

Chapter 3

Chapter 3 Tracking Report Revision List

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
RAI GEN-03 RAI HYD-23 RAI LU-03	3.4.1.4	3.4-4	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised flow rates discussed in the “Circulating Water System” category to be consistent with the conceptual design.	-
RAI GEN-03 RAI HYD-23 RAI LU-03	3.6.1.1	3.6-2	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised discussion of permeate, TDS, and chloride concentrations to be consistent with the conceptual design.	-
RAI GEN-03 RAI HYD-23 RAI LU-03	3.6.1.1	3.6-2	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised the dimensions of the evaporation pond depth.	-
RAI GEN-03 RAI HYD-23 RAI LU-03	3.6.1.4	3.6-4	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Added a new subsection to provide an overview of the BDTF and the functions of the conceptual design.	-
RAI GEN-03 RAI HYD-23 RAI LU-03	Figure 3.6-1	-	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Added a figure to illustrate the BDTF.	-
RAI HYD-27	3.4.3 Table 3.3-1 Figure 3.3-1	3.4-5 3.3-5	Response to RAI HYD-27 Luminant Letter No. TXNB-10013 Date 2/24/2010	Revised text, Table, and Figure to indicate whether the values are per unit, for two units, or for the entire site (four units). Since some of the values from Figure 3.3-1 changed Table 3.3-1 and text was revised to be consistent.	-
RAI GEN-09	3.6.2	3.6-11 3.6.12 3.6.13	Response to RAI HYD-27 Luminant Letter No. TXNB-10013 Date 2/24/2010	Revised to include paragraph on Sanitary Waste Treatment Plant	-

RAI GEN-07	Figures 3.1-1 3.3-1 3.4.1	-	Response to RAI GEN-07 Luminant Letter No. TXNB-10013 Date 2/24/2010	Figure 3.1-1 revised to include UHS Cooling System/ESW Pump House Figure 3.3-1 revised to include BDTF. Figure 3.4-1 revised cooling tower designation to be consistent with Figure 3.3-1.	-
RAI GEN-14	Table 3.6-6	3.6-14	Response to RAI HYD-27 Luminant Letter No. TXNB-10013 Date 2/24/2010	Revised Table 3.6-6 to include the annual emissions of reportable pollutants under the CAA for the auxiliary boilers.	-
RAI GEN-07 S01	Figure 3.4-1	-	Response To RAI GEN-07 Supplemental Response Luminant Letter no.TXNB-10023 Date 3/19/2010	Revised Figure 3.4-1 to include boxes for Condenser and BDTF.	-

*Page numbers for the attached marked-up pages may differ from the revision 1 page numbers due to text additions and deletions. When the page numbers for the attached pages do differ, the page number for the attached page is shown in brackets.

Chapter 4

Chapter 4 Tracking Report Revision List

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
RAI GEN-03 RAI HYD-23 RAI LU-03	4.2.1.1.5	4.2-3	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised the reference from Subsection 3.6.1.1 to new Subsection 3.6.1.4 in the last sentence.	-
CTS-01105	4.1.1.1	4.1-2	Access change to SCR	Revised text to reflect controlled access to SCR and park.	3
CTS-01105	4.2.2.3	4.2-11	Access change to SCR	Deleted text stating that SCR has no other users because it is for CPNPP use.	3
CTS-01105	4.3.1.3	4.3-8	Access change to SCR	Revised text in 3rd paragraph of subsection to reflect to the change from SCR being closed to the public to reflect that it will be open for full recreational uses with controlled access.	3
CTS-01105	4.3.2.4	4.3-12	Access change to SCR	Added text to reflect the change the status of SCR and the common type of fish found.	3
CTS-01105	4.4.1.4	4.4-4	Access change to SCR	Added text to include visitors to SCR.	3
CTS-01105	4.4.1.5	4.4-6	Access change to SCR	Added text to discuss Squaw Creek Reservoir and Park activities.	3
CTS-01105	4.4.2.6	4.4-20	Access change to SCR	Added text to discuss controlled access to SCR and to state that no new visual impact are anticipated due to the proximity of CPNPP are Units 1 and 2.	3
RAI GEN-08	4.1.2	4.1-5	Response to RAI No. GEN-08 Luminant Letter no. TXNB-10013 Date 2/24/2010	Revised text, Table, and Figure to show that the proposed transmission line will run adjacent to the existing lines, adding an additional ROW of 160ft.	-

RAI HYD-28	4.2.1.3	4.2-5	Response to RAI HYD-27 Luminant Letter No. TXNB-10013 Date 2/24/2010	Revised text to reflect the availability of water from Wheeler Branch.	-
RAI HYD-28	4.2.1.8	4.2-8	Response to RAI HYD-27 Luminant Letter No. TXNB-10013 Date 2/24/2010	Revised text to reflect the availability of water from Lake Granbury.	-
RAI GEN-11	4.3.1.1	4.3-3 4.3-4	Response to RAI GEN-11 Luminant Letter No. TXNB-10013 Date 2/24/2010	Revised text to delete the option of burning vegetation and to estimate the amount of mulch that will be created.	-
RAI HYD-28	4.4.2.3	4.4-16 4.4-17	Response to RAI HYD-27 Luminant Letter No. TXNB-10013 Date 2/24/2010	Revised text to reflect the availability of water from Wheeler Branch.	-

*Page numbers for the attached marked-up pages may differ from the revision 1 page numbers due to text additions and deletions. When the page numbers for the attached pages do differ, the page number for the attached page is shown in brackets.

Chapter 5

Chapter 5 Tracking Report Revision List

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
RAI GEN-03 RAI HYD-23 RAI LU-03	5.2.1.3	5.2-4	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised the water loss estimates for BDTF to be consistent with the conceptual design.	-
RAI GEN-03 RAI HYD-23 RAI LU-03	5.2.2.3.1	5.2-12	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised the referenced subsection from 3.6.1.1 to the new subsection 3.6.1.4.	-
RAI GEN-03 RAI HYD-23 RAI LU-03	5.2.3.4	5.2-15	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Added new paragraph to describe the water quality affects as a result of the BDTF.	-
RAI GEN-03 RAI HYD-23 RAI LU-03	5.5.1.2.1	5.5-4	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised the referenced subsection from 3.6.1.1 to the new subsection 3.6.1.4.	-
RAI-HYD-15	5.2.1.7	5.2-6 5.2-7	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised subsection 5.2.1.7 to reflect the discussions in the Freese & Nichols' memorandum attached to the RAI Supplemental response.	-
RAI-HYD-15	5.2.2.1	5.2-9	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Added Possum Kingdom Lake.	-
RAI-HYD-15	5.2.2.2	5.2-9	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised reference from Subsection 5.2.1.1 to Subsection 5.2.1, in the first paragraph.	-
RAI-HYD-15	5.2.2.2	5.2-10	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised third paragraph to reflect the discussions in the Freese & Nichols' memorandum attached to the RAI Supplemental response.	-

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
RAI-HYD-15	5.2.2.2	5.2-10	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised the environmental impacts from SMALL to MODERATE.	-
RAI-HYD-15	5.2.2.3.1	5.2-11	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Changed “Standard” to “System.”	-
RAI-HYD-15	5.2.3	5.2-19	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Added reference citation for Freese & Nichols’ work cited in the text.	-
RAI TE-11	5.3.2.3	5.3-10	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Added new subsection to discuss environmental impacts to terrestrial ecosystems for the BDTF.	-
CTS-01105	5.4.1.1	5.4-2	Access change to SCR	Revised text to reflect the change of access to SCR and to identify the types of activity that are expected to be allowed. Additional text added to reflect that 100 boats maximum will be allowed but more may be allowed at special events.	3
CTS-01105	Table 5.4-1	5.4-14 5.4-15	Access change to SCR	Revised table to reflect additional pathways due to status change of SCR and clarification for dose.	3
CTS-01105	Table 5.4-8	5.4-29	Access change to SCR	Revised table to reflect estimated max individual dose due to status change of SCR.	3
CTS-01105	Table 5.4-11	5.4-32	Access change to SCR	Revised table to reflect estimated population dose due to status change of SCR.	3

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
CTS-01105	5.8.1.5	5.8-4	Access change to SCR	Revised text to reflect the change of access to SCR and to identify the types of activity that are expected to be allowed. Also to include information concerning Squaw Creek Reservoir and Park and associated activities.	3
CTS-01105	5.8.2.3.4	5.8-15	Access change to SCR	Revised text to reflect the change of access to SCR.	3
CTS-01105	Table 5.10-1 (Sheet 5 of 10)	5.10-7	Access change to SCR	Revised text to reflect to the change of access to SCR.	3
RAI HYD-29	5.2.3.4	5.2-15	Response to RAI HYD-29 Luminant Letter No. TXNB-10013 Date 2/24/2010	Revised text to provide a discussion of the estimated copper concentration at 2.4 cycle concentration at low flow and mean annual flow.	-
RAI HP-04	5.3.4.1	5.3-15 5.3-16	Response to RAI HYD-27 Luminant Letter No. TXNB-10013 Date 2/24/2010	Revised text to address the potential for the BDTF evaporation ponds to increase the growth of thermophilic microorganisms.	-
RCOL2_02.03.02-04	5.3.3.1.3 5.3.3.2.1	5.3-13 5.3-15	Response to RAI No 156 Luminant letter TXNB-10048 Date 6/25/2010	Revised text to be consistent with revisions and corrections made to TXUT-001-ER-5.3-CALC-005, Rev. 3.	-
RCOL2_02.03.02-04	Tables 5.3-3 through 5.3-6	5.3-22 through 5.3-29	Response to RAI No 156 Luminant letter TXNB-10048 Date 6/25/2010	Revised text to be consistent with revisions and corrections made to TXUT-001-ER-5.3-CALC-005, Rev. 3.	-
CTS-01105	5.4.1.2	5.4-6	Access change to SCR	Revised table to reflect the inclusion of SCR.	5
CTS-01105	5.4.1.3	5.4-7	Access change to SCR	Revised table to reflect the inclusion of SCR.	5

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
CTS-01105	5.4.2.2	5.4-8	Access change to SCR	Revised text to include discussion of the doses to the maximally exposed individual at SCR.	5
CTS-01105	5.4.3.2	5.4-8 [5.4-9]	Access change to SCR	Revised text to include discussion of the maximum dose to an individual using SCR.	5
CTS-01105	Table 5.4-1	5.4-14 5.4-15	Access change to SCR	Revised table to reflect inclusion of the gaseous effluent pathway parameters for SCR and changed L/yr to l/yr.	5
CTS-01105	Table 5.4-3 (Sheet 1 of 2)	5.4-17	Errata	Revised the “X/Q” to be the Greek chi symbol as expressed in the text and changed L/yr to l/yr.	5
CTS-01105	Table 5.4-3 (Sheet 2 of 2)	5.4-18	Access change to SCR	Revised table to reflect the inclusion of the gaseous effluent pathway parameters for SCR.	5
CTS-01105	Table 5.4-9	5.4-30	Access change to SCR	Revised table to reflect the inclusion of SCR.	5
CTS-01105	Table 5.4-10	5.4-31	Access change to SCR	Revised table to reflect the inclusion of SCR.	5
CTS-01105	Table 5.4-12	5.4-33 through 5.4-38	Access change to SCR	Revised table to reflect the inclusion of SCR and corrected table formatting.	5
CTS-01105	Table 5.4-13	5.4-39	Access change to SCR	Revised table to reflect the inclusion of SCR.	5
CTS-01105	Table 5.4-14	5.4-40	Access change to SCR	Revised table to reflect the inclusion of SCR.	5
CTS-01105	Table 5.4-15	5.4-41	Access change to SCR	Revised table to reflect the inclusion of SCR.	5
CTS-01105	Table 5.4-16	5.4-42	Access change to SCR	Revised table to reflect the inclusion of SCR.	5

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
CTS-01105	Table 5.4-27	5.4-54 [5.4-55]	Access change to SCR	Developed a new table to reflect the total gaseous doses to the maximally exposed individual at SCR.	5

*Page numbers for the attached marked-up pages may differ from the revision 1 page numbers due to text additions and deletions. When the page numbers for the attached pages do differ, the page number for the attached page is shown in brackets.

5.4.1.2 Gaseous Pathways

Two release points are considered in the evaluation of off-site dose consequences due to gaseous releases. These release points are the plant vent and the evaporation pond (EP). The purpose of the EP is to prevent tritium concentration in the SCR from exceeding the limit described in the existing CPNPP Off-site Dose Calculation Manual (ODCM) , Revision 26, due to tritium discharge from Units 3 & 4. The EP decreases the level of tritium discharge into the SCR by accepting liquid wastes, including tritium, from the liquid waste management system (LWMS) and evaporating the liquid wastes by natural processes.

The methodology contained in the GASPAR II program (described in NUREG/CR-4653) was used to determine the doses for gaseous pathways. This program implements the radiological exposure models described in Regulatory Guide 1.109, Revision 1, for radioactivity releases in gaseous effluent. The code calculates the radiation exposure to man from:

- External exposure to airborne radioactivity.
- External exposure to deposited activity on the ground.
- Inhalation of airborne activity.
- Ingestion of contaminated agricultural products.

Tables 5.4-3, 5.4-4, and 5.4-5 present the gaseous pathway parameters used to calculate doses for both the maximally exposed individual and for the population. Pathway doses for the maximally exposed individual are determined at the receptor location with the highest atmospheric dispersion (χ/Q) and deposition (D/Q) values. Details of the χ/Q and D/Q calculations are given in Section 2.7. The nearest residence in the south-southwest (SSW) sector results in the highest χ/Q and D/Q values for releases from the plant vent or the evaporation pond. The maximum point of concentration at the EAB is used for evaluation of noble gas external doses. The maximum point of concentration at SCR is used for evaluation of noble gas, ground, and inhalation doses to an individual at SCR for recreational purposes. CTS-01105

Doses due to milk ingestion are determined assuming milk ingestion from both cows and goats. This assumption is conservative because it assumes the individual consumes twice the annual milk ingestion. This assumption is also conservative because, there are no identified milk animals (cows or goats) near the site (within five mi). Where there are no identified milk cows in counties within the 50-mi radius of the plant, or where the number of milk cows was withheld for the 2002 U.S. Department of Agriculture (USDA) agricultural census, data from the 1997 agricultural census were used and assumed to represent current values.

For counties within 50 mi of the Comanche Peak site where the number of milk goats was unavailable, it was assumed that the number of milk goats is equal to the number of milk cows in the county. The dose evaluation conservatively assumed that leafy vegetables are grown all year long and that the maximally exposed individual ingests 76 percent of his annual vegetable intake from his own contaminated garden. It is also assumed that cows and goats are on pasture all year long, and their entire food intake is from the pasture. The population within a 50-mi radius of

the CPNPP site, projected to the year 2058, is 3,493,553 persons. Vegetable, milk and meat production data was determined from USDA county farm statistics.

A discussion pertaining to doses calculated for the gaseous pathway is presented in Subsection 5.4.2.2.

5.4.1.3 Direct Radiation from Station Operation

As stated in referenced DCD Subsection 12.4.2.1, the direct radiation from the containment and other plant buildings is negligible. The General Area Monitoring (GAM) program at CPNPP Units 1 and 2 gives an annual average dose rate of 0.001 mrad/hr at the protected area fence. Using this dose rate ~~for the direct radiation dose gives an annual dose of 8.76 person-mrad (0.001 mrad/hr * 365 day/yr * 24 hr/day).~~and assuming the maximum individual spends 134 hours per year at the worst-case location gives an annual dose of 0.134 person-mrad (0.001 mrad/hr * 134 hrs/yr). This is conservative because the nearest location a member of the public would occupy for an extended amount of time is SCR. As described in Section 5.4.3.2, the maximally exposed individual is assumed to use SCR 134 hours per year. Using the dose rate at the PA fence for an individual assumed to be at SCR is very conservative because the dose due to direct radiation decreases by the inverse square of the distance from the source. CTS-01105

5.4.2 RADIATION DOSES TO MEMBERS OF THE PUBLIC

5.4.2.1 Liquid Pathways Doses

Maximum dose rate estimates to man due to liquid effluent releases were determined for the following pathways:

- Eating fish or invertebrates.
- Using the shoreline for activities, such as sunbathing or fishing.
- Swimming and boating.
- Ingestion of contaminated drinking water.
- Consumption of food produced with contaminated water.

The concentrations of radioactive effluents in SCR are estimated using a completely mixed impoundment model (Regulatory Guide 1.113). Table 5.4-6 provides the expected annual liquid radionuclide releases to SCR. The impoundment receives plant effluents and allows additional time for radiological decay before release of effluents to the receiving water body (Squaw Creek). Dilution of the impoundment occurs due to precipitation, flow from tributaries of Squaw Creek, and make-up flow from Lake Granbury. Mixing is promoted by drawing water from the impoundment for Units 1 and 2 plant cooling and return of plant cooling water to SCR. Table 5.4-1 summarizes parameters used in the calculation of nuclide concentrations in SCR.

The estimates for the maximum individual whole-body and critical organ doses from these interactions are presented in Table 5.4-8. These doses would only occur under conditions that

maximize the resultant dose. It is unlikely that any individual would receive doses of the magnitude calculated.

5.4.2.2 Gaseous Pathways Doses

Dose rate estimates were calculated for hypothetical individuals of various ages exposed to gaseous radioactive effluents through the following pathways:

- Direct radiation from immersion in the gaseous effluent cloud and from particulates deposited on the ground;
- Inhalation of gases and particulates;
- Ingestion of milk; and
- Ingestion of foods contaminated by gases and particulates.

Tables 5.4-3, 5.4-4 and 5.4-5 provide the parameters used in the gaseous effluents dose evaluation. Table 5.4-7 gives the expected annual gaseous releases for the plant vent and the evaporation pond. Table 5.4-12 provides the estimated whole-body and critical organ doses for the identified gaseous effluent pathways. These doses would only occur under conditions that maximize the resultant dose. It is unlikely that any individual would receive doses of the magnitude calculated. The doses to the maximally exposed individual at SCR due to normal effluent releases from the plant vent and the evaporation pond are also calculated. These doses are calculated at the point of maximum exposure at SCR, which occurs at a distance of 0.10 miles NNW of Units 3 and 4 for plant vent releases and at a distance of 0.41 miles NNW of the evaporation pond for evaporation pond releases. CTS-01105

5.4.3 IMPACTS TO MEMBERS OF THE PUBLIC

5.4.3.1 Impacts from Liquid Pathways

The most conservative maximum individual dose resulted from Case 1, which used the minimum flow from SCR to Squaw Creek. The maximally exposed individual dose calculated was compared to 10 CFR 50, Appendix I criteria and is presented in Table 5.4-8. The estimated maximum individual doses are compared to the 10 CFR 20.1301 criteria in Table 5.4-9. The maximally exposed individual dose calculated for all units at the site was also compared to 40 CFR 190 criteria and is presented in Table 5.4-10. The estimated population dose due to liquid effluent releases is given in Table 5.4-11. The most conservative population dose resulted from Case 2, which used a higher (more realistic) flow from SCR to Squaw Creek.

5.4.3.2 Impacts from Gaseous Pathways

The gaseous effluent release pathway dose to maximally exposed individuals is given in Table 5.4-12. Table 5.4-13 gives a comparison between the calculated maximally exposed individual dose and 10 CFR 50, Appendix I criteria. In addition, the maximally exposed individual gaseous effluent dose calculated for all units at the site was also compared to 40 CFR 190 criteria (Table 5.4-14). The maximum doses to an individual using SCR for recreational activities are given in CTS-01105

Table 5.4-27. The doses to the maximally exposed individual at SCR were calculated based on a person occupying the worst-case location for 134 hours per year. The number of hours was conservatively assumed to be twice the number of hours of shoreline exposure for the maximum age group from Table E-5 of RG 1.109. The doses to an individual at SCR were conservatively included in the maximum individual doses even though SCR is a restricted area per the definition provided in 10 CFR 20.1003 because CPNPP has control of access to the reservoir and has restricted public access in the past. CTS-01105

The population dose due to gaseous effluents from CPNPP Units 3 and 4 was also calculated. The population within a 50-mi radius of the CPNPP site was projected to the year 2058 using the cohort component method. The population dose for the various pathways (immersion, inhalation, ingestion, recreational use of SCR, and ground deposition) is provided in Table 5.4-15. CTS-01105

5.4.3.3 Direct Radiation Doses

As reported in the CPNPP Units 1 and 2 Annual Radiological Environmental Operating Report for 2006, the background radiation dose rate equivalent for the area surrounding Fort Worth, Texas is 0.22 mrad/day. This calculated value varies widely with changes in location but represents an appropriate reference value to compare with actual measured thermoluminescence dosemeter (TLD) readings. Using data from the pre-operational program for the two years prior to the startup of Unit 1, the quarterly TLDs averaged a calculated dose rate of 0.14 mrad/day while the yearly TLDs averaged a calculated dose rate of 0.16 mrad/day. The range of measured values from this same two-year period varied from a minimum of 0.11 mrad/day to a maximum of 0.22 mrad/day. For comparative purposes, a minimum dose rate of 0.11 mrad/day will be assumed for natural background radiation giving an annual background dose of 0.04 rad.

The dose due to direct radiation and skyshine from all units on-site is reported in Table 5.4-16. Population doses resulting from natural background radiation to individuals living within a 50-mi radius of the CPNPP site are also presented in this table for comparison.

Radioactive wastes stored inside the plant structures are shielded so that areas outside the structures meet Radiation Zone I criteria. If it becomes necessary to temporarily store radioactive wastes/materials outside the plant structures, radiation protection measures will be taken by the radiation protection staff to ensure compliance with 10 CFR 20 and to be consistent with the recommendations of RG 8.8.

5.4.4 IMPACTS TO BIOTA OTHER THAN MEMBERS OF THE PUBLIC

Radiation exposure pathways to biota other than man or members of the public are examined to determine if the pathways could result in doses to biota greater than those predicted for man. This assessment uses surrogate species that provide representative information on the various dose pathways potentially affecting broader classes of living organisms. Surrogates are used because important attributes are well defined and are accepted as a method for judging doses to biota. Important biota considered are state or federally listed species that are endangered, threatened, commercial, recreationally valuable, or important to the local ecosystem.

Table 5.4-17 identifies important biota from Section 2.4 and the assigned surrogates in this assessment. Surrogate biota used includes algae (also taken as aquatic plants), invertebrates

TABLE 5.4-1 (Sheet 1 of 2)
LIQUID EFFLUENT PATHWAY PARAMETERS

Description	Parameter	
Completely Mixed Impoundment Model		
SCR Volume[(a)]	144,700 ac-ft (6.3E+09 ft^3)	
Effluent Discharge Flow rate	247,500 gpm	
SCR minimum discharge flow rate (Case 1)	1.5 ft^3/s	
SCR expected average discharge flow rate (Case 2)	45.4 ft^3/s (32,900 ac-ft/year)	
Midpoint of plant life	30 yr	
Maximally Exposed Individual		
Shoreline and fishing use location	On SCR ~~2 mi below Squaw Creek Dam~~	CTS-01105
Shore-width factor (Squaw Creek)	0.2	
Shore-width factor (SCR)	0.3	CTS-01105
Squaw Creek stream velocity	0.4 ft/sec	
Transit time to location of maximum individual dose	7.3 hr	
Transit time (SCR)	0.0	CTS-01105
Dilution factor for Squaw Creek	1	
Dilution factor for SCR	1	CTS-01105
Downstream distance to first potential drinking water location (City of Cleburne diversion)		
Along Squaw Creek	4.3 mi (22,704 ft)	
Along Paluxy and Brazos Rivers	44.5 mi (235,046 ft)	
Brazos River stream velocity	1.3 ft/sec	
Transit time to first potential drinking water location	66 hr	
Brazos River monthly average stream flow	1,234 ft^3/sec	
Dilution factor for drinking closest drinking water (Case 1) (complete mixing of Squaw Creek and Brazos River)	822.7	
Dilution factor for drinking closest drinking water (Case 2) (complete mixing of Squaw Creek and Brazos River)	27.2	
Population Dose		
2058 projected 50-mile population including transients	3,493,553 persons	
Location of potential drinking water location		
City of Cleburne diversion	given above	
City of Whitney diversions	9.6 mi (50,654 ft) downstream of Cleburne	
Transit time to assumed City of Whitney diversion	77 hr	
Dilution factor for drinking water, multiplied by a factor of two for dilution in Whitney Reservoir (Case 1)	1645.4 (822.7*2)	

TABLE 5.4-1 (Sheet 2 of 2)
LIQUID EFFLUENT PATHWAY PARAMETERS

Description	Parameter
Dilution factor for drinking water, multiplied by a factor of two for dilution in Whitney Reservoir (Case 2)	54.4 (27.2*2)
Projected population of Cleburne	53,440
Projected population of Whitney	3,722
Distance to assumed location of fish harvest (above Whitney Reservoir, City of Cleburne diversion)	given above
Total annual fish harvest, Whitney Reservoir and the Brazos River	715,125 lb/yr (324,375 kg/yr)
Transit time for aquatic food	66 hrs
Dilution factor for aquatic foods (Case 1 / Case 2)	822.7 / 27.2
Downstream distance of shoreline, boating and swimming use (midpoint of Whitney Reservoir)	9.6 mi (50,654 ft) downstream of Cleburne
Shore-width factor for shoreline use (Whitney Reservoir)	0.3
Transit time for recreational usage	77 hr
Dilution factor for recreational usage (Case 1 / Case 2)	1645.4 / 54.2
Shoreline, boating and swimming usage based on RG 1.109 exposure times and age group fractions and 50 percent of the 50 mile population (population dose due to public use of SCR is estimated to be 250 times the maximum SCR individual dose based on an estimated maximum usage of 250 people)	22,358,746 person-hr/yr (each activity)
Location of assumed irrigation diversion (City of Cleburne)	given above
Transit time for irrigation usage	66 hr
Dilution factor (Case 1 / Case 2)	822.7 / 27.2
Irrigation rate	74.6 $L/m^2/mo$
Total Meat Production along the Brazos River	281,000 (kg/yr)
Total Milk Production along the Brazos River	943,000 (~~L~~l/yr)
Irrigated Agricultural Products along the Brazos River	
Total Leafy Vegetables	54,038 lb (25,000 kgm)
Total All Other Vegetables	11,619,279 lb (5,270,000 kgm)

CTS-01105

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a) Based on USGS minimum pool elevation of 772.98 ft

Note: Default values from RG 1.109 used for all input values not listed above.

TABLE 5.4-3 (Sheet 1 of 2)
GASEOUS EFFLUENT PATHWAY PARAMETERS

Description	Value	
Population Data	Table 5.4-5	
Milk Production	908,000,000 ~~L~~l/yr	CTS-01105
Vegetable Production	481,000,000,kgm	
Meat Production	42,500,000 kg/yr	
Source Term	Table 5.4-7	
Nearest Residence (for plant vent release)	0.79 mi SSW	
Point of Maximum Concentration at the EAB (for plant vent release)	0.37 mi NNW	
Nearest Residence (for evaporation pond release)	0.31 mi SSW	
Midpoint of plant life	30 yrs	
Nearest Residence ~~X~~χ/Q and D/Q values for plant vent release		CTS-01105
No decay, undepleted	4.4×10^{-7} s/m^3	
2.26 day decay, undepleted	4.4×10^{-7} s/m^3	
8 day decay, depleted	3.9×10^{-7} m^{-2}	
D/Q for maximum individual dose calculation	4.5×10^{-9} m^{-2}	
EAB ~~X~~χ/Q and D/Q values for plant vent release		CTS-01105
No decay, undepleted	5.5×10^{-6} s/m^3	
2.26 day decay, undepleted	5.5×10^{-6} s/m^3	
8 day decay, depleted	5.1×10^{-6} s/m^3	
D/Q for maximum individual dose calculation	5.5×10^{-8} m^{-2}	
Nearest Residence ~~X~~χ/Q and D/Q values for evaporation pond release		CTS-01105
No decay, undepleted	3.10×10^{-6} s/m^3	
2.26 day decay, undepleted	3.10×10^{-6} s/m^3	
8 day decay, depleted	2.90×10^{-6} s/m^3	
D/Q for maximum individual dose calculation	2.10×10^{-8} m^{-2}	
Annual Average ~~X~~χ/Q (worst location)	4.4×10^{-7} s/m^3	CTS-01105
Annual Average D/Q (worst location)	4.5×10^{-9} m^{-2}	
Annual Average Decayed ~~X~~χ/Q (worst location)	3.9×10^{-7} s/m^3 for 8.00 day decay (depleted)	CTS-01105

TABLE 5.4-3 (Sheet 2 of 2)
GASEOUS EFFLUENT PATHWAY PARAMETERS

Description	Value
SCR χ/Q and D/Q values for plant vent release	
No decay, undepleted	6.0×10^{-5} s/m^3
2.26 day decay, undepleted	6.0×10^{-5} s/m^3
8.00 day decay, depleted	5.6×10^{-5} s/m^3
D/Q for maximum individual dose calculation	3.9×10^{-7} m^{-2}
SCR χ/Q and D/Q values for evaporation pond release	
No decay, undepleted	7.9×10^{-6} s/m^3
2.26 day decay, undepleted	7.9×10^{-6} s/m^3
8.00 day decay, depleted	7.3×10^{-6} s/m^3
D/Q for maximum individual dose calculation	4.8×10^{-8} m^{-2}
Fraction of the year that leafy vegetables are grown.	1
Fraction of the year that milk cows are on pasture.	1
Fraction of the maximum individual's vegetable intake that is from his own garden.	0.76
Fraction of milk-cow feed intake that is from pasture while on pasture.	1
Average absolute humidity over the growing season	8 g/m^3
Fraction of the year that goats are on pasture.	1
Fraction of milk-goats feed intake that is from pasture while on pasture.	1
Fraction of the year that beef cattle are on pasture.	1
Fraction of beef-cattle feed intake that is from pasture while the cattle are on pasture	1

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Note: Default values from RG 1.109 used for all input values not listed above.

TABLE 5.4-9
10 CFR 20.1301 COMPARISON ESTIMATED MAXIMUM INDIVIDUAL DOSE
FROM LIQUID EFFLUENTS (MREM/YR, PER UNIT)

Dose	10 CFR 20.1301 Objective	CPNPP Unit 3 or 4 Assessment
Total Body	-	9.00E-01[a]
Thyroid Dose	-	~~1.52E-01~~1.53E-01 CTS-01105
TEDE	100	9.05E-01[b]
Dose in any hour (mrem/hr)	2	1.03E-04

a) An adult receives the maximum individual total body dose.

b) The total effective dose equivalent (TEDE) is approximated by the sum of the whole body dose and 3 percent of the thyroid dose. (Regulatory Guide 1.183)

TABLE 5.4-10
DOSE EQUIVALENT FROM LIQUID EFFLUENTS TO ANY MEMBER OF THE PUBLIC (MREM/YR, PER SITE)

Dose	40 CFR 190 Requirements	CPNPP Assessment of all Units	
Whole Body Dose Equivalent(c)	25	7.79E+00	CTS-01105
Thyroid Dose	75	~~9.17E+00~~9.18E+00(a)	
Dose to Another Organ(b)	25	1.14E+01	

a) Note that the collective thyroid dose includes the maximum organ dose due to ~~gaseous~~liquid effluents from Units 1 and 2. This value bounds the thyroid dose. CTS-01105

b) A teenager receives the maximum individual organ dose, which is to the liver.

c) An adult receives the maximum individual total body dose.

TABLE 5.4-12 (Sheet 1 of 6)
GASEOUS PATHWAYS - MAXIMUM EXPOSED INDIVIDUAL DOSE SUMMARY

PLANT VENT

CTS-01105

Pathway/Age Group	~~T.BODY~~Total Body	GI-~~TRACT~~Tract	~~BONE~~Bone (max organ)	~~LIVER~~Liver	~~KIDNEY~~Kidney	~~THYROID~~Thyroid	~~LUNG~~Lung	~~SKIN~~Skin
~~PLUME~~Plume	~~4.61E-02~~5.38E-02	~~4.61E-02~~ 5.38E-02	~~4.61E-02~~5.38E-02	~~4.61E-02~~ 5.38E-02	~~4.61E-02~~ 5.38E-02	~~4.61E-02~~ 5.38E-02	~~5.13E-02~~ 5.99E-02	~~4.31E-01~~ 5.03E-01
~~GROUND~~Ground	~~4.35E-02~~1.01E-01	~~4.35E-02~~ 1.01E-01	~~4.35E-02~~1.01E-01	~~4.35E-02~~ 1.01E-01	~~4.35E-02~~ 1.01E-01	~~4.35E-02~~ 1.01E-01	~~4.35E-02~~ 1.01E-01	~~5.10E-02~~ 1.19E-01
Vegetables								
~~ADULT~~Adult	3.20E-02	3.44E-02	2.50E-01	3.09E-02	2.48E-02	5.70E-02	2.27E-02	2.17E-02
~~TEEN~~Teen	4.44E-02	4.75E-02	3.62E-01	4.76E-02	3.83E-02	7.71E-02	3.53E-02	3.36E-02
~~CHILD~~Child	9.28E-02	8.77E-02	7.99E-01	1.01E-01	8.53E-02	1.59E-01	8.04E-02	7.78E-02
Meat								
~~ADULT~~Adult	8.31E-03	1.42E-02	3.70E-02	8.36E-03	7.68E-03	8.79E-03	7.42E-03	7.31E-03
~~TEEN~~Teen	6.61E-03	9.96E-03	3.09E-02	6.90E-03	6.35E-03	7.13E-03	6.16E-03	6.06E-03
~~CHILD~~Child	1.18E-02	1.33E-02	5.77E-02	1.23E-02	1.16E-02	1.28E-02	1.13E-02	1.12E-02
Cow Milk[(a)]								
~~ADULT~~Adult	1.46E-02	9.72E-03	5.06E-02	1.65E-02	1.14E-02	5.40E-02	9.43E-03	8.57E-03
~~TEEN~~Teen	2.12E-02	1.66E-02	9.04E-02	2.91E-02	2.02E-02	8.75E-02	1.69E-02	1.52E-02
~~CHILD~~Child	4.12E-02	3.72E-02	2.17E-01	5.95E-02	4.42E-02	1.82E-01	3.87E-02	3.61E-02
~~INFANT~~Infant	7.94E-02	7.52E-02	3.96E-01	1.19E-01	8.71E-02	4.28E-01	7.89E-02	7.42E-02

TABLE 5.4-12 (Sheet 2 of 6)
GASEOUS PATHWAYS - MAXIMUM EXPOSED INDIVIDUAL DOSE SUMMARY

PLANT VENT

CTS-01105

Pathway/Age Group	~~T.BODY~~Total Body	GI-~~TRACT~~Tract	~~BONE~~Bone (max organ)	~~LIVER~~Liver	~~KIDNEY~~Kidney	~~THYROID~~Thyroid	~~LUNG~~Lung	~~SKIN~~Skin
Goat Milk								
~~ADULT~~Adult	2.72E-02	1.09E-02	6.92E-02	3.33E-02	1.78E-02	6.42E-02	1.23E-02	9.72E-03
~~TEEN~~Teen	3.37E-02	1.83E-02	1.21E-01	5.78E-02	3.07E-02	1.03E-01	2.19E-02	1.67E-02
~~CHILD~~Child	5.20E-02	3.97E-02	2.86E-01	1.07E-01	6.13E-02	2.13E-01	4.63E-02	3.85E-02
~~INFANT~~Infant	9.08E-02	7.90E-02	4.95E-01	2.09E-01	1.14E-01	5.03E-01	9.18E-02	7.78E-02
Inhalation								
~~ADULT~~Adult	~~1.86E-03~~5.75E-03	~~1.91E-03~~ 5.89E-03	~~4.80E-04~~1.53E-03	~~1.87E-03~~ 5.79E-03	~~1.85E-03~~ 5.70E-03	~~4.27E-03~~ 1.33E-02	~~2.98E-03~~ 9.33E-03	~~1.80E-03~~ 5.56E-03
~~TEEN~~Teen	~~1.87E-03~~5.77E-03	~~1.92E-03~~ 5.93E-03	~~5.67E-04~~1.81E-03	~~1.91E-03~~ 5.90E-03	~~1.88E-03~~ 5.81E-03	~~5.09E-03~~ 1.59E-02	~~3.59E-03~~ 1.13E-02	~~1.82E-03~~ 5.61E-03
~~CHILD~~Child	~~1.64E-03~~5.07E-03	~~1.65E-03~~ 5.09E-03	~~6.72E-04~~2.15E-03	~~1.70E-03~~ 5.25E-03	~~1.66E-03~~ 5.13E-03	~~5.74E-03~~ 1.79E-02	~~3.08E-03~~9.79E-02	~~1.61E-03~~ 4.96E-03
~~INFANT~~Infant	~~9.42E-04~~2.92E-03	~~9.38E-04~~ 2.90E-03	~~2.97E-04~~9.47E-04	~~9.92E-04~~ 3.07E-03	~~9.60E-04~~ 2.96E-03	~~4.74E-03~~ 1.48E-02	~~1.95E-03~~ 6.13E-03	~~9.24E-04~~ 2.85E-03

a) The nearest milking cow for human consumption is located beyond 5 mi.

TABLE 5.4-12 (Sheet 3 of 6)
GASEOUS PATHWAYS - MAXIMUM EXPOSED INDIVIDUAL DOSE SUMMARY

EVAPORATION POND

Pathway/Age Group	~~T.BODY~~Total Body	GI-~~TRACT~~Tract	~~BONE~~Bone (max organ)	~~LIVER~~Liver	~~KIDNEY~~Kidney	~~THYROID~~Thyroid	~~LUNG~~Lung	~~SKIN~~Skin
~~PLUME~~Plume	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
~~GROUND~~Ground	~~2.20E-02~~2.27E-02	~~2.20E-02~~ 2.27E-02	~~2.20E-02~~2.27E-02	~~2.20E-02~~ 2.27E-02	~~2.20E-02~~ 2.27E-02	~~2.20E-02~~ 2.27E-02	~~2.20E-02~~ 2.27E-02	~~2.59E-02~~ 2.66E-02
Vegetables								
~~ADULT~~Adult	1.13E-01	2.87E-01	1.33E-02	1.16E-01	1.13E-01	1.10E-01	1.04E-01	1.02E-01
~~TEEN~~Teen	1.28E-01	3.38E-01	2.04E-02	1.38E-01	1.34E-01	1.26E-01	1.19E-01	1.17E-01
~~CHILD~~Child	1.94E-01	3.54E-01	4.68E-02	2.17E-01	2.09E-01	1.99E-01	1.85E-01	1.82E-01
Meat								
~~ADULT~~Adult	1.94E-02	1.89E+00	2.97E-02	1.62E-02	7.12E-02	1.50E-02	1.48E-02	1.47E-02
~~TEEN~~Teen	1.24E-02	1.18E+00	2.50E-02	9.98E-03	5.62E-02	9.01E-03	8.91E-03	8.76E-03
~~CHILD~~Child	1.68E-02	7.22E-01	4.69E-02	1.21E-02	7.31E-02	1.10E-02	1.08E-02	1.06E-02
Cow Milk								
~~ADULT~~Adult	4.64E-02	3.97E-02	7.69E-03	5.11E-02	4.18E-02	4.38E-02	3.61E-02	3.45E-02
~~TEEN~~Teen	5.96E-02	5.10E-02	1.36E-02	7.35E-02	5.73E-02	5.95E-02	4.80E-02	4.49E-02
~~CHILD~~Child	8.86E-02	7.53E-02	3.18E-02	1.18E-01	9.07E-02	1.00E-01	7.58E-02	7.12E-02
~~INFANT~~Infant	1.28E-01	1.13E-01	5.32E-02	2.00E-01	1.39E-01	1.78E-01	1.17E-01	1.08E-01

TABLE 5.4-12 (Sheet 4 of 6)
GASEOUS PATHWAYS - MAXIMUM EXPOSED INDIVIDUAL DOSE SUMMARY

EVAPORATION POND

CTS-01105

Pathway/Age Group	~~T.BODY~~Total Body	GI-~~TRACT~~Tract	~~BONE~~Bone (max organ)	~~LIVER~~Liver	~~KIDNEY~~Kidney	~~THYROID~~Thyroid	~~LUNG~~Lung	~~SKIN~~Skin
Goat Milk								
~~ADULT~~Adult	1.05E-01	7.39E-02	2.24E-02	1.19E-01	9.15E-02	8.15E-02	7.51E-02	7.05E-02
~~TEEN~~Teen	1.35E-01	9.59E-02	3.97E-02	1.76E-01	1.27E-01	1.09E-01	1.01E-01	9.17E-02
~~CHILD~~Child	1.96E-01	1.48E-01	9.33E-02	2.83E-01	2.02E-01	1.80E-01	1.59E-01	1.45E-01
~~INFANT~~Infant	2.78E-01	2.23E-01	1.56E-01	4.93E-01	3.09E-01	3.05E-01	2.47E-01	2.20E-01
Inhalation								
~~ADULT~~Adult	~~5.67E-02~~5.89E-02	~~5.85E-02~~ 6.08E-02	~~5.16E-04~~5.36E-04	~~5.68E-02~~ 5.90E-02	~~5.69E-02~~ 5.92E-02	~~5.68E-02~~ 5.90E-02	~~7.43E-02~~ 7.72E-02	~~5.65E-02~~ 5.87E-02
~~TEEN~~Teen	~~5.72E-02~~5.95E-02	~~5.91E-02~~ 6.14E-02	~~7.25E-04~~7.53E-04	~~5.75E-02~~ 5.97E-02	~~5.75E-02~~ 5.98E-02	~~5.74E-02~~ 5.96E-02	~~8.74E-02~~ 9.08E-02	~~5.70E-02~~ 5.92E-02
~~CHILD~~Child	~~5.05E-02~~5.25E-02	~~5.13E-02~~ 5.33E-02	~~9.89E-04~~1.03E-03	~~5.08E-02~~ 5.28E-02	~~5.09E-02~~ 5.29E-02	~~5.08E-02~~ 5.28E-02	~~7.74E-02~~ 8.04E-02	~~5.03E-02~~ 5.23E-02
~~INFANT~~Infant	~~2.90E-02~~3.02E-02	~~2.93E-02~~ 3.04E-02	~~5.44E-04~~5.65E-04	~~2.93E-02~~ 3.04E-02	~~2.93E-02~~ 3.04E-02	~~2.94E-02~~ 3.05E-02	~~5.08E-02~~ 5.28E-02	~~2.89E-02~~ 3.00E-02

TABLE 5.4-12 (Sheet 5 of 6)
GASEOUS PATHWAYS - MAXIMUM EXPOSED INDIVIDUAL DOSE SUMMARY

(PLANT VENT AND EVAPORATION POND)

CTS-01105

Pathway/Age Group	~~T.BODY~~Total Body	GI-~~TRACT~~Tract	~~BONE~~Bone (max organ)	~~LIVER~~Liver	~~KIDNEY~~Kidney	~~THYROID~~Thyroid	~~LUNG~~Lung	~~SKIN~~Skin
Plume	5.38E-02	5.38E-02	5.38E-02	5.38E-02	5.38E-02	5.38E-02	5.99E-02	5.03E-01
~~GROUND~~Ground	~~6.55E-02~~1.24E-01	~~6.55E-02~~ 1.24E-01	~~6.55E-02~~1.24E-01	~~6.55E-02~~ 1.24E-01	~~6.55E-02~~ 1.24E-01	~~6.55E-02~~ 1.24E-01	~~6.55E-02~~ 1.24E-01	~~7.69E-02~~ 1.45E-01
Vegetables								
~~ADULT~~Adult	1.45E-01	3.21E-01	2.63E-01	1.47E-01	1.38E-01	1.67E-01	1.27E-01	1.24E-01
~~TEEN~~Teen	1.72E-01	3.86E-01	3.82E-01	1.86E-01	1.72E-01	2.03E-01	1.54E-01	1.51E-01
~~CHILD~~Child	2.87E-01	4.42E-01	8.46E-01	3.18E-01	2.95E-01	3.58E-01	2.65E-01	2.60E-01
Meat								
~~ADULT~~Adult	2.78E-02	1.90E+00	6.67E-02	2.46E-02	7.89E-02	2.38E-02	2.22E-02	2.20E-02
~~TEEN~~Teen	1.90E-02	1.19E+00	5.59E-02	1.69E-02	6.25E-02	1.61E-02	1.51E-02	1.48E-02
~~CHILD~~Child	2.86E-02	7.35E-01	1.05E-01	2.44E-02	8.47E-02	2.38E-02	2.21E-02	2.18E-02
Cow Milk								
~~PLUME~~	~~4.61E-02~~	~~4.61E-02~~	~~4.61E-02~~	~~4.61E-02~~	~~4.61E-02~~	~~4.61E-02~~	~~5.13E-02~~	~~4.31E-01~~
~~ADULT~~Adult	6.10E-02	4.94E-02	5.83E-02	6.76E-02	5.32E-02	9.78E-02	4.55E-02	4.31E-02
~~TEEN~~Teen	8.08E-02	6.76E-02	1.04E-01	1.03E-01	7.75E-02	1.47E-01	6.49E-02	6.01E-02
~~CHILD~~Child	1.30E-01	1.12E-01	2.49E-01	1.77E-01	1.35E-01	2.82E-01	1.15E-01	1.07E-01
~~INFANT~~Infant	2.07E-01	1.88E-01	4.49E-01	3.19E-01	2.26E-01	6.06E-01	1.96E-01	1.82E-01

TABLE 5.4-12 (Sheet 6 of 6)
GASEOUS PATHWAYS - MAXIMUM EXPOSED INDIVIDUAL DOSE SUMMARY

(PLANT VENT AND EVAPORATION POND)

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Pathway/Age Group	~~T.BODY~~Total Body	GI-~~TRACT~~Tract	~~BONE~~Bone (max organ)	~~LIVER~~Liver	~~KIDNEY~~Kidney	~~THYROID~~Thyroid	~~LUNG~~Lung	~~SKIN~~Skin
Goat Milk								
~~ADULT~~Adult	1.32E-01	8.48E-02	9.16E-02	1.52E-01	1.09E-01	1.46E-01	8.74E-02	8.02E-02
~~TEEN~~Teen	1.69E-01	1.14E-01	1.61E-01	2.34E-01	1.58E-01	2.12E-01	1.23E-01	1.08E-01
~~CHILD~~Child	2.48E-01	1.88E-01	3.79E-01	3.90E-01	2.63E-01	3.93E-01	2.05E-01	1.84E-01
~~INFANT~~Infant	3.69E-01	3.02E-01	6.51E-01	7.02E-01	4.23E-01	8.08E-01	3.39E-01	2.98E-01
Inhalation								
~~ADULT~~Adult	~~5.86E-02~~6.47E-02	~~6.04E-02~~ 6.66E-02	~~9.96E-04~~2.07E-03	~~5.87E-02~~ 6.48E-02	~~5.88E-02~~ 6.49E-02	~~6.11E-02~~ 7.23E-02	~~7.73E-02~~ 8.65E-02	~~5.83E-02~~ 6.43E-02
~~TEEN~~Teen	~~5.91E-02~~6.52E-02	~~6.10E-02~~ 6.73E-02	~~1.29E-03~~2.56E-03	~~5.94E-02~~ 6.56E-02	~~5.94E-02~~ 6.56E-02	~~6.25E-02~~ 7.55E-02	~~9.10E-02~~ 1.02E-01	~~5.88E-02~~ 6.48E-02
~~CHILD~~Child	~~5.22E-02~~5.76E-02	~~5.29E-02~~ 5.84E-02	~~1.66E-03~~3.18E-03	~~5.25E-02~~ 5.80E-02	~~5.26E-02~~ 5.80E-02	~~5.65E-02~~ 7.07E-02	~~8.05E-02~~ 9.01E-02	~~5.19E-02~~ 5.72E-02
~~INFANT~~Infant	~~3.00E-02~~3.31E-02	~~3.02E-02~~ 3.33E-02	~~8.41E-04~~1.51E-03	~~3.03E-02~~ 3.35E-02	~~3.03E-02~~ 3.34E-02	~~3.41E-02~~ 4.54E-02	~~5.28E-02~~ 5.89E-02	~~2.98E-02~~ 3.29E-02

TABLE 5.4-13
GASEOUS PATHWAYS - COMPARISON OF MAXIMUM INDIVIDUAL DOSE
COMPARED TO 10 CFR 50, APPENDIX I CRITERIA (PER UNIT)

Type of Dose	10 CFR 50 Design Objective	Calculated Dose
Gaseous Effluents (Noble Gases ~~and Ground~~)		
Gamma Air Dose	10 mrad	~~7.22E-02~~8.42E-02 mrad
Beta Air Dose	20 mrad	~~5.57E-01~~6.05E-01 mrad
Total Body Dose	5 mrem	~~3.69E-02~~5.38E-02 mrem
Skin Dose	15 mrem	~~3.45E-01~~5.03E-01 mrem
Radioiodines and Particulates		
Maximum to any organ	15 mrem	~~1.65~~2.55 mrem ~~(bone of child)~~

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~~Locations of highest pathway doses off site.~~
Notes:

Doses were calculated at the locations resulting in the highest pathway doses to the public.

~~Note:~~ mrad = millirad

TABLE 5.4-14
GASEOUS PATHWAYS COMPARISON OF MAXIMUM INDIVIDUAL DOSE
COMPARED TO 40 CFR 190 CRITERIA (MREM/YR, PER SITE)

Type of Dose (Annual)	40 CFR 190 Design Objective	Calculated Doses
Whole Body ~~Dose Equivalent~~	25 mrem	~~1.78~~2.01
~~Dose To~~ Thyroid	75 mrem	~~4.57~~5.47
Max to any organ	25 mrem	~~7.17~~7.40

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Note that the collective thyroid dose includes the maximum organ dose due to gaseous effluents from Units 1 and 2. This value bounds the thyroid dose.

TABLE 5.4-15
GASEOUS PATHWAYS – ANNUAL POPULATION DOSE RESULTS

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Pathway	Calculated Dose~~s~~ (Person rem) per unit
Whole Body ~~Dose Equivalent~~	~~2.59~~3.77
~~Dose To~~ Thyroid	~~2.98~~4.29
TEDE	~~2.68~~3.89

Note:

The population doses in this table include gaseous doses due to effluents from the evaporation pond and plant vent.

TABLE 5.4-16
DIRECT RADIATION DOSE

	Location	Estimated Annual Dose	
Direct radiation from site	Maximum Individual at site boundary	~~8.76~~1.34E-01 mrad	CTS-01105
~~Background radiation~~	~~Population within 50 mi~~	~~1.4E+05 person-rad~~	CTS-00629

~~The total population within 50 mi of the CPNPP site projected to the year 2058 is 3,493,553 people.~~

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TABLE 5.4-27
TOTAL GASEOUS DOSES TO THE MAXIMALLY EXPOSED INDIVIDUAL AT SQUAW CREEK RESERVOIR

Pathway	Calculated Dose (mrem) per unit
Whole Body	7.22E-02
Thyroid	8.02E-02
TEDE	7.46E-02

Chapter 6

Chapter 6 Tracking Report Revision List

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
RAI-HYD-20	6.3.5	6.3-8	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Added new subsection to describe post-construction groundwater monitoring.	-
RAI-HYD-20	6.3.6	6.3-9	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Changed Reference subsection from 6.3.5 to 6.3.6.	-
CTS-01105	6.2.5	6.2-4	Access change to SCR	Revised text to reflect the change of status for SCR.	3

*Page numbers for the attached marked-up pages may differ from the revision 1 page numbers due to text additions and deletions. When the page numbers for the attached pages do differ, the page number for the attached page is shown in brackets.

Chapter 7

Chapter 7 Tracking Report Revision List

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
CTS-01101	7.5	7.4-8	Address ASLB Contention 13	Added Section 7.5 to provide description of impacts of a severe accident in one unit on other Comanche Peak units.	1
CTS-01103	7.5	7.5-1	Editorial	Change “the distance between the center point between Units 3 and 4 and the center point between Units 1and 2 is approximately 1700ft” to “the distance between the center point between Units 3 and 4 and the center point between Units 1 and 2 is approximately 1700ft” by adding a space between “Units 1” and ”and”.	2
CTS-01103	7.5	7.5-3	Editorial	Change “The following table presents the release frequencies” to “The following table presents the release frequencies”.	2
CTS-01103	7.5	7.5-11	Editorial	Change “CONCLUSION” to “CONCLUSIONS”	2
CTS-01104	7.5	7.5-11	Cost change	Change “$402,747” to “$400,073”. Change “$584,533” to “$692,576” at two places.	2
CTS-01117	7.3.3	7.3-4	Correction to be consistent with previous change	Revised values to be consistent with ER Section 7.5 (changed all values to November 2009 dollars).	4
CTS-01117	Table 7.3-1	7.3-5	Correction to be consistent with previous change	Revised values to be consistent with ER Section 7.5 (changed all values to November 2009 dollars).	4
CTS-01117	Table 7.3-2	7.3-6	Correction to be consistent with previous change	Revised values to be consistent with ER Section 7.5 (changed all values to November 2009 dollars).	4

*Page numbers for the attached marked-up pages may differ from the revision 1 page numbers due to text additions and deletions. When the page numbers for the attached pages do differ, the page number for the attached page is shown in brackets.

Chapter 8

Chapter 8 Tracking Report Revision List

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R

*Page numbers for the attached marked-up pages may differ from the revision 1 page numbers due to text additions and deletions. When the page numbers for the attached pages do differ, the page number for the attached page is shown in brackets.

Chapter 9

Chapter 9 Tracking Report Revision List

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
CTS-00920	9.2.2.11	9.2-30 Through 9.2-50	Address ASLB Contention 18	Added Section 9.2.2.11 to provide discussion of energy alternatives in combination with energy storage.	0
CTS-00920	9.2.5	9.2-44 through 9.2-49	Address ASLB Contention 18	Included references found in Section 9.2.2.11.	0
RAI GEN-03 RAI HYD-23 RAI LU-03	Table 9.2-6	9.2-57 9.2-58	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Added new table to reflect alternatives that have been considered in the past.	-
RAI GEN-03 RAI HYD-23 RAI LU-03	9.4.2.1.4	9.4-17	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised the percent diversion from 46 percent to 83 percent to reflect the conceptual design.	-
RAI GEN-03 RAI HYD-23 RAI LU-03	9.4.2.2.5	9.4-22	ER Supplemental Response Luminant Letter no.TXNB-09087 Date 12/18/2009	Revised the percent diversion from 46 percent to 83 percent and cited the effluent concentrations of 2500 mg/l and 1000 mg/l to reflect the conceptual design.	-

*Page numbers for the attached marked-up pages may differ from the revision 1 page numbers due to text additions and deletions. When the page numbers for the attached pages do differ, the page number for the attached page is shown in brackets.

Chapter 10

Chapter 10 Tracking Report Revision List

Change ID No.	Section	ER Rev. 1 Page*	Reason for change	Change Summary	Rev. of ER T/R
CTS-01097	Table 10.4-3 (Sheet 1 of 2)	10.4-16	Editorial	Corrected “679” to “675” in the “Land Use” category.	4

*Page numbers for the attached marked-up pages may differ from the revision 1 page numbers due to text additions and deletions. When the page numbers for the attached pages do differ, the page number for the attached page is shown in brackets.