CHAPTER 12

RADIATION PROTECTION

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ACRONYMS AND ABBREVIATIONS

A/B	auxiliary building
ALARA	as low as reasonably achievable
B.A.	boric acid
CFR	Code of Federal Regulations
COL	Combined License
CPNPP	Comanche Peak Nuclear Power Plant
CST	condensate storage tank
DCD	Design Control Document
ESW	essential service water
ESWS	essential service water system
FSAR	Final Safety Analysis Report
GDC	General Design Criteria
HDPE	High Density Polyethylene
ISFSI	Independent spent fuel storage installation
LWMS	liquid waste management system
MCR	main control room
NEI	Nuclear Energy Institute
NIST	National Institute of Standards and Technology
NUREG	NRC Technical Report Designation (Nuclear Regulatory Commission)
PMWT	primary makeup water tank
PS/B	power source building
RG	Regulatory Guide
RIS	Regulatory Issue Summary
RWP	radiation work permit
RWSAT	refueling water storage auxiliary tank
SGBD	steam generator blowdown
SGBDS	steam generator blowdown system
SSC	structure, system, and component
TEDE	total effective dose equivalent
T/B	turbine building
UHS	ultimate heat sink
VHRA	very high radiation area

12.0 RADIATION PROTECTION

12.1 ENSURING THAT OCCUPATIONAL RADIATION EXPOSURES ARE AS LOW AS REASONABLY ACHIEVABLE

This section of the referenced Design Control Document (DCD) is incorporated by reference with the following departures and/or supplements.

12.1.1.3.1 Compliance with Regulatory Guide 1.8

CP COL 12.1(1) Replace the paragraph in DCD Subsection 12.1.1.3.1 with the following.

The administrative programs and procedures demonstrate compliance with Regulatory Guide (RG) 1.8, including the operation policies activities conducted by management personnel who have plant operational responsibility for radiation protection, by utilizing NEI 07-08A. These are addressed in the operational radiation protection program, described in Section 12.5.

12.1.1.3.2 Compliance with Regulatory Guide 8.8

CP COL 12.1(1) Replace the second paragraph in DCD Subsection 12.1.1.3.2 with the following.

The administrative programs and procedures demonstrate compliance with RG 8.8, including the operation policies activities conducted by management personnel who have plant operational responsibility for radiation protection, by utilizing of NEI 07-08A. These are addressed in the operational radiation protection program, described in Section 12.5.

12.1.1.3.3 Compliance with Regulatory Guide 8.10

CP COL 12.1(1) Replace the paragraph in DCD Subsection 12.1.1.3.3 with the following.

The administrative programs and procedures demonstrate compliance with RG 8.10, including the operation policies activities conducted by management personnel who have plant operational responsibility for radiation protection, by utilizing of NEI 07-08A. These are addressed in the operational radiation protection program, described in Section 12.5.

12.1.3 Operational Considerations

STD COL 12.1(3) Replace the first and second paragraphs in DCD Subsection 12.1.3 with the following.

The operational radiation protection program for ensuring that operational radiation exposures are as low as reasonably achievable (ALARA) is discussed in Section 12.5, by utilizing of NEI 07-03A (Reference 12.1-25). The program follows the guidance of RG 8.2, 8.4, 8.7, 8.9, 8.13, 8.15, 8.25, 8.27, 8.28, 8.29, 8.34, 8.35, 8.36, and 8.38.

STD COL 12.1(6)
STD COL 12.1(7)
STD COL 12.1(8)

Replace the last sentence of third paragraph in DCD Subsection 12.1.3 with the following.

The licensee performs periodic reviews of operational practices to ensure that operating procedures reflect the installation of new or modified equipment, personnel qualification and training are kept current, and facility personnel are following the operating procedures. In accordance with 10 CFR 50.75(g) and 10 CFR 70.25(g) as applicable, records containing facility design and construction, facility design changes, site conditions before and after construction, onsite waste disposal and contamination, and results of radiological surveys, are used to facilitate decommissioning. The guidance of RG 4.21 (Reference 12.1-27) is followed in developing and implementing operational procedures for SSCs which could be potential sources of contamination, with the objective of limiting leakage and the spread of contamination within the plant. These procedures are subject to the requirements of Subsection 13.5.2.2.

12.1.4 Combined License Information

Replace the content of DCD Subsection 12.1.4 with the following.

CP COL 12.1(1) ***12.1(1)*** *Policy considerations regarding plant operations*

This Combined License (COL) item is addressed in Subsections 12.1.1.3.1, 12.1.1.3.2 and 12.1.1.3.3.

12.1(2) *Deleted from the DCD.*

STD COL 12.1(3) ***12.1(3)*** *Following the guidance regarding radiation protection*

This COL item is addressed in Subsection 12.1.3.

12.1(4) *Deleted from the DCD.*

CP COL 12.1(5) ***12.1(5)*** *Radiation protection program*

This COL item is addressed in Section 12.5 and Tables 12.5-201 and 12.5-202.

STD COL 12.1(6) ***12.1(6)*** *Periodic review of operational practices*

This COL item is addressed in Section 12.1.3 and Subsection 12.3.1.3.2.

STD COL 12.1(7) ***12.1(7)*** *Implementation of requirements for record retention*

This COL item is addressed in Section 12.1.3 and Subsection 12.3.1.3.2.

STD COL 12.1(8) ***12.1(8)*** *Develop and implement operational procedures for SSCs which could be potential sources of contamination, with the objective of limiting leakage and the spread of contamination within the plant.*

This COL item is addressed in Section 12.1.3 and Subection 12.3.1.3.2.

12.2 RADIATION SOURCES

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

12.2.1.1.10 Miscellaneous Sources

CP COL 12.2(2) Replace the second and third sentences of the sixth paragraph in DCD Subsection 12.2.1.1.10 with the following.

CPNPP Units 3 and 4 have no additional storage space for radwaste inside the plant structures. An additional storage space for radwaste, to be named the Interim Radwaste Storage Building, is planned for the future construction outside the plant structures. The radiation protection program (see Section 12.5) associated with this additional radwaste storage space is in place to ensure compliance with 10 CFR 20, 10 CFR 50, Appendix A, GDC 61 and 63, 40 CFR 190 and to be consistent with the recommendations of RG 8.8 and Generic Letter 81.38. The Interim Radwaste Storage Building design criteria is described in Subsection 11.4.2.3.

STD COL 12.2(2) Replace the second sentence of the seventh paragraph in DCD Subsection 12.2.1.1.10 with the following.

There are no additional radwaste facilities for dry active waste.

CP COL 12.2(1) Replace the last paragraph in DCD Subsection 12.2.1.1.10 with the following.

The Evaporation Pond is described in FSAR Subsection 11.2.3.4. Access to the radioactive material in the pond will be restricted by use of a fence with locked gate, surrounding the pond area with posting and labeling, such as the appropriate radioactive placards, in accordance with the Operational Radiation Protection Program. The fence will be placed at a distance from the pond, so that the dose rate at the fence is below the maximum dose rate for Zone I (0.25 mrem/hr). Additionally, the evaporation pond is located within the Owner Property Boundary and the area is subject to surveillance by random Security patrols. Potential exposure to airborne activity is discussed in FSAR Subsections 11.2.3.1 and 11.2.3.4.

The estimated fission and corrosion product activity in the evaporation pond water are shown in the Table 12.2-201. This estimated source term is initial activity into

the evaporation pond, based on the realistic source term of the Waste Monitor Tank and the decontamination factors from NUREG-0017.

STD COL 12.2(1) Additionally, the site maintains contained sources of known isotope and activity containing byproduct, source, or special nuclear materials for use as calibration, check, or radiography sources. Example uses for these types of sources include systems security checks; equipment standardization and calibration; process control; gauging and quality assurance testing; teaching; and nuclear reactor operations.

Licensed sources containing byproduct, source, and special nuclear materials that warrant shielding design consideration meet the applicable requirements of 10 CFR Parts 20, 30, 31, 32, 33, 34, 40, 50, and 70. A supplementary warning symbol is used in the presence of large sources of ionizing radiation consistent with the guidance in Regulatory Issue Summary (RIS) 2007-03. Sources maintained on site are shielded to keep personnel exposure ALARA. Sources brought on-site by contractors for activities such as the servicing or calibration of plant instrumentation or the performance of radiography are maintained and used in accordance with the provisions of the licensed utility group or contractor. If these sources must be maintained on site, designated plant personnel approve the storage location and identify appropriate measures for maintaining security and personnel protection. The licensee maintains procedures to control, limit and monitor cumulative dose for construction workers and security employees such that total exposure for each construction worker and security employee is maintained less than 100 mrem per year in accordance with 10 CFR Part 20.1301.

Specific details regarding the isotope, quantity, form and use of these sources are maintained onsite following their procurement. The following minimum information is maintained:

- Isotopic concentration
- Location on site
- Source strength, form, and geometry (as applicable)
- Description of the use

Written procedures based upon the Radiation Protection Program govern the procurement, receipt, inventory, labeling, leak testing, surveillance, control, transfer, disposal, storage, issuance, and use of these sources. Additionally, these procedures comply with 10 CFR Parts 19 and 20 to assure that occupational doses associated with the control and use of these materials are maintained ALARA.

During the period prior to the implementation of the Emergency Plan (in preparation for the initial fuel loading following the 52.103(g) finding), no specific materials related emergency plan will be necessary because:

a. No byproduct material will be received, possessed, or used in a physical form that is "in unsealed form, on foils or plated sources, or sealed in glass," that exceeds the quantities in Schedule C in 10 CFR 30.72, and

b. The source material to be received, possessed, or used does not include any uranium hexafluoride.

No 10 CFR Part 40 specifically licensed source material, including natural uranium, depleted uranium, and uranium hexafluoride, will be received, possessed, or used prior to initial fuel loading.

12.2.3 Combined License Information

Replace the content of DCD Subsection 12.2.3 with the following.

CP COL 12.2(1)
STD COL 12.2(1)

12.2(1) *Additional sources*

This COL item is addressed in Subsection 12.2.1.1.10 and Table 12.2-201.

CP COL 12.2(2)
STD COL 12.2(2)

12.2(2) *Additional storage space and radwaste facilities*

This COL item is addressed in Subsection 12.2.1.1.10 and Section 12.5.

CP COL 12.2(3)

12.2(3) *Radiation Protection Program provisions for limiting the radiation levels of the RWSAT and PMWTs.*

This COL item is addressed in Section 12.5.

CP COL 12.2(4)

12.2(4) *Ensuring the radioactivity concentration in the RWSAT and PMWTs remain under the levels described in the DCD.*

This COL item is addressed in Section 12.5.

CP COL 12.2(1)

Table 12.2-201 (Sheet 1 of 2) Estimated Initial Activity into the Evaporation Pond (Based on the Realistic Source Terms of the Waste Monitor Tank)

Nuclide	Activity ($\mu Ci/cm^3$)
Ag-110m	1.3E-08
Ba-140	1.3E-07
Ce-141	1.5E-09
Ce-143	3.1E-08
Ce-144	4.0E-08
Co-58	4.5E-08
Co-60	5.2E-09
Cr-51	3.1E-08
Cs-134	1.9E-08
Cs-136	4.6E-07
Cs-137	2.7E-08
Fe-55	1.2E-08
Fe-59	2.9E-09
H-3	1.8E-01
I-131	2.0E-09
I-132	1.0E-07
I-133	3.1E-08
I-134	1.8E-07
I-135	7.7E-08
La-140	2.7E-07
Mn-54	1.5E-08
Mo-99	6.7E-08
Na-24	5.8E-07

CP COL 12.2(1)

**Table 12.2-201 (Sheet 2 of 2)
Estimated Initial Activity into the Evaporation Pond
(Based on the Realistic Source Terms of the Waste Monitor Tank)**

Nuclide	Activity ($\mu Ci/cm^3$)
Nb-95	2.7E-09
Np-239	2.3E-08
Rb-88	1.9E-04
Ru-103	7.4E-08
Ru-106	8.6E-07
Sr-89	1.4E-09
Sr-90	1.2E-10
Sr-91	1.3E-08
Tc-99m	6.8E-08
Te-129	4.3E-07
Te-129m	1.8E-09
Te-131	1.5E-07
Te-131m	1.7E-08
Te-132	1.7E-08
W-187	2.9E-08
Y-91	5.0E-11
Y-91m	8.6E-09
Y-93	5.6E-08
Zn-65	4.9E-09
Zr-95	3.8E-09

12.3 RADIATION PROTECTION DESIGN FEATURES

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

12.3.1.1.1.2 Balance of Plant Equipment

Add the following information at the end of DCD Subsection 12.3.1.1.1.2.

STD COL 12.3(6)
STD COL 12.3(7)
STD COL 12.3(8)

N. Mobile Liquid Waste Processing System

The mobile liquid waste processing system is located in the Auxiliary Building, and treats the effluent prior to discharging it to the waste monitor tank. This system is designed to comply with SRP Section 12.3-12.4, RG 1.206 and RG 1.69. As described in Subsection 11.2.1.6, provisions are included to mitigate contamination, and the system complies with 10 CFR 20.1406. The mobile liquid waste processing system is located in a radiation zone III area. Shield walls are provided for the system in order to allow the surrounding area to maintain a radiation zone III designation.

CP SUP 12.3(1)

O. Zinc Injection System

Injecting a soluble zinc (Zn) solution depleted of Zn-64 into the reactor coolant system (RCS) limits corrosion products by depositing zinc on the inner surface of RCS components. This reduces occupational radiation exposure by reducing the portion of the source term derived from the irradiation of erosion and corrosion products such as Co-60. (Subsection 9.3.4.2.3.3)

12.3.1.2.1.1 Radiation Zoning

STD COL 12.3(4)

Replace the fourth sentence of the fourth paragraph in DCD Subsection 12.3.1.2.1.1 with the following.

Site radiation zones for plant arrangement plan under normal operation/shutdown conditions are shown in Figure 12.3-1R (COL information provided on Sheet 1 of 34).

12.3.1.3.1 Design Considerations

CP COL 12.3(10) Add the following information after DCD Subsection 12.3.1.3.1.

12.3.1.3.1.1 Design Considerations for Site Specific Design

The radwaste evaporation pond is designed with two layers of High Density Polyethylene (HDPE) with smooth surfaces and a drainage net in between for leak detection and collection. By this and operating procedures, the evaporation pond is in compliance with RG 4.21. Detail discussion for the evaporation pond is described in the FSAR Subsections 11.2.3.1 and 11.2.3.4.

STD COL 12.3(10) The Ultimate Heat Sink (UHS) has an interface with essential service water system (ESWS). As discussed in DCD Table 12.3-8, the ESWS is in compliance with RG 4.21 (Reference 12.3-30), and does not normally contain any radioactivity. Therefore, the UHS has no direct interface with any radioactive system and does not require compliance with RG 4.21.

12.3.1.3.2 Operational/Programmatic Considerations

STD COL 12.1(6)
STD COL 12.1(7)
STD COL 12.1(8)
STD COL 12.3(10)

Replace the last paragraph in DCD Subsection12.3.1.3.2 with the following.

Programs and procedures are implemented consistent with NEI 08-08A, "Generic FSAR Template Guidance for Life Cycle Minimization of Contamination," (Reference 12.3-201) to meet the site-specific, operational and post-construction objectives of RG 4.21 (Reference 12.3-30) and the requirements of 10 CFR 20.1406 (Reference 12.3-29). These objectives include:

- Periodically reviewing operational practices to ensure operating procedures reflect the installation of new or modified equipment, personnel qualification and training are kept current, and facility personnel are following the operating procedures;
- Facilitating decommissioning by maintaining records relating to facility design and construction, facility design changes, site conditions before and after construction, contamination events, and results of radiological surveys;
- Development of a conceptual site model (based on site characterization and facility design and construction) that aids in the understanding of the interface with environmental systems and the features that control the movement of contamination in the environment;

- Evaluating the final site configuration after construction to assist in preventing the migration of radionuclides offsite via unmonitored pathways; and
- Establishing and performing an onsite contamination monitoring program along the potential pathways from the release sources to the receptor points.

12.3.2.2.8 Spent Fuel Transfer Canal and Tube Shielding Design

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STD COL 12.3(5) Replace the last paragraph in DCD Subsection 12.3.2.2.8 with the following.

Administrative control of the fuel transfer tube inspection and the access control of the area near the seismic gap below the fuel transfer tube will be addressed in a radiation protection program, described in Section 12.5.

12.3.4 Area Radiation and Airborne Radioactivity Monitoring Instrumentation

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STD COL 12.3(1) Replace the last paragraph in DCD Subsection 12.3.4 with the following.

Portable instruments to be used in the event of an accident are placed so as to be readily available to personnel responding to an emergency.

The use of portable instruments and the associated training and procedures to accurately determine the airborne iodine concentration in areas within the facility where plant personnel may be present during an accident, in accordance with the requirements of 10 CFR 50.34(f)(2)(xxvii) and the criteria in Item III.D.3.3 of NUREG-0737 will be addressed in radiation protection program, described in Section 12.5.

Procedures for locating suspected high-activity areas are part of the radiation protection program that is described in Section 12.5.

12.3.6 Combined License Information

Replace the content of DCD Subsection 12.3.6 with the following.

STD COL 12.3(1)
CP COL 12.3(1)

12.3(1) *Portable instruments*

This COL item is addressed in Subsection 12.3.4 and Section 12.5.

12.3(2) *Deleted from the DCD.*

12.3(3) *Deleted from the DCD.*

STD COL 12.3(4)
CP COL 12.3(4)

12.3(4) *Site radiation zones*

This COL item is addressed in Subsection 12.3.1.2.1.1 and Figure 12.3-1R (sheet 1 of 34).

CP COL 12.3(5)
STD COL 12.3(5)

12.3(5) *Administrative control of the fuel transfer tube inspection*

This COL item is addressed in Subsection 12.3.2.2.8 and Section 12.5.

STD COL 12.3(6)

12.3(6) *The radiation protection aspects of the Mobile Liquid Waste Processing System.*

This COL item is addressed in Subsection 12.3.1.1.1.2.

STD COL 12.3(7)

12.3(7) *How the system meets the requirements of 10 CFR 20.1406 and RG 4.21.*

This COL item is addressed in Subsections 11.2.1.6 and 12.3.1.1.1.2.

STD COL 12.3(8)

12.3(8) *Radiation Zones for the Mobile Liquid Waste Processing System area.*

This COL item is addressed in Subsection 12.3.1.1.1.2.

CP COL 12.3(9)

12.3(9) *Radiation Protection Program contains provisions to ensure the B.A. evaporator room does not become a VHRA.*

This COL item is addressed in Section 12.5

CP COL 12.3(10)
STD COL 12.3(10)

12.3(10) *The COL Applicant will address the site-specific design features, operational and post-construction objectives of Regulatory Guide 4.21.*

This COL item is addressed in Subsections 12.3.1.3.1.1, 12.3.1.3.2, Figures 12.3-201 and 12.3-202 and Table 12.3-201.

12.3.7 References

Add the following reference after the last reference in DCD Subsection 12.3.7.

12.3-201 Generic FSAR Template Guidance for Life Cycle Minimization of Contamination. NEI Technical Report 08-08A, Revision 0, October 2009.

CP COL 12.3(10)

Table 12.3-201 (Sheet 1 of 5)

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

Steam Generator Blowdown System

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

Objective		System Features	FSAR Reference
1	Minimize leaks and spills and provide containment in areas where such events may occur.	This discharge line consists of the following piping segments: 1. Single-walled stainless steel pipe from the startup SGBD heat exchanger up to and including the radiation monitor and valves associated with the startup SGBD equipment. This line section includes the condensate return line and the discharge piping; 2. Of the two discharge piping segments, including the portion through the wall penetrations, the first piping segment in between the Startup SGBD system and the T/B (going to the Waste Holdup Tanks) is double-walled piping with stainless inner pipe and carbon steel outer pipe with no insulation. The second piping segment in between the Startup SGBD system and the T/B (going to the Waste Management Pond C) is double-walled carbon steel piping. The outer carbon steel pipe on both segments is coated to protect against corrosion; 3. Once inside the T/B, the discharge piping is connected (transferring effluent to the Waste Holdup Tanks) to single-walled stainless steel piping and is routed in pipe chases. And the other piping segment (transferring effluent to the Waste Management Pond C) is connected to single-walled carbon steel piping and is also routed in pipe chases. 4. From the Unit 3 pipe chase, the discharge pipe exits the T/B penetration and is routed as a single-walled carbon steel piping in a concrete trench from the T/B to the transition manhole downstream of the condensate storage tanks (CSTs). This portion of the piping is in the same concrete trench as the condensate transfer piping to the CST. From the Unit 4 pipe chase, the discharge pipe exits the T/B penetration and is routed as a single-walled carbon steel pipe in a concrete trench from the T/B to the transition manhole at the plant cement pavement boundary. The concrete trench is sloped and has an	10.4.8.2.1
2	Provide for adequate leak detection capability to provide prompt detection of leakage for any structure, system, or component which has the potential for leakage.		

CP COL 12.3(10)

Table 12.3-201 (Sheet 2 of 5)

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

Steam Generator Blowdown System

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

Objective		System Features	FSAR Reference
2		epoxy coating to facilitate drainage. This design eliminates liquid accumulation in the trench and thus minimizes unintended release. Using single-walled carbon steel pipe in the trench facilitates additional radial cooling of the fluid and enables the use of High Density Polytheylene (HDPE) piping for underground burial; 5. From the transition manhole, the discharge piping is connected to a buried double-walled HDPE piping to an existing waste water management Pond C for discharge. A transition manhole is constructed near the plant pavement boundary. HDPE pipe has the property of good corrosion resistance in the soil environment; 6. The trench and the double-walled HDPE piping are both sloped towards the nearby manhole so that leakage can be collected at the manholes. This approach also facilitates the determination of the segment of pipe that is leaking. Analysis of samples of the liquid collected in the manholes can also differentiate whether the leakage is rain water, groundwater or condensate.	

CP COL 12.3(10)

Table 12.3-201 (Sheet 3 of 5)

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

Steam Generator Blowdown System

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

Objective		System Features	FSAR Reference
2		Additional manholes are provided for testing and inspection for the buried piping. Each manhole is equipped with drain collection basins and leak detection instruments. This design approach minimizes unintended releases and provides accessibility to facilitate periodic hydrostatic or pressure testing and visual inspection to maintain pipe integrity. This design feature is in compliance with the guidance of RG 4.21. The startup SGBDS is housed in a separate structure located outside the T/B consisting of a concrete foundation and pre-fabricated walls around the startup SGBD equipment. The surface of the startup SGBD housing foundation is slightly sloped to facilitate drainage to a pit with leak detection capabilities and to avoid unintended release to the environment. The concrete foundation, the walls, and the pit are coated with epoxy to facilitate decontamination. Leakage collected in the drainage pit is pumped back to the T/B sumps for collection and analysis. The T/B sump contents are pumped to the LWMS if a significant level of radioactive contamination is present.	
3	Use leak detection methods (e.g., instrumentation, automated samplers) capable of early detection of leaks in areas where it is difficult or impossible to conduct regular inspections (such as for spent fuel pools, tanks that are in contact with the ground, and buried, embedded or subterranean piping (to avoid release of contamination of the environment.	A radiation monitor located downstream of the startup SG blowdown heat exchanger measures the radioactive level in the blowdown water. When an abnormally high radiation level is detected, the blowdown lines are isolated and the blowdown water included in the SGBDS is transferred to the waste holdup tank in the LWMS.	10.4.8.2.1

CP COL 12.3(10)

Table 12.3-201 (Sheet 4 of 5)

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

Liquid Waste Management System

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

Objective		System Features	FSAR Reference
1	Minimize leaks and spills and provide containment in areas where such events may occur.	The LWMS effluent release piping for transporting radioactive effluent from the discharge valve inside the Auxiliary Building (A/B) to the pond and the piping from the pond to the Unit 1 flow receiver and head box consists of the following piping segments: 1. From the discharge valve, single-walled carbon steel pipe is routed in pipe chases from the A/B, through the Power Source Building (PS/B), up to the Turbine Building (T/B) exit wall penetration. 2. The effluent pipe is then connected to a single-walled carbon steel pipe or double-walled High Density Polyethylene (HDPE) piping from the T/B wall to the yard. This portion of pipe is run in the piping trench. A transition manhole is constructed near the plant pavement boundary to accomodate splitting the radwaste effluent pipe into two piping segments: first segment goes to the Unit 1 flow receiver and headbox, and second effluent pipe to the radwaste evaporation pond. 3. Buried double-walled HDPE piping from the transition manhole to the Unit 1 flow receiver and head box. 4. Buried double-walled HDPE piping from the transition manhole to the radwaste evaporation pond. Additional manholes are constructed to monitor leakage along the buried pathway. 5. The radwaste evaporation pond return pipe is buried double-walled HDPE piping from the pond to the Unit 1 flow receiver and head box. This return pipe is buried parallel to the effluent pipe and passes through the same manholes for testing and inspection for piping integrity.	11.2.3.4
2	Provide for adequate leak detection capability to provide prompt detection of leakage for any structure, system, or component which has the potential for leakage.		

CP COL 12.3(10)

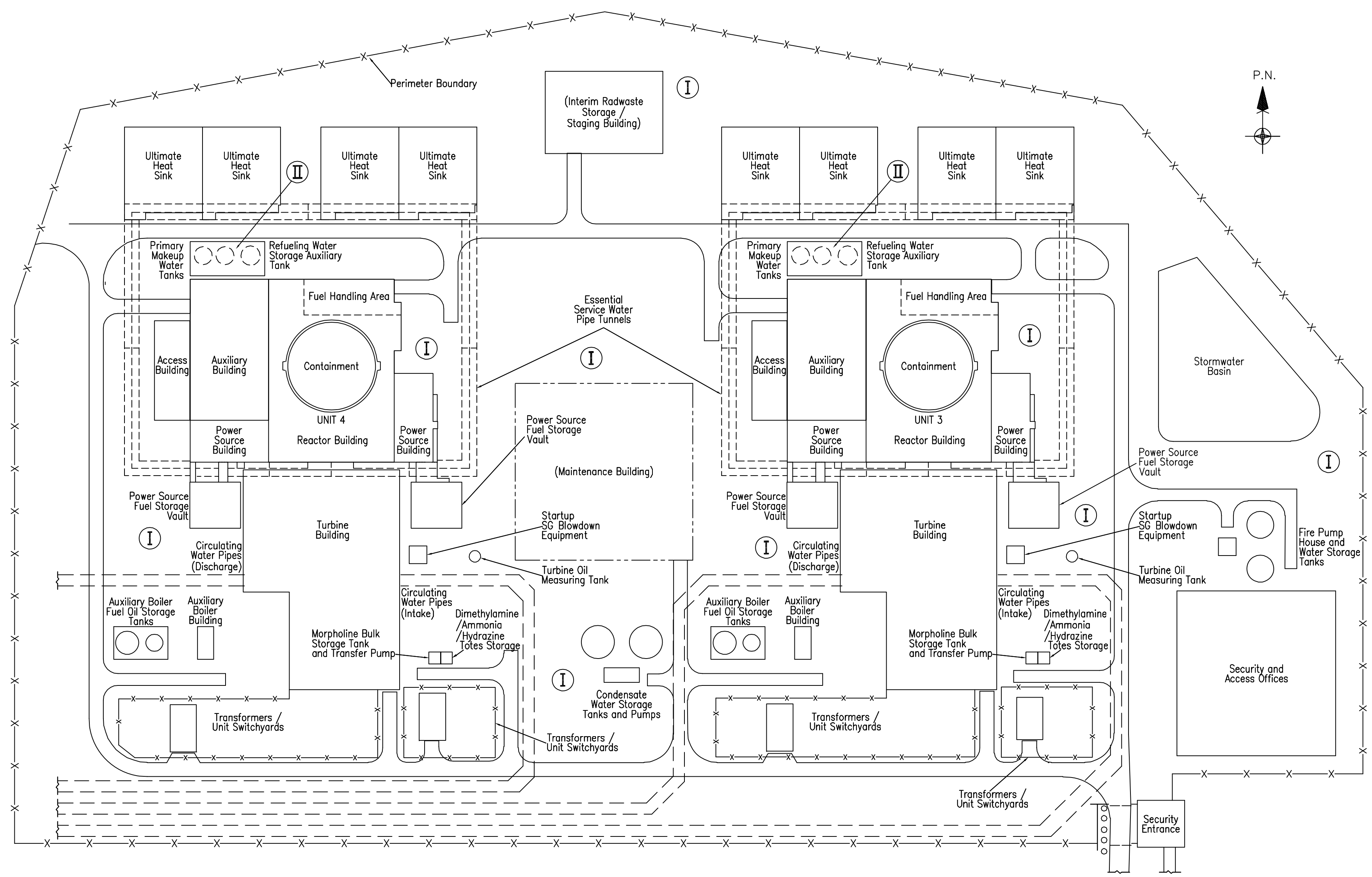
Table 12.3-201 (Sheet 5 of 5)

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

Liquid Waste Management System

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

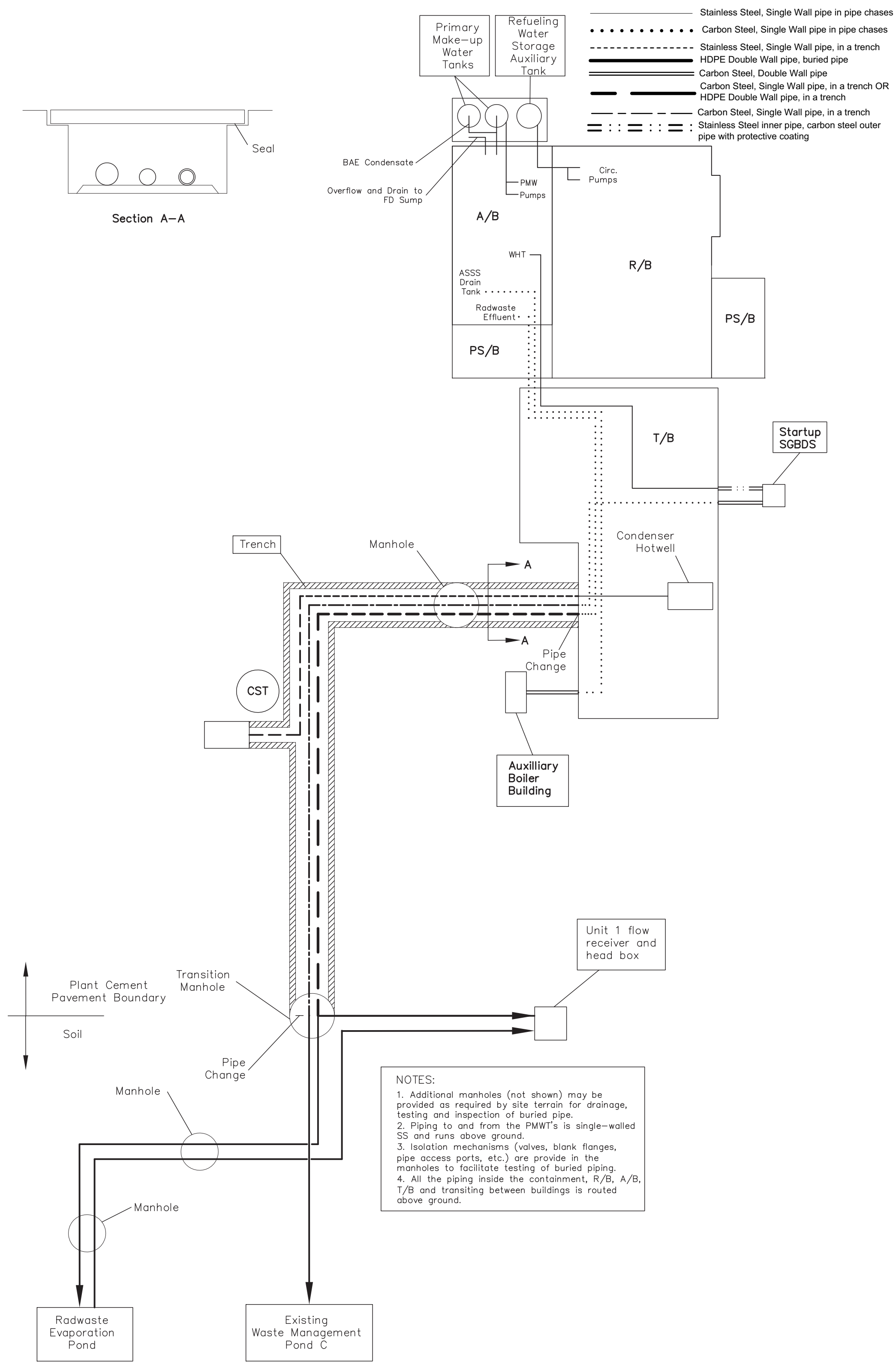
Objective		System Features	FSAR Reference
2		Additional manholes are provided for testing and inspection for the buried piping. Each manhole is equipped with drain collection basins and leak detection instruments to send the signal when activated by fluid in the manhole to a receiver in the Main Control Room (MCR) for operator action. This design approach minimizes leakage and provides accessibility to facilitate periodic testing (hydrostatic or pressure), or visual inspection to maintain pipe integrity and is compliant with RG 4.21.	
3	Use leak detection methods (e.g., instrumentation, automated samplers) capable of early detection leaks in areas where it is difficult or impossible to conduct regular inspections (such as for spent fuel pools, tanks that are in contact with the ground, and buried, embedded or subterranean piping) to avoid release of contamination of the environment.	A radiation monitor is provided close to the pump discharge to monitor radiation level of the content, and provides a signal to automatically turn off the pump, shut off the discharge valve, and initiate a signal to alarm in the Main Control Room and the Radwaste Control Room for operator actions.	11.2.3.4



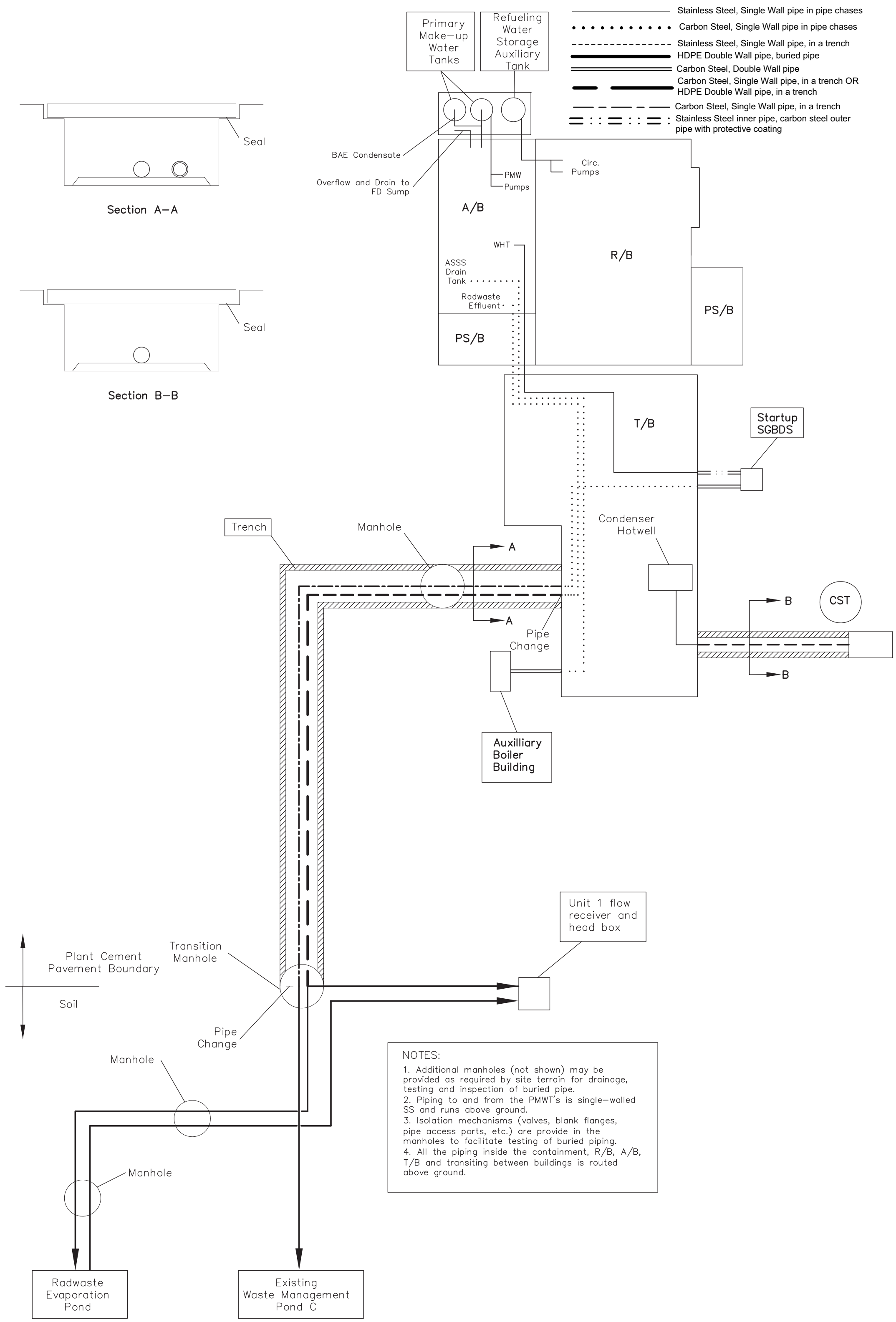
Zone	Maximum Design Dose Rate
I	≦ 0.25 mrem/h
II	≦ 1 mrem/h
III	≦ 2.5 mrem/h
IV	≦ 15 mrem/h
V	≦ 100 mrem/h
VI	≦ 1 rem/h
VII	≦ 10 rem/h
VIII	≦ 100 rem/h
IX	≦ 500 rad/h
X	> 500 rad/h

CP COL 12.3(4)

Figure 12.3-1R Radiation Zones for Normal Operation/Shutdown Site (Sheet 1 of 34)



CP COL 12.3(10) **Figure 12.3-201 Yard Piping Routing and Building Penetration Schematic for CPNPP Unit 3 (Not to scale)**



CP COL 12.3(10) **Figure 12.3-202 Yard Piping Routing and Building Penetration Schematic for CPNPP Unit 4 (Not to scale)**

12.4 DOSE ASSESSMENT

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

12.4.1.9 Dose to Construction Workers

CP COL 12.4(1) Replace the paragraph in DCD Subsection 12.4.1.9 with the following.

RG 1.206 requires that an annual dose to construction workers be estimated in a new unit construction area for multi-unit plants. This subsection evaluates the potential radiological dose impacts to construction workers at the CPNPP Units 3 and 4 resulting from the operation of CPNPP Units 1 and 2. Because the CPNPP Units 3 and 4 construction period occurs while CPNPP Units 1 and 2 are operating, construction workers at CPNPP Units 3 and 4 would be exposed to direct radiation and gaseous radioactive effluents from CPNPP Units 1 and 2. Doses to CPNPP Unit 4 construction workers from operation of CPNPP Unit 3 are not evaluated because the CPNPP Unit 4 construction will be substantially complete and many of the construction workers gone before CPNPP Unit 3 begins commercial operation. Gaseous effluent releases from CPNPP Unit 3 during fuel loading and low power testing, less than 5 percent power, are not expected to be significant, and are bounded by the conservatisms in the following dose estimate. During CPNPP Unit 3 testing, the overall work force, as well as outdoor construction activities on CPNPP Unit 4, would be reduced.

Additionally, the site maintains contained sources of known isotope and activity containing byproduct, source, or special nuclear materials for use in equipment standardization and calibration, security checks, process control, gauging, quality assurance, teaching, or radiography sources. Luminant maintains procedures to control, limit and monitor cumulative dose for construction workers and security employees such that total exposure for each construction worker and security employee is maintained less than 100 mrem in a year in accordance with 10 CFR Part 20.1301 and the Radiation Protection Program. Once CPNPP Unit 3 completes 5% power ascension testing and proceeds to commercial operation, the remaining construction workers doses will be maintained ALARA in accordance with 10 CFR 20.1301 as described in Section 12.5, Operational Radiation Protection Program. Subsection 13.4 provides an implementation milestones for the Operational Radiation Protection Program that meets the regulations provided in 10 CFR Parts 20.1101 (a) and (b), 1301 and 1302. Once CPNPP Units 3 and 4 become operational, the estimated dose for remaining construction workers will be maintained ALARA at less than 2 mrem/hr.

12.4.1.9.1 Site Layout

The CPNPP Units 3 and 4 power block areas are shown on Figure 1.2-1R. As shown, the additional units would be located northwest of the protected area for the existing units. Construction activity for CPNPP Units 3 and 4 would be outside the protected area for CPNPP Units 1 and 2, but inside the restricted area boundary.

12.4.1.9.2 Radiation Sources

Workers constructing CPNPP Units 3 and 4 could be exposed to direct radiation and to gaseous and liquid radioactive effluents emanating from the routine operation of CPNPP Units 1 and 2 as described in the following paragraphs.

12.4.1.9.2.1 Direct Radiation

The refueling water storage tanks are the principal contained sources that could contribute to direct radiation exposure at the construction site. This source is not significant at CPNPP because a 2 ft.-6 in. thick concrete wall is used instead of a thin steel shell wall for the refueling water storage tanks. CPNPP Units 1 and 2 do not have an independent spent fuel storage installation (ISFSI); therefore, this source of direct radiation is not considered. In general, the dose rate at the ISFSI protected area fence would be below 5 mrem/hr. The radiation intensity from the ISFSI decreases with distance from the source, varying as the inverse square of the distance. For a point source, the following relation expresses the inverse square spreading effect:

$$\phi = \frac{S}{4\pi R^2}$$

Where ϕ is the intensity at a surface of a sphere of radius R, and S is the source strength. The energy twice as far from the source is spread over 4 times the area; therefore, it has one-fourth the intensity. Any point source that spreads its influence equally in all directions without limits to its range would obey the inverse square law. The distance from the CPNPP Units 3 and 4 construction area to any potential ISFSI site is well over 1000 ft. For conservatism, a distance of 1000 ft is assumed. Neglecting attenuation in the air and applying the inverse square relation, a 5 mrem/hr dose rate within the confines of the ISFSI (at an assumed distance of 1 ft from the source) is reduced to 5.0E-06 mrem/hr at 1000 ft from the ISFSI facility. Considering an exposure period of 2500 hr/yr, the annual dose to a construction worker from direct radiation emanating from the ISFSI is 1.25E-02 mrem/yr.

Other direct radiation sources could potentially affect construction workers at the proposed CPNPP Units 3 and 4 site locations and the modification to the existing Sanitary Sewage Treatment Facility. These other direct radiation sources include the existing Warehouse C Dry Active Waste and Fixed Contamination Tool area, the planned Outage Laydown Area east of the CPNPP Units 1 and 2 Fuel Building, and the existing Storage Level “D” Zone where Class B and C radioactive waste is stored.

All of these areas will be maintained at the fence area boundary with dose rates <2 mrem/hr in accordance with the current site Radiation Protection Program entitled "General Health Physics Plan" STA-650 (Reference 12.4-204). Construction workers performing activities in any of the Unit 1 and 2 areas delineated above will be working under the authority of the Units 1 and 2 Radiation Protection Program (which meets the requirements of 10CFR 20.1101, 20.1301 and 20.1302), including an approved Radiation Work Permit (RWP) when required by the CPNPP Units 1 and 2 Radiation Protection Program, STA-650. Distances from these areas to the CPNPP Units 3 and 4 proposed construction area are much greater than 1000 feet. Distances between these facilities and a proposed modification to the Sanitary Sewage Treatment Facility to accommodate additional volume, range from approximately 1100 to 1600 feet. As a result, and considering that the dose rates will be maintained <2 mrem/hr at the source fence boundary, the construction worker will not be affected by any of these other direct radiation sources.

The CPNPP site will be continually monitored during the construction period and appropriate actions will be taken as necessary to ensure that the construction workers are protected from radiation exposure. Use of radioactive materials and sources during construction, such as sources used in radiography, will be controlled and monitored to maintain construction worker doses ALARA.

12.4.1.9.2.2 Gaseous Effluents

Some radioactive gaseous effluents are released on a batch basis from CPNPP Units 1 and 2 to the environment. Release pathways in this category include intentional discharges from the containment purge exhaust and the waste gas decay tanks via the plant vent stacks. Radioactive gaseous effluents are released continuously from CPNPP Units 1 and 2 to the environment from the fuel buildings, safeguards buildings, and auxiliary building (A/B) ventilation exhaust systems, and the condenser off-gas system via the plant vent stacks.

The CPNPP Units 1 and 2 annual releases for 2006 have been reported as 148 Ci of fission and activation gases, 4.23E-04 Ci of iodines, 0.00 Ci of particulates with half-lives greater than eight days, and 47 Ci of tritium (Reference 12.4-201). The annual releases for 2006 are higher than normal for the existing units (Reference 12.4-201).

12.4.1.9.2.3 Liquid Effluents

Effluents from the liquid waste disposal system introduce small amounts of radioactivity into Squaw Creek Reservoir and the low volume waste pond. The annual liquid radioactivity releases for 2006 have been reported as 5.9E-03 Ci of fission and activation products, 1522 Ci of tritium, and 0.54 Ci of dissolved and entrained gases (Reference 12.4-201). The annual releases for 2006 are typical for the existing units; however, the tritium production is dependent on fuel type, power production, and core power history.

12.4.1.9.3 Measured and Calculated Dose Rates

12.4.1.9.3.1 Direct Radiation

CPNPP Units 1 and 2 have a general area monitoring program that monitors various points inside the protected area. The limiting cumulative dose rate is 0.001 mrem/hr from the protected area fence thermoluminescent dosimeter readings for 2006. This dose rate bounds the CPNPP Units 3 and 4 construction worker direct radiation dose rate from CPNPP Units 1 and 2 because this location is closer to CPNPP Units 1 and 2 than to the CPNPP Units 3 and 4 construction area.

12.4.1.9.3.2 Gaseous Effluents

The Annual Radioactive Effluent Release Report for 2006 (Reference 12.4-201) provides continuous and batch mode releases for CPNPP Units 1 and 2. The total combined 2006 gaseous effluent releases are conservative when compared to historic average gaseous effluent release data (Reference 12.4-201).

The CPNPP Unit 3 construction area is approximately 1900 ft. (579 m) NW of the closest corner of the CPNPP Unit 2 turbine building. This distance is conservative relative to any actual gaseous effluent release point for either CPNPP Unit 1 or Unit 2. Use of the distance to the CPNPP Unit 3 construction area is also conservative because the CPNPP Unit 4 construction area is farther away. To ensure that the limiting dose at the construction area is captured, atmospheric dispersion factors were also calculated for the WNW and NNW directions at a distance of 1900 ft. The XOQDOQ computer code (Reference 12.4-202) was used with the 2001 – 2006 CPNPP meteorological data to determine the atmospheric dispersion and deposition from this assumed release location to the CPNPP Unit 3 construction area.

The GASPAR computer code (Reference 12.4-203) was then used, with the calculated atmospheric dispersion factors, to determine the CPNPP Unit 3 construction worker dose due to gaseous effluent releases from CPNPP Units 1 and 2. The gaseous effluent releases from CPNPP Units 1 and 2 were conservatively modeled as ground level releases because the release height is not more than 2 times the height of adjacent buildings. The release elevation of the plant vent stack is approximately 58 m above plant grade. The assumed area for calculation of building wake effects was 3193 m^2. This represents the cross sectional area of the CPNPP Unit 1 containment building. This is conservative because the gaseous effluent releases are from both operating units. The building height used was 260 ft (79m) above grade.

12.4.1.9.3.3 Liquid Effluents

The Annual Radioactive Effluent Release Report for 2006 (Reference 12.4-201) reports a total body dose of 0.103 mrem and a critical organ dose of 0.103 mrem to the maximally exposed member of the public due to the release of liquid

effluents from CPNPP Units 1 and 2, calculated in accordance with the existing units' Offsite Dose Calculation Manual.

12.4.1.9.4 Construction Worker Doses

Construction worker doses were conservatively estimated using the following information:

- The estimated maximum dose rate for each pathway
- An exposure time of 2500 hr/yr (50 hr/week * 50 week/yr)
- A peak loading of 4300 construction workers

The estimated maximum annual dose for each pathway as well as the total dose is discussed below.

12.4.1.9.4.1 Direct Radiation

Using the protected area fence cumulative dose rate of 0.001 mrem/hr from Subsection 12.4.1.9.3.1, the annual dose due to direct radiation at the CPNPP Units 1 and 2 protected area fence would be 2.5 mrem based on an exposure of 2500 hr/yr. This is the dose at the CPNPP Units 1 and 2 protected area fence. Doses to the CPNPP Units 3 and 4 construction workers would be reduced due to the distance to the construction area.

12.4.1.9.4.2 Gaseous Effluents

The annual gaseous effluent doses to the maximally exposed member of the public are based on continuous occupancy. Adjusted for an exposure time of 2500 hr/yr, the estimated individual worker doses due to gaseous effluent releases from CPNPP Units 1 and 2 are 4.05E-03 mrem for the total body and 4.20E-03 mrem for the critical organ. Applying a weighting factor of 0.03 to the critical organ dose, as discussed in RG 1.183, page 1.183-9, and adding to the total body dose, a total effective dose equivalent (TEDE) of 4.18E-03 mrem is estimated.

12.4.1.9.4.3 Liquid Effluents

The annual liquid effluent doses to the maximally exposed member of the public are based on continuous occupancy and are adjusted for an exposure time of 2500 hr/yr. Although the liquid effluent dose rates to which the workers would be exposed are not expected to be as high as the dose to the maximally exposed member of the public, the doses calculated for the public are used. The resulting doses are 2.9E-02 mrem for the whole body and 2.9E-02 mrem for the critical organ. Applying a weighting factor of 0.03 to the organ dose and adding to the whole body dose, a TEDE of 3.0E-02 mrem is estimated.

The location for the Units 3 and 4 liquid waste management system (LWMS) connection to the Units 1 and 2 is an open pit near the existing Units 1 and 2

waste treatment ponds (Northeast corner of Units 1 and 2 radioactive waste treatment facility). The CPNPP Units 3 and 4 effluent tap will be made into CPNPP Units 1 and 2 at the pipe inside the Unit 1 Turbine Building. In accordance with the Radiation Protection Program established (see FSAR Subsection 13.4 and Table 13.4-201), the construction worker dose for this connection tie-in will be ALARA and meet the limits established in 10 CFR 20.1301. Pre-staging of the connection, health physics surveys and other effective techniques will be utilized to ensure that worker doses are ALARA in accordance with an approved Radiation Work Permit.

12.4.1.9.4.4 Total Doses

The annual doses from all three pathways are compared to the public dose criteria of 10 CFR 20.1301 in Table 12.4-201. Because the calculated doses meet the public dose criteria of 10 CFR 20.1301, the workers would not need to be classified as radiation workers. The maximum annual collective dose to the construction work force of 4300 workers is estimated to be 10.75 person-rem.

The calculated doses are based on available dose rate measurements and calculations. It is possible that these dose rates could increase in the future as site conditions change. The site will be continually monitored during the construction period, and appropriate actions would be taken as necessary to ensure that the construction workers are protected from radiation.

The annual estimated construction worker doses attributable to the operation of CPNPP Units 1 and 2 for the proposed construction areas for CPNPP Units 3 and 4 are below 10 CFR 20 limits. Therefore, in accordance with 10 CFR 20.1301 criteria, monitoring of individual construction workers is not required.

12.4.3 Combined License Information

Replace the content of DCD Subsection 12.4.3 with the following.

CP COL 12.4(1) ***12.4(1)*** *Estimated annual doses to construction workers*

This COL item is addressed in Subsection 12.4.1.9 and Table 12.4-201.

12.4.4 References

Add the following references after the last reference in DCD Subsection 12.4.4.

12.4-201 *Comanche Peak Steam Electric Station Units 1 and 2 Radioactive Effluent Release Report*, January 1, 2006 - December 31, 2006.

12.4-202 *U.S. Nuclear Regulatory Commission, XOQDOQ Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations, NUREG/CR-2919, September 1982.*

12.4-203 *U.S. Nuclear Regulatory Commission, GASPAR II Technical Reference and User Guide, NUREG/CR-4653, March 1987.*

12.4-204 Comanche Peak Steam Electric Station General Health Physics Plan, STA-650, June 1997.

CP COL 12.4(1)

Table 12.4-201

Construction Worker Dose Comparison to 10 CFR 20.1301 Criteria

Type of Dose	Annual Dose Limits[1]	Estimated TEDE Dose[2]
Annual dose (mrem)	100	2.5
Unrestricted area dose rate (mrem/hr)	2	0.001

Note:

(1) 10 CFR 20.1301 criteria.

(2) Dose due to direct radiation and liquid and gaseous effluent releases from CPNPP Units 1 and 2.

12.5 OPERATIONAL RADIATION PROTECTION PROGRAM

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

CP COL 12.1(5) Replace the contents in DCD Section 12.5 with the following.

NEI 07-03A, Generic FSAR Template Guidance for Radiation Protection Program Description, Revision 0, is incorporated by reference. Site specific information in radiation protection program will be implemented in accordance with the milestones listed in Table 13.4-201, by utilizing of NEI 07-03A, and NEI 07-08A, Generic FSAR Template Guidance for Ensuring that Occupational Radiation Exposures are as Low as is Reasonably Achievable (ALARA), Revision 0.

Revise the contents of NEI 07-03A, with the following.

Add the following information after the first paragraph in Subsection 12.5.3.2 of NEI 07-03A.

The selection and calibration of this instrumentation and equipment is based on relevant industry standards such as ANSI N42.17A-1989, as it relates to the accuracy and overall performance of portable survey instrumentation, and ANSI N323A-1997, as it relates to the calibration and maintenance of portable radiation survey instruments. Table 12.5-202 provides a list of personnel monitors, radiation survey instruments and laboratory equipment, with reference to consensus standards containing guidance for their calibration. Luminant will use the listed consensus standards in addition to vendor recommendations as part of the guidance for determining the method of calibration of the listed instrumentation.

CP COL 12.2(2)
CP COL 12.3(1)
CP COL 12.3(5)
Add the following information after the second paragraph in Subsection 12.5.3.3 of NEI 07-03A.

In case the National Institute for Occupational Safety and Health/Mine Safety and Health Administration certified equipments are not used, equipments are used to be compliance with 10 CFR 20.1703(b) and 20.1705.

Add the following information prior to the last paragraph in Subsection 12.5.4.1 of NEI 07-03A.

Calibration of portable and non-portable radiation protection equipment is normally performed onsite by station personnel, although, calibration by a qualified vendor is allowed. Calibration is performed using written procedures and radioactive sources traceable to the National Institute of Standards and

Technology (NIST) or using transfer instruments, such as electrometers, which have been calibrated using NIST traceable sources.

CP COL 12.2(3)
CP COL 12.2(4)
CP COL 12.3(9)

Modify the third paragraph of Subsection 12.5.4.1 of NEI 07-03A as indicated below.

The frequency and extent of the surveys will depend upon several factors, such as location, actual or potential radiation levels, plant operational status and work in progress, and accessibility/occupancy. The frequency of surveys may be weekly, monthly, quarterly, semiannually, annually, or as directed by the Radiation Protection Manager. Surveys are performed more frequently in accessible areas subject to changes in radiological conditions. For example, periodic routine surveillance activities are required to ensure that the dose rate at 2 meters from the surface of both the RWSAT and the PMWTs remain below 0.25 mrem/h. Similarly, the radiological protection procedures must stipulate routine surveillance activities for the B.A. evaporator room during the end of cycle to ensure that continued operation of the evaporator does not lead to the B.A. evaporator room inadvertently becoming a VHRA. Site specific procedures define the survey frequencies and extent.

Add the following information after the paragraph in the discussion on Radwaste Handling in Subsection 12.5.4.2 of NEI 07-03A.

CPNPP Units 3 and 4 have a plan to store temporarily radioactive wastes/materials in Interim Radwaste Storage/Staging Building outside the plant structures. Entry into the radiologically controlled areas of this building is allowed only through the issuance of a Radiation Work Permit. Non-radiologically controlled areas allow for general access.

CP COL 12.2(3)
CP COL 12.2(4)
CP COL 12.3(9)

Add the following information after the paragraph in the discussion on Normal Operation in Subsection 12.5.4.2 of NEI 07-03A.

If the activity concentration in the RWSAT and the PMWTs becomes higher than the levels described in the DCD, the dose rate at 2 meters from the surface of the tank will exceed 0.25 mrem/h. Therefore, a method of ensuring that the radioactivity concentration in both the RWSAT and the PMWTs remain under the specified concentration level described in the DCD is to be implemented. Additionally, the radiological surveillance procedures provide for periodic routine surveillances to verify that the dose rate at 2 meters from the surface of the RWSAT and the PMWTs remains below 0.25 mrem/h.

In order to ensure that the B.A. evaporator room does not become a VHRA during the end of cycle, routine surveillance for the B.A. evaporator room during the end of cycle is stipulated in the Radiation Protection Program. In the event that the

routine surveillance shows an increase in dose level, an appropriate strategy to sufficiently reduce the dose rate below the criteria for a VHRA is to be provided.

Add the following information after the last paragraph in the discussion on Calibration in Subsection 12.5.4.2 of NEI 07-03A.

Source Term Reduction Strategy

The plant source term is described by the level of radiation, or radioactive material, given off or contained in plant systems, structures, or components that results in occupational radiation exposure from routine operation of the plant, including anticipated operational occurrences. The source term includes, but is not limited to, activated components in the primary coolant, corrosion and wear products activated in the reactor and distributed in plant systems, or sealed sources maintained to support plant operations. The reduction and control of the plant radiation source term is an essential element of meeting the requirements of 10 CFR 20.1101(b).

FSAR Subsection 12.1.1.3.2 commits the administrative programs and procedures to comply with RG 8.8, which provides several strategies for reducing personnel exposure, including some options that would limit the overall source term, such as crud control and equipment isolation and decontamination. Additionally, the following DCD Subsections, which describe design considerations for the reduction of the overall source term, are already incorporated into the FSAR by reference:

- Subsection 12.1.2.1
- Subsection 12.1.2.2.3
- Subsection 12.3.1.1.1.1 Item (E)
- Table 12.3-7

Luminant will identify cobalt and other activated material sources during the detailed design phase of the project. During plant operation, Luminant will utilize industry practice guidance similar to EPRI report TR-103296 to ensure that procurement of components or piping, conducting maintenance, or modifications considers the identified sources of cobalt and other activated materials.

Add the following information after the third paragraph in Subsection 12.5.4.4 of NEI 07-03A.

The locations and radiological controls of the radiation zones on plant layout drawings are located in DCD Subsection 12.3.1.2. Administrative controls for restricting access to Very High Radiation Areas are incorporated into plant procedures which require approval by the Plant Manager (or designee) for each entry. Entry will be controlled through the Radiation Work Permit (RWP) process. Physical access controls for Very High Radiation Areas are provided by physical barriers such as lockable gates or doors which prevent unauthorized access. It's not necessary to enter these areas periodically. DCD Subsection 12.3.1.2 includes detailed drawings of the very high radiation areas and indicates the physical access controls. Table 12.5-201 summarizes the plant areas with the potential to become very high radiation areas. Radiation monitor locations for each area are indicated in DCD Subsection 12.3.4.

Add the following information after the sixth paragraph in Subsection 12.5.4.4 of NEI 07-03A.

The gates provide access control of the fuel transfer tube inspection (Very High Radiation Area) and the area near the seismic gap below the transfer tube. Access control for these areas is controlled by the gates and entry to these areas is allowed only the issuance of a Radiation Work Permit.

Add the following information at the end of Subsection 12.5.4.8 of NEI 07-03A.

In addition, NEI Template 08-08A Revision 0, "Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination" is fully adopted. And also, the guidance provided in NEI 08-08A will be used at CPNPP Units 3 and 4 to minimize contamination during construction, operation and decommissioning. This will include the use of photographs and video records during construction to facilitate updating the conceptual site model for groundwater movement and aid in revising the groundwater monitoring plan post-construction. Final layout drawings, photographs, global positioning survey information and video records will be used in assessing the proper location for groundwater monitoring wells, foundations, pipes, conduits and other below grade structures.

Replace the first paragraph of Subsection 12.5.4.9 of NEI 07-03A with the following.

Respiratory protection procedures assure compliance with 10 CFR Part 20, Subpart H, and are consistent with the guidance in Regulatory Guide 8.15 to assure protection against radiological hazards and the relevant portions of 29 CFR 1910.134 to assure protection against non-radiological hazards, such as fumes, dust, smoke, or oxygen deficiency.

Replace the first and second paragraph in Subsection 12.5.4.12 of NEI 07-03A with the following.

The radiation protection program and procedures are established, implemented, maintained and reviewed consistent with the 10 CFR 20.1101 and the quality assurance program referenced in Chapter 17.

CP COL 12.1(5)

Table 12.5-201 (Sheet 1 of 2) Summary of Comanche Peak Units 3 and 4 Very High Radiation Areas (VHRAs)

Plant Area	Description of Area and Methods Employed to Ensure Personnel Safety
Refueling Canal Refueling Cavity (including Core Internals Laydown Area) Cask Pit Fuel Inspection Pit Spent Fuel Pit	These areas have the potential to become VHRAs during underwater spent fuel transfer and inspection operations. These areas are submerged during this period and it becomes inaccessible for personnel. Per DCD Subsection 12.3.2.2.4, all spent fuel removal, transfer, and inspection operations are performed under borated water to provide radiation protection and to maintain sub-criticality conditions. Administrative and access controls, such as temporary fences or ropes, are in place to assure that personnel doses are maintained ALARA during fuel handling and inspection operations. With the exception of the spent fuel pit, the dose rates in these areas of the plant are significantly less under all other operating conditions
Fuel Transfer Tube	This area only has the potential to reach Zone X radiation conditions while there is spent fuel passing through the tube. As indicated in Section 12.5 of the COL FSAR, locked gates provide positive access control of the fuel transfer tube. Entry to these areas is allowed only through the issuance of a specific Radiation Work Permit. However, the issuance of a specific Radiation Work Permit for access to these areas is not regularly permitted while spent fuel is passing through the tube.
Reactor Cavity	This area is designed to contrain the molten core from the reactor vessel in the event of a severe accident. This area is inaccesible to personnel.
Reactor Vessel	This area is inaccessible to personnel.

CP COL 12.1(5)

Table 12.5-201 (Sheet 2 of 2) Summary of Comanche Peak Units 3 and 4 Very High Radiation Areas (VHRAs)

<table>
<tr><th>Plant Area</th><th>Description of Area and Methods Employed to Ensure Personnel Safety</th></tr>
<tr><td>Waste Gas Surge Tanks Rooms</td><td rowspan="9">As indicated in DCD Figure 12.3-1, these areas are isolated in individual shielded compartments with elevated access by ladder/stairs or completely enclosed shielded compartments with hatch openings or removable concrete block walls. Locked gates positively control entry into these areas, which is allowed only with the issuance of a Specific Radiation Work Permit. However, there is no projected reason for entry into these areas for equipment maintenance, repair or replacement. The issuance of a Specific Radiation Work Permit for access to these areas is not regularly permitted. However, if entry is required, the applicable ALARA principles, such as remote operations, limiting stay time, using temporary shielding, backwashing filters, draining tanks, etc., will be employed to reduce doses as much as practical.</td></tr>
<tr><td>Spent Resin Storage Tank Rooms</td></tr>
<tr><td>Spent Resin Storage Tank Valve Area</td></tr>
<tr><td>Charcoal Beds Rooms (including the passage near the rooms)</td></tr>
<tr><td>Mixed-Bed Demineralizer Room</td></tr>
<tr><td>Cation-Bed Demineralizer Room</td></tr>
<tr><td>Valve Area next to the Mixed-Bed Demineralizer Room, the Cation-Bed Demineralizer Room and the Deborating Demineralizer Room</td></tr>
<tr><td>A, B-Waste Demineralizer Room</td></tr>
<tr><td>Volume Control Tank Room</td></tr>
</table>

CP COL 12.1(5)

Table 12.5-202
Calibration Guidance for Personnel Monitors, Radiation Survey Instruments and Laboratory Equipment

Instrumentation Type	Consensus Standard
Portable radiation survey instruments	ANSI N323A ANSI N323B for Near Background
Laboratory proportional detectors	Regulatory Guide 4.15 and applicable sections of NUREG-1576
Laboratory scintillation detectors	Regulatory Guide 4.15 and applicable sections of NUREG-1576
High resolution gamma spectroscopy systems	Regulatory Guide 4.15 and applicable sections of NUREG-1576
Whole body counting systems (stationary)	ANSI N323D
Portal radiation monitors (stationary)	ANSI N323D
Portable continuous air monitoring	ANSI N323C
Personnel contamination monitors	ANSI N323B
Personnel electronic dosimeter	ANSI N323B
Portable RP instrument calibration facility sources and standards	Regulatory Guide 4.15 and applicable sections of NUREG-1576

Note: ANSI N323 provides basic calibration guidance for radiation detection instrumentation.