PMComanchePekNPEm Resource

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Cc:	James.Hill2@luminant.com
Subject:	Luminant Submitted Supplemental RAI Response
Attachments:	TXNB-10065 RAI 135.pdf

Luminant has submitted the attached letter, which provides supplemental information about the minimization of radioactive contamination. If there are any questions regarding the letter, please contact me or contact Don Woodlan (254-897-6887, Donald.Woodlan@luminant.com)

Thanks,

John Conly

Luminant
COLA Project Manager
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Hearing Identifier: ComanchePeak_COL_NonPublic
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Ref. # 10 CFR 52

September 22, 2010

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

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4
DOCKET NUMBERS 52-034 AND 52-035
SUPPLEMENTAL INFORMATION FOR RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 4206

Dear Sir:

Luminant Generation Company LLC (Luminant) submits herein supplemental information for the response to Request for Additional Information (RAI) No. 4206 (CP RAI #135) for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. The RAI involves the minimization of radioactive contamination.

The attachment to this letter completes Regulatory Commitment #7221 made on March 5, 2010 (ML100700263) and modified on June 29, 2010 (ML101830423). A new commitment is captured on page 2 of this letter.

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

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

Executed on September 22, 2010.

Sincerely,

Luminant Generation Company LLC

Rafael Flores for

Attachment: Supplemental Response to Request for Additional Information No. 4206 (CP RAI #135)

Regulatory Commitments in this Letter

This communication contains the following new or revised commitment which will be completed or incorporated into the CPNPP licensing basis as noted. The Commitment Number is used by Luminant for internal tracking.

Number	Commitment	Due Date/Event
7801	In the next revision of the DCD currently scheduled for March 2011, Subsection 9.1.3.2.1.3 will be revised to include the operating experience discussed in EPRI TR 1013470	March 30, 2011

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SUPPLEMENTAL RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 4206 (CP RAI #135)

SRP SECTION: 12.03-12.04 - Radiation Protection Design Features

QUESTIONS for Health Physics Branch (CHPB)

DATE OF RAI ISSUE: 1/29/2010

QUESTION NO.: 12.03-12.04-11

10 CFR 20.1406, NUREG-0800, 'Standard Review Plan,' Section 12.03-12.04, Regulatory Guide (RG) 1.206, RG 4.21, RG 8.8, IEB 80-10

By letter dated September 30, 2009, the NRC staff issued RAI No. 3511 (CP RAI # 99). In Question 12.03-12.04-1 (13765), the NRC staff requested the applicant provide information regarding the design features and program elements needed to meet the requirements of 10 CFR 20.1406 for the systems structures and components for which the COL applicant has responsibility.

The applicant's response, dated November 11, 2009, noted several design features and program elements were provided to minimize contamination of the facility and the environment consistent with the guidance in Regulatory Guide 4.21 "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning" and Nuclear Energy Institute template NEI 08-08A "Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination".

The NRC staff has reviewed the applicant's response and found the following examples of where question portions were not fully addressed by the applicant's response.

- The applicant was asked to describe the provisions for those portions cooling water systems, down stream of the Liquid Waste Processing System (LWPS) connection points. While the applicant noted that evaporation pond piping would use leakage detection and inspection ports, neither this response, nor the response to RAI No. 2747 (CP RAI # 29), Question 11.02-2, dated September 24, 2009, noted this provision in the COL FSAR changes. This response also does not address the piping down stream of where the discharge piping from the evaporation pond connects to the cooling water discharge piping. The "Liquid Radioactive Release Lessons Learned Task Force Final Report" describes industry-operating experience involving inadvertent releases from cooling water piping or components located down stream of LWPS connections.

- COL FSAR COL 10.4(2) notes that with abnormal chemistry, the Steam Generator Blowdown System (SGBDS) directs SGBDS water to Waste Water Management Pond C. However, this response does not describe the leakage prevention and leakage detection provisions for the piping to and from Waste Pond C and for the construction of Waste Pond C.

- The applicant was asked to describe leakage prevention and detection provisions for portions of the Steam and Condensate systems. The applicant's response only discussed the radiation monitoring detector installed on the condenser air ejector, and not prevention or early detection of releases from PWR secondary system piping. This radiation monitor is not capable of detecting tritium contamination. Electric Power Research Institute (EPRI) Technical Report (TR) 1008219 "PWR Primary-to-Secondary Leak Guidelines-Revision 3", notes that even without primary to secondary leakage, radioactive tritium will be present in PWR secondary side systems due to hydrogen diffusion through the Steam Generator u-tubes. Operating Experience regarding PWR secondary system underground piping leakage is discussed in Indian Point Nuclear Generating Unit 2 - NRC Integrated Inspection Report 05000247/2009002, dated May 14, 2009 (ML091340445), and May 24, 2004, Event Number 40771 for Surry Power Station.

- The applicant was asked to describe provisions for leakage prevention and detection from systems receiving water from the boron recycle system. The applicant's response addressed leakage prevention provisions for valves, but did not discuss the leakage prevention and detection methods for piping containing recycled fluid, especially those portions of piping that originated in one building, and terminated in a separate building, such as the piping to and from the Primary Makeup Water Storage Tanks.

- The applicant's response stated that heat exchangers separate radioactive fluid from non-radioactive fluid by tube walls. As noted in the USAPWR Design Control Document FSAR Tier 2 Section 9.1.3.2.1.3, the CCW/SFP heat exchanger is a plate type heat exchanger. Operating Experience from EPRI TR 1013470 "Plant Support Engineering: Guidance for Replacing Heat Exchangers at Nuclear Power Plants with Plate Heat Exchangers", notes that Plate Type heat exchanger gaskets are subject to leakage due to fouling of the gasket sealing surfaces during maintenance, and as a result of pressure spikes due to operational transients and events. The applicant did not discuss how the elements of the contamination minimization program will address operating experience showing the increased risk of leakage with Plate Type heat exchangers.

The examples provided are illustrative in nature, and do not portray an exhaustive review of the systems, structures and components, which should be considered during the 10 CFR 20.1406 review process.

Please revise and update the COL FSAR to describe in Comanche Peak FSAR Chapter 12, the design features, and related maintenance and inspection requirements, to prevent or mitigate contamination of the environment from COL applicant provided systems, structures and components, which may contain radioactive material. Alternately, describe and justify the specific approaches employed to prevent contamination of the environment and facility from COL Applicant provided Systems, Structures or Components containing radioactive material.

SUPPLEMENTAL INFORMATION:

The response to RAI No. 4206 (CP RAI #135) on March 5, 2010 (ML100700263) addressed RG 4.21 elements at the system level. This current submittal includes supplemental responses to specific NRC information requests and the system level responses originally prepared, and replaces the original submittal in its entirety.

The following five numbered subsections address the specific NRC comments in the five bullets above. Some of these bulleted items have been addressed in DCD Tier 2 by the amended MHI response to DCD RAI No. 578-4483 submitted on August 9, 2010 (UAP-HF-10232) and are included here for convenience.

The COLA sections have been revised to reflect this response, which addresses design attributes at the component level and are not included at the system level in DCD Tier 2 Table 12.3-8. Plant-specific design considerations have been included in FSAR Table 12.3-201. The DCD changes resulting from the MHI response have been incorporated by reference in CPNPP Units 3 and 4 FSAR. FSAR Figure 12.3-201 has been added to pictorially represent the pipe routing discussed in this response.

1. The treated effluent from Units 3 and 4 and the radwaste evaporation pond are piped directly to the Unit 1 flow receiver and head box (see attached FSAR Figure 11.2-201 Sheet 10). The effluent from the Unit 1 flow receiver and head box flows to the Unit 1 discharge flume, then through existing Unit 1 piping to the Unit 1 circulating water system, and then to Squaw Creek Reservoir (SCR). This was addressed in FSAR Subsection 11.2.2 by response to RAI No. 2747 (CP RAI #29) on September 24, 2009 (ML092720676) and is included for convenience below:

> The treated liquid effluents released from the CPNPP Units 3 and 4 and the evaporation pond are piped directly into the Unit 1 Waste Management System (WMS) flow receiver and head box, which includes the discharge flume. The effluents enter from the top of the receiver and head box and are above the liquid level in the box so that they flow freely into the box, from where the content flows to the Unit 1 WMS discharge flume, and by gravity to the Unit 1 Circulating Water System (CWS), via an existing Unit 1 pipeline connecting the WMS to the CWS. At this pipeline intersection, the Unit 3 and 4 treated effluent and the Unit 3 and 4 evaporation pond effluents are commingled with various Unit 1 and 2 waste effluent streams. This Unit 1 circulating water flow path then goes to the Unit 1 condenser water box outlet, where it joins the Unit 2 condenser water box outlet flow. The joined flows from the Unit 1 and 2 condenser water boxes are then sent to the SCR via the Unit 1 and 2 discharge tunnel and outfall structure from all four units (see Figure 11.2-201 Sheet 10 for a visual representation of the above described flow path.)

The WMS 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 (see Figure 12.3-201):

- From the discharge valve, single-wall 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.
- The effluent pipe is then connected to a single-wall carbon steel pipe or double-wall High Density Polyethylene (HDPE) piping from the T/B wall to the yard near the condensate storage tank (CST). This portion of pipe is run via the condensate transfer piping trench. A transition manhole is constructed near the plant pavement boundary to accommodate splitting the radwaste effluent pipe into two piping segments: the first segment goes to the Unit 1 flow receiver and head box, and the second effluent pipe foes to the radwaste evaporation pond.
- Buried double-wall HDPE piping from the transition manhole to the Unit 1 flow receiver and head box.
- Buried double-wall HDPE piping from the transition manhole to the radwaste evaporation pond. Additional manholes are constructed to monitor leakage along the buried pathway.
- The radwaste evaporation pond return pipe is buried double-wall 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.

Additional manholes are provided for testing and inspection for the buried piping. Each manhole is equipped with drain collection basins and leak detection instruments, which are either a cable- or battery-operated level switch and a wireless transmitter. When activated by fluid in the manhole, the instruments send a signal to a receiver in the main control room (MCR) for operator action.

This design approach minimizes leakage and provides accessibility to facilitate periodic hydrostatic or pressure testing, or visual inspection to maintain pipe integrity, and is compliant with RG 4.21. COL Item 12.3(10) is included in DCD Tier 2 to implement the site-specific design features of the radwaste effluent piping to minimize leakage.

FSAR Subsection 11.2.3.4 states that the piping for transporting radioactive effluent from the discharge valve inside the A/B to the pond and the piping from the pond to the Unit 1 flow receiver and head box is HDPE material. FSAR Subsection 11.2.3.4 has been revised to include the radwaste effluent piping segment information.

Three new monitoring wells are being installed along the existing piping from the Unit 1 flow receiver and head box to the Unit 1 discharge box to monitor any potential leakage as part of the existing waste minimization program for Units 1 and 2. This approach is consistent with the NEI guidance for operating plants and is provided here for informational purposes. Samples from the monitoring wells are collected for analysis. If any leak is detected, an action plan is developed, and the piping is excavated and repaired or replaced as required.

2. The US-APWR SGBDS employs two subsystems: one for normal operation located inside the T/B and another for startup operations located outside the T/B. The SGBD flash tank inside the T/B is used during normal operation. The blowdown water is flashed, cooled, and then routed to the SGBD ion exchange columns for treatment. The treated blowdown water is sent back to the condenser hotwell for recycling and is not intended for release. The piping in the T/B and between the T/B, PS/B, Reactor Building (R/B), and A/B is routed above ground inside the buildings. There is no buried piping. The piping that transfers spent resin to the spent resin storage tanks is also located in a pipe chase, not buried. In the event that the blowdown water is contaminated, the water downstream of the SGBD mixed bed demineralizers is routed to the Waste Holdup Tank (WHT) via above ground piping for treatment and release through the LWMS effluent release piping. Details are provided in the response to CP RAI #29 and FSAR Section 11.2.

   During plant restart after refueling, SGBD is flashed directly into the startup SGBD flash tank located outside the T/B. The startup SGBD flash tank is equipped with its own heat exchanger to lower the temperature of the blowdown for release to the existing waste water management Pond C. The condensate exits the bottom of the startup SGBD flash tank, is cooled by the heat exchanger, and its contamination level is monitored by a radiation element designed to detect gross gamma. At this point, the piping is split into a condensate return line and a discharge line. When a pre-determined setpoint is reached, the radiation monitor initiates signals to alarm in the MCR for operator action, to close the isolation valve located in the discharge line to Pond C, and to open the valve for the return line to forward the flashed blowdown water to the WHT in the LWMS for further processing and release.

   Existing Pond C is a low volume waste retention pond with double synthetic liners and a leachate collection system currently used by Units 1 and 2 (FSAR Subsection 10.4.8.2.1).

   The condensate return line from the startup SGBD equipment to the WHT in the A/B runs above ground and is kept as short as practical before it penetrates the building wall back to the T/B. The piping is then run in pipe chases inside the T/B to the WHT in the A/B to minimize pipe leakage to the outside. Leakage inside the T/B and A/B is collected in sumps for processing. The short piping with insulation jackets located outside is inspected periodically to check for leakage. Turbine building wall penetration sleeves are provided to direct potential leakage into the T/B sumps for collection and treatment.

During SG restart operation, which is anticipated to be a few hours for each SG restart, the condensate is cooled and is directed to Pond C for release. This discharge line consists of the following piping segments (see Figure 12.3-201):

- Single-walled stainless steel pipe from the startup SGBD heat exchanger up to and including the radiation monitor and the valves associated with the startup SGBD equipment. This line section includes the condensate return line and the discharge piping;
- Of the two discharge piping segment, including the portion through the wall penetrations, the first piping segment between the Startup SGBD system and the T/B (going to the Waste Holdup Tanks) is single-wall stainless steel piping and is insulated and wrapped for protection against the environment. The second piping segment between the Startup SGBD system and the T/B (going to Pond C) is double-wall carbon steel piping;
- Inside the T/B, the discharge piping transferring effluent to the WHTs is connected to single-wall stainless steel piping routed in pipe chases. The other piping segment transferring effluent to Pond C is connected to single-wall carbon steel piping also routed in pipe chases;
- From the pipe chase, the discharge pipe exits the T/B penetration and is routed as single-wall carbon steel piping in a concrete trench from the T/B to the transition manhole downstream of the CSTs. This portion of piping is in the same concrete trench as the condensate transfer piping to the CST. The concrete trench is sloped and has an epoxy coating to facilitate drainage. This design eliminates liquid accumulation in the trench and minimizes unintended release. Using single-wall carbon steel pipe in the trench facilitates additional radial cooling of the fluid and enables the use of HDPE piping for underground burial;
- From the transition manhole, the discharge piping is connected to buried double-wall HDPE piping to Pond C for discharge. A transition manhole is constructed near the plant pavement boundary. HDPE pipe has good corrosion resistance in the soil environment.
- The trench and the double-wall HDPE piping are both sloped towards the nearby manhole so that leakage can be collected at the manholes. This approach also facilitates determination of which segment of pipe that is leaking. Analysis of samples of the liquid collected in the manholes can also determine if the leakage is rain water, groundwater, or condensate.

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 leakage and provides accessibility to facilitate periodic hydrostatic or pressure testing or visual inspection to maintain pipe integrity, and is compliant with RG 4.21. COL Item 12.3(10) is included in DCD Tier 2 to implement the site-specific design features of the startup SGBDS to minimize leakage.

Other piping associated with SGBD operation and other systems that carry radioactively contaminated liquid or that may become contaminated are designed with welded connections to reduce leakage through flanged or screwed connections. Piping materials are compatible with the transferred fluid to preserve water quality and minimize pipe corrosion for the life of the plant.

FSAR Subsection 10.4.8.2.1 has been revised to include the startup SGBD piping information.

3. The following response is based upon the MHI response to DCD RAI 578-4483 and is included here for informational purposes only.

   The condensate polishing system (CPS) is located on the second floor of the T/B. The CPS is designed to remove dissolved ionic solids and impurities from the condensate and to assist in the removal of suspended corrosion products. The condensate still contains a small amount of tritium due to tritium diffusion in the SG tubes and minor primary-to-secondary leakage. Valve and piping leakage inside the T/B is collected in the T/B sumps for analysis. If it is determined to be contaminated, the leakage is forwarded to the LWMS for processing.

   The CPS cleans up the entire condensate inventory in the hotwell before plant startup and is also used to maintain desired water chemistry during normal operation. The condensate after treatment is returned to the hotwell or sent to the CST to maintain liquid level in the hotwell. The CST is located in the yard and is connected to the hotwell via a condensate transfer pipe which transfers condensate from the hotwell at high liquid level, and transfers makeup at low hotwell liquid level. As a result of industry lessons learned on underground piping, the condensate transfer pipe is comprised of single-wall, welded stainless steel piping in a coated trench with removable covers. This design is supplemented by operational programs which include periodic hydrostatic or pressure testing of pipe segments, instrument calibration, and when required, visual inspection and maintenance of piping, trench, and instrument integrity. The trench is designed with removable, but sealed covers, to minimize the infiltration of precipitation, and to provide the capability to maintain, repair, and replace the piping and trench coating when needed. The trench is sloped downward toward inspection manholes which contain drain collection basins and liquid level switches. When fluid is detected, the instrument initiates alarms for operator action that include inspection, sampling, and analysis to determine the characteristics and source of the fluid, and extraction of the fluid for treatment and disposal. The provisions of inspection manholes, leak detection instruments, and testing of the piping, minimize the need to remove the trench covers to maintain the integrity of the seals. Sections of the manholes are removed only when leakage is detected or when trench repair is needed. The concrete trench has an epoxy coating to facilitate drainage and minimize unintended release. This design approach provides maximum accessibility to inspect and test the pipe and the trench, and prompt detection of leakage for operator action. Thus this design approach is compliant with the guidance of RG 4.21. COL Item 12.3(10) is included to implement the site-specific design features and operational programs to prevent and/or minimize leakage.

   DCD Subsection 9.2.6.2.4 as revised by the MHI response to DCD RAI 578-4483 and incorporated by reference in the CPNPP Units 3 and 4 FSAR addresses the CST piping design.

4. Distilled water from the boric acid evaporator is normally sent from the evaporator condenser in the A/B to each primary makeup water tank (PMWT) located outside the north wall of the A/B. Alternatively, the distilled water is sent to the WHT located at a lower level inside the A/B for processing. The piping is welded to the extent practical to reduce leakage because the distilled water contains tritium. The piping to and from the PMWT is single-wall stainless steel pipe designed to run above ground and penetrates the building wall directly into the tank. This piping is mostly in pipe chases inside the A/B. For piping between buildings, penetration sleeves are provided to collect and direct any leakages back into the building for further processing. The PMWTs and the Refueling Water Storage Auxiliary Tank are housed in a tank enclosure which protects the tanks and the piping from the environment. Similar piping is provided for the PMWTs carrying recycle water back to the A/B. This design is supplemented by operational programs which include periodic hydrostatic or pressure testing of pipe segments, and when required, visual inspection and maintenance of piping, trench and instrument integrity.

DCD Subsection 9.2.6.2.6 as revised by the MHI response to DCD RAI 578-4483 and incorporated by reference in the CPNPP Units 3 and 4 FSAR addresses the PMWT piping design.

5. The CCW/SFP heat exchangers for the US-APWR incorporate specific features reflecting operating experience from EPRI TR 1013470. The purchase specification for the CCW/SFP plate-type heat exchanger requires the manufacturer to provide recommendations regarding the types of preventive maintenance activities and their frequency. These include, as indicated in the EPRI report, preventive maintenance for plate heat exchangers generally consisting of cleaning and regasketing. In addition, plates can be chemically cleaned to remove scale buildup and other deposits. Damaged plates can be replaced. Gasket lifetime depends on process variables such as operating temperature, temperature variations, differential pressure, compatibility with the fluids involved, and the environment in which the plate heat exchanger is installed. Irrespective of the time the plate heat exchanger is actually used or in operation, the gaskets are subject to physical aging and chemical deterioration-swelling or shrinkage, hardening, loss of sealing force, cracking, and blowout of the gasket. The gasket material specified by the manufacturer is based on the maximum pressure, temperature, and process fluid constituents. Gaskets for the CCW/SFP heat exchangers will be replaced in accordance with the site-specific preventive maintenance program based on manufacturer’s recommendations.

   In the next revision of the DCD currently scheduled for March 2011, Subsection 9.1.3.2.1.3 will be revised to include the operating experience discussed in EPRI TR 1013470 as follows:

   > The design of the SFP heat exchangers incorporates specific features regarding industry operating experience discussed in EPRI TR 1013470 to minimize leakage from plate-type heat exchangers.

   The potential manufacturers for the US-APWR CCW/SFP include the same vendors listed in Table 5-1 of the EPRI report.

   The US-APWR ESWS design assures that the CCW HX operating pressure on the ESW side is not higher than the CCWS operating pressure. Thus, any leakage is from the CCW to the ESWS. Therefore, the service water does not contaminate the demineralized CCW. The system is designed to detect and preclude release of radioactive contaminants to the environment. Radioactive contaminants may enter the ESWS from the CCWS. Radiation monitors are provided in each discharge line of CCW HX ESW side. These monitors alert the operator if the leaking CCW contains radioactivity so that the operator can isolate the leaking train.

   The CCW HXs are located in the R/B on EL 845’-9”. Each CCW HX is located in a separate room with its associated CCW pump. The SFP HXs are located in the R/B on EL 823’-0”. Each SFP HX is located in a separate room. Any leakage from the SFP HXs is collected by the floor drains in R/B sump tanks and pumped to the waste holdup tanks. Any leakage from the CCW HXs is collected by the floor drains in R/B non-radioactive sumps and pumped to the T/B sump for disposal. If radioactivity is detected in the leakage, the floor drains are transferred to the waste holdup tanks directly or via the T/B sump.

   For site-specific SSCs, FSAR Subsection 12.3.1.3.2 states that programs and procedures are implemented consistent with NEI 08-08A to meet the site-specific, operational and post-construction objectives of RG 4.21 and the requirements of 10 CFR 20.1406. FSAR Table 12.3-201 has been added to specifically address the site-specific design aspects of RG 4.21.

Attachment

FSAR Rev 1 Figure 11.2-201 Sheet 10

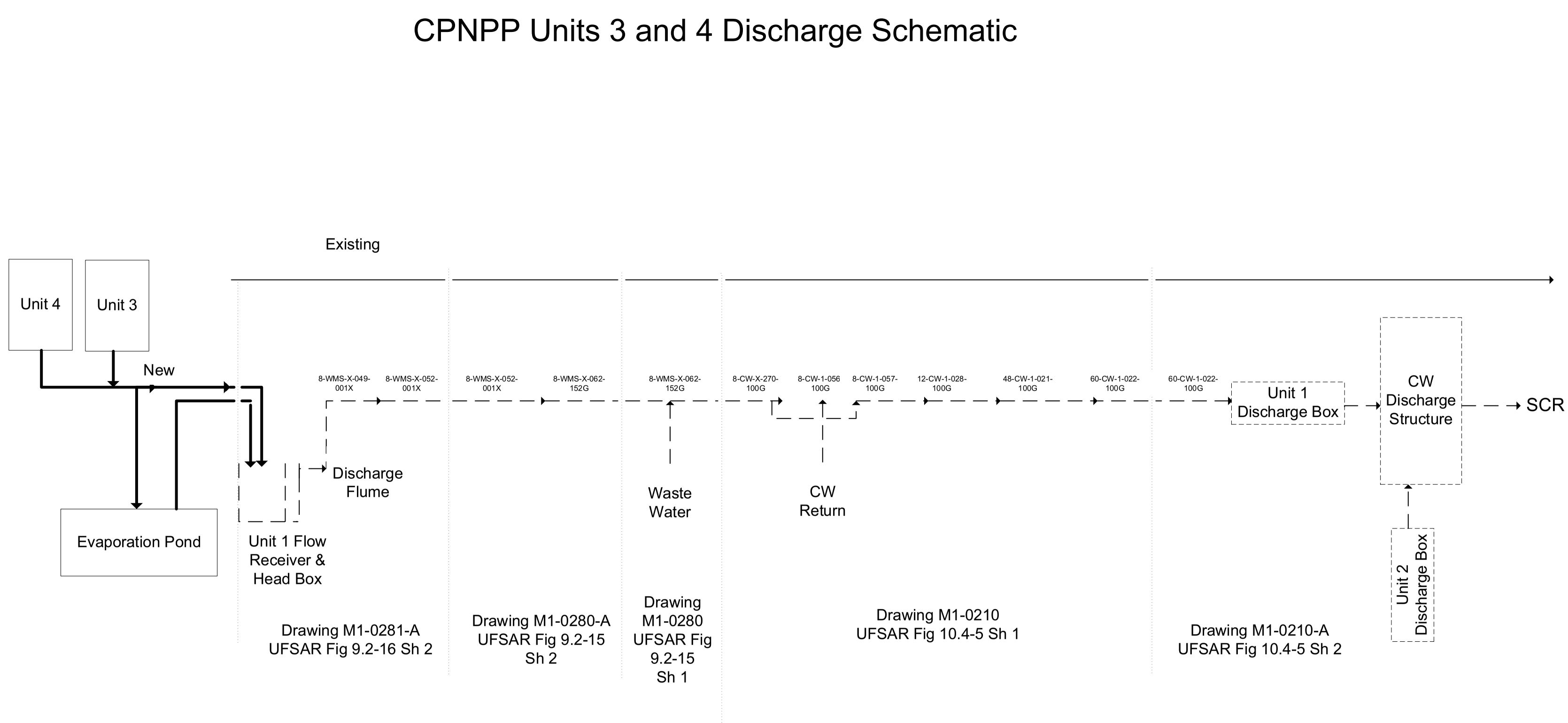
Impact on R-COLA

See marked-up FSAR Revision 1 pages 1.9-16, 10.4-7, 10.4-8, 11.2-3, 11.2-9, 11.2-10, 12.1-2, 12.1-3, 12.3-1, 12.3-2, 12.3-4; new pages 12.3-5, 12.3-6, 12.3-7, and 12.3-8; and new FSAR Figure 12.3-201.

Impact on DCD

None.

Attachment 1 to RAI #135
Question 12.03-12.04-11



CP COL 11.2(6)

Figure 11.2-201 Liquid Waste Management System Piping and Instrumentation Diagram (Sheet 10 of 10)

CP COL 1.9(1)

Table 1.9-202

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

RG Number	RG Title	Revision/Date	COLA/FSAR Status	Corresponding Chapter/Section	
4.7	General Site Suitability Criteria for Nuclear Power Stations	Revision 2 April 1998	Conformance	2.1 2.4.12 2.4.13 2.5.5	
4.15	Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination) – Effluent Streams and the Environment	Revision 2 July 2007	Conformance with exceptions (QA requirements meet existing active radiological monitoring program for CPNPP Units 1 and 2.)	11.5 12.5	RCOL2_14.02.01-1
4.21	Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning	June 2008	Conformance	11.2.3.1 11.2.3.4 12.3.1.3.1.1 12.3.1.3.2 and Table 12.3-201	RCOL2_12.03-12.04-1 RCOL2_12.03-12.04-11

The SGBDS also includes startup SG blowdown flash tank, startup blowdown heat exchanger, piping, valves and instrumentation used during plant startup and abnormal water chemistry conditions.

CP COL 10.4(2) Replace the thirteenth and fourteenth paragraph in DCD Subsection 10.4.8.2.1 with the following.

During plant startup, the blowdown rate is up to approximately 3 % of maximum steaming rate (MSR) at rated power. The blowdown from each SG flows to the startup SG blowdown flash tank. The blowdown lines from SGs A and B and the blowdown lines from SGs C and D are joined together before flowing to the startup SG blowdown flash tank.

The blowdown water from each SG is depressurized by a throttle valve located downstream of the isolation valves located in the startup blowdown line. The throttle valves can be manually adjusted to control the blowdown rate.

The depressurized blowdown water flows to the startup SG blowdown flash tank, where water and flashing vapor are separated. The vapor is diverted to the condenser and the water flows to the startup SG blowdown heat exchanger for cooling. The CWS cools blowdown water in this heat exchanger before discharging to the existing waste water management Pond C. Pond C has 6.7×10^6 gal storage capacity.

This discharge line consists of the following piping segments: RCOL2_12.03-12.04-11

1. Single-walled stainless steel pipe from the startup SGBD heat exchanger up to and including the radiation monitor and the 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 single-walled stainless steel piping and is insulated and wrapped for protection against the environment. 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;

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 Waste Management Pond C) is connected to single-walled carbon steel piping and is also routed in pipe chases;

4. From the 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 (CST). This portion of the piping is in the same concrete trench as the condensate transfer piping to the CST. The concrete trench is sloped and has an epoxy coating to facilitate drainage. This design eliminates liquid accumulation in the trench and thus minimizes unintended release. Using single-wall carbon steel pipe in the trench facilitates additional radial cooling of the fluid and enables the use of High Density Polyethylene (HDPE) piping for underground burial; RCOL2_12.03-12.04-11

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.

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, provided in Subsection 12.3.1.3.1. A radiation monitor located downstream of the startup SG blowdown heat exchanger measures 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 waste holdup tank in the LWMS. The location and other technical details of the monitor (RMS-RE-110) is described in Subsection 11.5.2.5.3 and Table 11.5-201~~will be developed during the detail design phase~~. RCOL2_11.05-2

With abnormal water chemistry, the flow of blowdown rate up to approximately 3 % of MSR at rated power is directed to the existing waste water management pond C via the startup SG blowdown flash tank for processing. In this mode, flashed vapor from the startup SG blowdown flash tank flows to the deaerator.

During normal operation, blowdown rate is approximately 0.5 to 1 % of MSR at rated power. At the 1% of MSR at rated power blowdown rate, both cooling trains are used.

CP COL 10.4(2) Add the following text after last bullet of the seventeenth paragraph in DCD Subsection 10.4.8.2.1.

- High radiation signal from startup SG blowdown water radiation monitor flow. The joined flows from the Unit 1 and 3 condenser water boxes are then sent to the SCR via the Unit 1 and 2 discharge tunnel and outfall structure from all four units (see Figure 11.2-201 Sheet 10) for a visual representation of the above described flow path.

The header where the WMS intersects with the CWS is located within the Unit 1 Turbine building. The header contains two flow balancing valves (1CW-247 and 1CW-248) for Units 1 and 2. This arrangement ensures that there is always circulating cooling water flow for Unit 1 and/or Unit 2. The circulating water discharge piping then becomes progressively larger and flows freely (no valves) into the Unit 1 condenser water discharge box. This flow path also ensures there is less back pressure into the treated effluent flow. Based on the fact that the effluent piping flows freely into the box and that there is less back pressure, there is no need for a mixing orifice and backflow preventer, as the large circulating water return flow and length of pipe is sufficient to thoroughly mix the release.

The bypass valve, VLV-531, is located in the same area with the radiation monitor and the discharge control valves (RCV-035A and RCV-035B), which are inside the Auxiliary Building. All normal discharge is required to go through the discharge control valves. To ensure discharge operation is not interrupted by the failure of the control valves at any time, a bypass valve is added around the radiation monitor and the discharge control valves.

Any leakage from the ~~bypass~~piping and the valves inside the buildings is collected in the floor drain sump, and is forwarded to the waste holdup tank for re-processing. It should be noted that the discharge control valves are downstream of the discharge isolation valve (AOV-522A and AOV-522B). During normal operations, the discharge is anticipated to occur once a week for approximately three hours for treated effluent, and one discharge (approximately an hour at 20 gpm) of detergent waste (filtered personnel showers and hand washes) daily. After each discharge, the line is flushed with demineralized water for decontamination. RCOL2_12.03-12.04-11

The bypass valve is normally locked-closed and tagged. It requires an administrative approval key to open and the valve position is verified by at least two technically qualified members of the CPNPP Operations staff before discharge can start. Thus, a single operator error does not result in an unmonitored release. In the unlikely event that the valve is inadvertently left open, or partially open, the flow element detects flow and initiate an alarm for operator action. Also, at least a portion of the flow goes through the radiation monitor. If the monitor reaches the high setpoint, it sends signals to initiate pump shutdown, valve closure and operator actions.

ii. liquid limit greater than 30%

iii. plasticity index greater than 15

iv. a minimum thickness of two feet

v. Permeability equal to or less than $1x10^{-7}$centimeter per second

- Soil compaction will be 95% standard proctor density at optimum moisture content
- The pond is protected from inundation by a ten-year 2 hour rainfall event

The evaporation pond is equipped with a centrifugal pump to return the contents to the Squaw Creek Reservoir as tritium concentration in Squaw Creek Reservoir permits. The return piping leaving the evaporation pond is connected to the circulating water return line discharge box upstream of the discharge point. 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.

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: RCOL2_12.03-12.04-11

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-wall High Density Polyethylene (HDPE) piping from the T/B wall to the yard near the CST. This portion of pipe is run via the condensate transfer 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. RCOL2_12.03-12.04-11

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.~~The piping for transporting the fluid from the discharge valve inside the Auxiliary Building to the pond, and the piping from the pond to the discharge point near Squaw Creak Reservoir , are High Density Polyethylene material. Leak collection and detection instrumentation are provided along the path of the pipe. Inspection ports are also provided to allow access for inspection of the integrity of the pipe.~~ A back flow preventer is provided near the CPNPP Units 1 and 2 discharge boxes to prevent back flow from the circulating pipe.

Evaporation Pond Design Summary:

Volume: ~~1.4~~2.1 million gallon net capacity RCOL2_11.02-8

Surface area: 1.5 acre

Depth: Total 6 feet deep (4 feet liquid depth with 2 feet freeboard)

Type: Open with no cover

Liner material: High Density Polyethylene, 60 mils, two layers

Permeability: 1×10^{-7} cm/sec

The evaporation pond contains treated liquid effluents in trace amounts that meet discharge requirements specified in 10 CFR 20 Appendix B, Table 2, and has radionuclide contents below that of the boric acid tank contents. Hence, the contamination level due to the failure of the evaporation pond is bounded by the failure of the boric acid tanks.

The evaporation pond is designed to meet and operate in accordance with RG 4.21. Preventive maintenance, monitoring and routine surveillance programs are an important part to minimize the potential for contamination. Leakage detection design and its instruments, radiation monitors are added for early detection to prevent spread of contamination. The current CPNPP pond management program is expanded to include the above requirements for the evaporation pond and its supporting components including the radiation monitor, pumps and valves. RCOL2_11.02-8

Operating procedures will need to be developed to limit the use of the pond to receive treated effluent on as needed basis and the pond will need to be washed

12.1.3 Operational Considerations

CP 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) ~~in combination with existing or modified CPNPP Units 1 and 2 site program information~~. The program follows the guidance of RG 8.2, 8.4, 8.6, 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. RCOL2_12.05-3

CP COL 12.1(6)
CP COL 12.1(7) Replace the last sentence of third paragraph in DCD Subsection 12.1.3 with the following.

STD COL 12.1(8)

~~To achieve this objective, two kinds of operational procedures are developed. First operational procedures are developed to~~COL Applicant performs periodic reviews of operational practices to ensure that operating procedures ~~are revised to~~ reflect the installation of new or modified equipment, personnel qualification and training are kept current, and facility personnel are following the operating procedures. ~~The other operational procedures are developed to track implementation of requirements for record retention according to~~In accordance with 10 CFR 50.75(g) and 10 CFR 70.25(g) as applicable, ~~. This~~ 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, ~~is~~are used to facilitate decommissioning. ~~These procedures are addressed in the Plant Radiation Protection Procedures, described in 13.5.2.2.~~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. RCOL2_12.03-12.04-11 RCOL2_12.03-12.04-11 RCOL2_12.03-12.04-11

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.*

CP 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.

CP 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. RCOL2_12.03-12.04-11

CP 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. RCOL2_12.03-12.04-11

CP 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.

12.3 RADIATION PROTECTION DESIGN FEATURES

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

12.3.1.2.1.1 Radiation Zoning

CP 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 CPNPP Units 3 and 4 plant arrangement plan under normal operation/shutdown conditions are shown in Figure 12.3-1R (COL information provided on Sheet 1 of 34).

12.3.1.2.2 Accident Conditions

CP SUP 12.3(1) Add the following information after the last sentence of the second paragraph in DCD Subsection 12.3.1.2.2.

The essential service water (ESW) pipe tunnel structure at elevation 793'-1" has been changed in the site-specific layout. However, the radiation protection design in DCD Chapter 12 is not affected by the modification of ESW pipe tunnel structure, and Figures 12.3-2 through 12.3-6 can be used except for the structure of ESW pipe tunnel. Thus, these figures are not replaced in Final Safety Analysis Report (FSAR) Chapter12. The structure of the ESW pipe tunnel is shown on Figure 1.2-2R.

12.3.1.3.1 Design Considerations

RCOL2_12.03-12.04-11

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. RCOL2_12.03-12.04-11

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)
CP 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.

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) ***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.

CP 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.* RCOL2_12.03-12.04-11

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

CP COL 12.3(10)

RCOL2_12.03-12.04-11

Table 12.3-201

Regulatory Guide 4.21 Design Objectives and Applicable FSAR Subsection Information for Minimizing Contamination and Generation of Radioactive Waste (Sheet 1 of 4)

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 single-walled stainless steel piping and is insulated and wrapped for protection against the environment. 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 ; 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 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. The conrete trench is sloped and has an epoxy coating to facilitate drainage. This design eliminates liquid accumulation in the trench and thus minimizes unintended release. Using single-wall 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;	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)

RCOL2_12.03-12.04-11

Table 12.3-201

Regulatory Guide 4.21 Design Objectives and Applicable FSAR Subsection Information for Minimizing Contamination and Generation of Radioactive Waste (Sheet 2 of 4)

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		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. 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.	
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

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Table 12.3-201

Regulatory Guide 4.21 Design Objectives and Applicable FSAR Subsection Information for Minimizing Contamination and Generation of Radioactive Waste (Sheet 3 of 4)

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-wall High Density Polyethylene (HDPE) piping from the T/B wall to the yard near the CST. This portion of pipe is run via the condensate transfer 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.		

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Table 12.3-201

Regulatory Guide 4.21 Design Objectives and Applicable FSAR Subsection Information for Minimizing Contamination and Generation of Radioactive Waste (Sheet 4 of 4)

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

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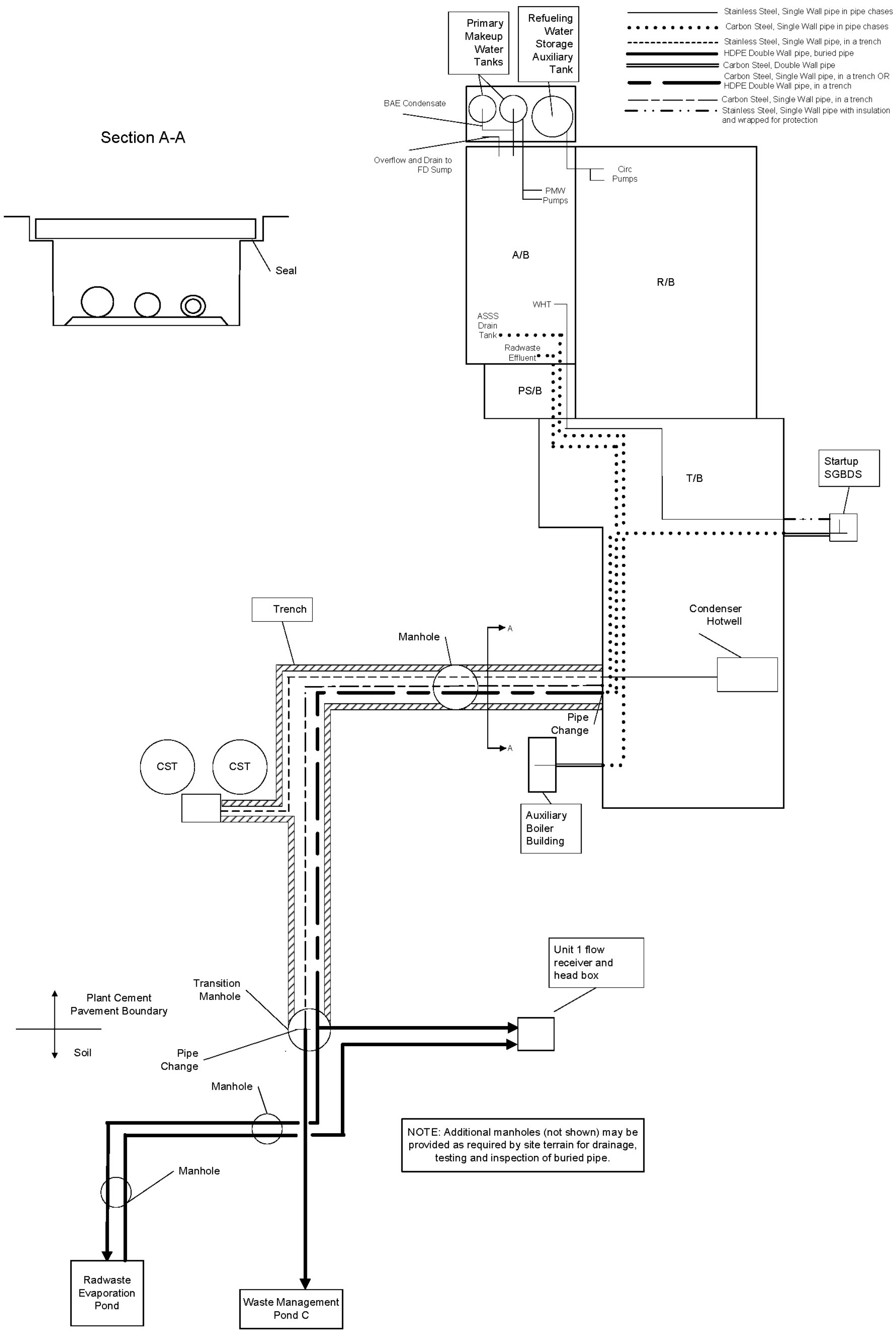
3-12.04-11



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