Luminant

Rafael Flores
Senior Vice President &
Chief Nuclear Officer
rafael.flores@luminant.com

Luminant Power
P O Box 1002
6322 North FM 56
Glen Rose, TX 76043

T 254.897.5590
F 254.897.6652
C 817.559.0403

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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
RESPONSES TO REQUESTS FOR ADDITIONAL INFORMATION NO. 2747 AND 3214

Dear Sir:

Luminant Generation Company LLC (Luminant) hereby submits the attached responses to Requests for Additional Information No. 2747 (CP RAI #29), and No. 3214 (CP RAI #28) for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. The FSAR pages changed as a result of these responses are presented in Attachment 3. Should you have any questions regarding these responses, please contact Don Woodlan (254-897-6887, Donald.Woodlan@luminant.com) or me.

The commitments made in this letter are listed on Page 3.

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

Executed on September 24, 2009.

Sincerely,

Luminant Generation Company LLC

Donald R. Woodlan for

Rafael Flores

Attachments:
1. Response to Request for Additional Information No. 2747 (CP RAI #29)
2. Response to Request for Additional Information No. 3214 (CP RAI #28)
3. Marked-up FSAR Pages

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Electronic Distribution w/attachments

mike.blevins@luminant.com
Brett.Wiggs@luminant.com
Rafael.Flores@luminant.com
mlucas3@luminant.com
jeff.simmons@energyfutureholdings.com
Bill.Moore@luminant.com
Brock.Degeyter@energyfutureholdings.com
rbird1@luminant.com
Matthew.Weeks@luminant.com
Allan.Koenig@luminant.com
Timothy.Clouser@luminant.com
Ronald.Carver@luminant.com
David.Volkening@luminant.com
Bruce.Turner@luminant.com
Eric.Evans@luminant.com
Robert.Reible@luminant.com
donald.woodlan@luminant.com
John.Conly@luminant.com
Jean.Amundson@luminant.com
JCaldwell@luminant.com
David.Beshear@txu.com
Ashley.Monts@luminant.com
Fred.Madden@luminant.com
Dennis.Buschbaum@luminant.com
Carolyn.Cosentino@luminant.com
James.Hill2@luminant.com

masahiko_kaneda@mnes-us.com
masanori_onozuka@mnes-us.com
ck_paulson@mnes-us.com
joseph_tapia@mnes-us.com
russell_bywater@mnes-us.com
diane_yeager@mnes-us.com
kazuya_hayashi@mnes-us.com
mutsumi_ishida@mnes-us.com
nan_sirirat@mnes-us.com
rjb@nei.org
kak@nei.org
michael.takacs@nrc.gov
cp34update@certrec.com
michael.johnson@nrc.gov
David.Matthews@nrc.gov
Balwant.Singal@nrc.gov
Hossein.Hamzehee@nrc.gov
Stephen.Monarque@nrc.gov
jeff.ciocco@nrc.gov
michael.willingham@nrc.gov
john.kramer@nrc.gov
Brian.Tindell@nrc.gov
Elmo.Collins@nrc.gov
Loren.Plisco@nrc.com
Laura.Goldin@nrc.gov
James.Biggins@nrc.gov
Susan.Vrahoretis@nrc.gov
sfrantz@morganlewis.com
tmatthews@morganlewis.com

Regulatory Commitments in this Letter

This communication contains the following new or revised commitments which will be completed or incorporated into the CPNPP licensing basis as noted:

Number	Commitment	Due Date/Event
6461	The FSAR will be revised in the next COLA revision to indicate the basic events and RAW values of the site-specific events (i.e., failure of cooling tower fans) that are different from the reference US-APWR DCD.	COLA Revision 1 November 2009
6471	Site-specific key assumptions and design features will be described in the subsection that references DCD Table 19.1-115. Design features and key assumptions that will be included in the FSAR are: - Design features and assumptions that contribute to high reliability of continuous operation after the 24 hour mission time. - Design features to prevent degradation of the ESWS caused by overfilling of the basin due to failure in the transfer pump or circulation system. It is assumed that a drain line is provided as overfill protection of the basin to prevent failing the pump(s). - Backup actions to avoid excessive room heatup in the event of loss of ESW room ventilation. Preparation of operational procedures to avoid excessive room heat up is assumed. - Seismic capacity of plant-specific systems, structures, and components (SSCs).	COLA Revision 1 November 2009
6481	Plant high confidence of low probability of failure (HCLPF) values for the plant-specific SSCs, such as cooling towers, will be confirmed with a calculation using EPRI TR-103959 methodology after completion of seismic design and stress analysis of the SSCs.	Mid - 2010
6491	When the seismic margin analysis for the design certification is available, we will confirm that the analysis envelopes the plant-specific design.	Mid - 2010

The Commitment Number is used by Luminant for internal tracking.

Attachment 1

Response to Request for Additional Information No. 2747 (CP RAI #29)

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.: 2747 (CP RAI #29)

SRP Section: 11.02 – Liquid Waste Management System

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

DATE OF RAI ISSUE: 8/14/2009

QUESTION NO.: 11.02-1

Technical Rationale Section 6 of Standard Review Plan (SRP) Section 11.2, "Liquid Waste Management System," (LWMS) states, "Compliance with GDC 61 requires that the LWMS and other systems (as permanently installed systems or in combination with mobile systems) that may contain radioactivity shall be designed to ensure adequate safety under normal and postulated accident conditions. This criterion specifies that such facilities shall be designed with a capability to permit inspection and testing of components important to safety and with suitable shielding for radiation protection."

Similarly, Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," Section C.I.11.2 states, "Discuss any mobile or temporary equipment used for storing or processing liquid radwaste in accordance with RG 1.143. For example, this includes discussion of equipment containing radioactive liquid radwaste in the nonseismic radwaste building. If this guidance is not followed, describe the specific alternative methods used. Describe system design features and operational procedures used to ensure that interconnections between plant systems and mobile processing equipment avoids the contamination of nonradioactive systems and uncontrolled releases of radioactivity in the environment (see IE BL-80-10, 'Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity in the Environment,' dated May 6, 1980, and RG 1.11 for details). Discuss system capability of and requirements for utilizing mobile processing equipment for refueling outages."

(1) With respect to mobile or temporary equipment, include in the FSAR a discussion of how contracted mobile systems and temporary equipment would meet Regulatory Guide (RG) 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants."

(2) Additionally, include in the FSAR discussions of capability to permit inspection, testing of components, shielding, and operational procedures for contracted mobile systems and/or temporary equipment.

ANSWER:

(1) Process and utility piping and electrical connections are provided to forward liquid waste to a future mobile system or temporary equipment, for CPNPP Units 3 and 4. Process piping has connectors different from the utility connectors to prevent cross-connection and contamination. The use of mobile or temporary equipment will require Luminant to address applicable regulatory requirements and guidance such as 10 CFR 50.34a, 10 CFR 20.1406 and RG 1.143. As such the purchase or lease contracts for any temporary and mobile equipment will specify the applicable criteria.

(2) The inspection, testing of components, and shielding for such equipment will be specified in the purchase or lease contracts and evaluated and approved prior to use, based on regulatory requirements and guidance such as RG 4.21 and RG 1.143. The operating procedures will be implemented and training will be complete prior to use of the equipment.

<u>Impact on R-COLA</u>

Attached FSAR Revision 0 page 11.2-1 mark up is revised to reflect this response.

See attached changes for page 11.2-1. Because of text additions and deletions, the page numbers on the marked-up FSAR pages may not be the same as the page numbers in FSAR Revision 0.

<u>Impact on S-COLA</u>

None.

<u>Impact on DCD</u>

None.

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.: 2747 (CP RAI #29)

SRP Section: 11.02 – Liquid Waste Management System

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

DATE OF RAI ISSUE: 8/14/2009

QUESTION NO.: 11.02-2

Regulatory Guide 1.206 Section C.III.4.3 states, "The COL applicant should identify, in Chapter 1 of the FSAR portion of the COL application, the COL information items that cannot be resolved completely before the COL is issued. The COL applicant should provide sufficient information on these items to support the NRC licensing decision and also propose a method for ensuring the final closure of the item following issuance of the COL."

- FSAR Section 11.2.2, "System Description," states, "The shape of the flow orifices and other technical details will be developed in the detail design phase. Subsection 11.2.3.1 discusses the design of the evaporation pond and return line connections."

  (1) Elaborate on what other technical details need to be developed.

  (2) Justify why this information is not included in the FSAR.

  (3) Justify why the resolution of these technical details does not require an ITAAC.

  (4) If Luminant proposes resolving these issues through a regulatory commitment, provide a time frame and document it in the FSAR.

- FSAR Section 11.2.3.1, "Radioactive Effluent Releases and Dose Calculation in Normal Operation," states, "The exact locations of the connections into the circulating water discharge header is determined in the detail design phase with consideration of the impact of sharing structure, system, and components (SSCs) among the nuclear units."

  (1) Justify why this information is not included in the FSAR.

  (2) Justify why the resolution of these issues does not require an ITAAC.

  (3) If Luminant proposes resolving these issues through the use of a regulatory commitment, provide a time frame and document it in the FSAR.

(4) Finally, discuss how the requirements of 10 CFR Part 50, Appendix General Design Criterion 5, "Sharing of structures, systems, and components," are met.

ANSWER:

A. Response to FSAR Subsection 11.2.2

(1) The only technical detail that was deferred was the orifice size, shape, and location. The actions to develop the orifice size, shape and other technical details pertaining to the liquid release flow orifice originally described in Subsection 11.2.2 have been determined to be unnecessary for the following reasons:

The treated liquid effluents released from 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 which 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 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 into this header from either 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 box 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.

(2) FSAR Subsection 11.2.2 has been updated to include the above design information.

(3) Based on the response to A (1) above, an ITAAC is not required.

(4) Based on the response to A (1) above, a commitment is not required.

B. Response to FSAR Subsection 11.2.3.1

(1) Based on response to A (1) above, FSAR Subsection 11.2.3.1 has been revised with the design information.

(2) Based on response to A (1) above, an ITAAC is not required.

(3) Based on response to A (1) above, a commitment is not required.

(4) The treated effluent release piping is non-safety and does not have any safety function. Treated liquid effluent is discharged into the SCR via the Unit 1 CW discharge outfall via the flow path described above in A(1). The WMS and the CWS are not required for: emergency cool down, operation of the engineered safeguard systems, or, cooling during shutdown of the Reactor Coolant System. The circulating water system, including the discharge box, is not required to perform any safety function or important to safety function. Hence, the requirements of 10 CFR 50, Appendix A, General Design Criterion 5 are not applicable.

Impact on R-COLA

Attached FSAR Revision 0 pages 11.2-2, 11.2-3, 11.2-17 through 11.2-25 mark up are revised to reflect this response.

See attached changes for pages 11.2-2, 11.2-4, 11.2-22 through 11.2-31. Because of text additions and deletions, the page numbers on the marked-up FSAR pages may not be the same as the page numbers in FSAR Revision 0.

Impact on S-COLA

None.

Impact on DCD

None.

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.: 2747 (CP RAI #29)

SRP Section: 11.02 – Liquid Waste Management System

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

DATE OF RAI ISSUE: 8/14/2009

QUESTION NO.: 11.02-3

Acceptance Criteria 5 of NUREG-0800, Standard Review Plan Section 11.2 states, "System designs should describe features that will minimize, to the extent practicable, contamination of the facility and environment; facilitate eventual decommissioning; and minimize, to the extent practicable, the generation of radioactive waste, in accordance with the guidelines of Regulatory Guide 1.143, for liquids and liquid wastes produced during normal operation and anticipated operational occurrences, and the requirements of 10 CFR 20.1406, or the DC application, update in the SAR, or the COL application, to the extent not addressed in a referenced certified design."

FSAR Section 11.2.3.1, "Radioactive Effluent Releases and Dose Calculation in Normal Operation," states, "A portion of the liquid effluent from [Comanche Peak Nuclear Power Plant] CPNPP Units 3 and 4 discharge header can be diverted to an evaporation pond located within the site boundary...The evaporation pond can also receive 100 percent of the liquid effluent on a temporary basis."

(1) Describe in the FSAR how the effluent holdup (evaporation) pond will meet the guidance of SRP Section 11.2, "Liquid Waste Management System," and RG 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants," Revision 2, November 2001, or justify an alternative.

(2) Justify why radiation monitors downstream of the effluent holdup pond are not included, and further describe how releases from the effluent holdup pond are suitably controlled.

(3) Discuss provisions for sampling of the effluent holdup pond or justify why these provisions are not discussed.

(4) Clarify how the requirements of 10 CFR 20.1406, "Minimization of Contamination," are met.

(5) Discuss in the FSAR the seismic and quality group classification of the effluent holdup pond and explain how it meets the other recommendations of RG 1.143, or justify an alternative.

ANSWER:

(1) As discussed in DCD Subsection 11.2.2, the Liquid Waste Management System (LWMS) boundary ends at the isolation valve of the discharge lines to a tank or the discharge header. The evaporation pond is not part of the LWMS because the pond only contains treated effluent for discharge. Unlike the waste monitor tanks, which could contain off-specification effluent that may need to be re-processed, the evaporation pond is designed to manage the tritium concentration in Squaw Creek Reservoir (SCR) by providing temporary holdup of treated effluent for discharge. Evaluating the dose contribution from the evaporation pond (conservatively assuming 50% evaporation of the diverted flow) amounts to 1.15E-01 mrem/yr (Adult's GI-Tract) described in FSAR Table 11.3-204 and the combined dose from the vent stack gaseous emission and the evaporation pond emission amounts to 2.37E+00 mrem/yr (Adult's GI-Tract) described in FSAR Table 11.3-205, which is well within the 10 CFR 50 Appendix I limit. Based on the above, the evaporation pond meets the acceptance criteria of SRP 11.2. RG 1.143 does not provide any guidance on specific design requirements for an evaporation pond. Hence RG 1.143 is not applicable to the design of the evaporation pond.

(2) A radiation monitor has been added to the discharge line downstream of the evaporation pond. The radiation monitor is set to alarm in the unlikely event that the effluent exceeds the radiation setpoint (the same setpoint as the waste monitor tank discharge). The radiation monitor alarms in the Radwaste Control Room and the Main Control Room for operator action. The signal will also simultaneously turn off the evaporation pond discharge pump and close the discharge valve. Figure 11.2-201 (Sheet 9 of 10) has been revised to reflect the response above.

(3) The evaporation pond discharge pump and the discharge isolation valve are under supervisory control. Prior to discharge, multiple effluent samples around the pond perimeter are required to ensure the pond effluent meets the discharge specifications. The evaporation pond is a relatively small pond. The effluent to the pond has been filtered and ion exchanged, and it is expected that effluent concentration in the pond will be uniform. Stagnation and stratification of concentrations is not expected. This is confirmed by obtaining representative samples from the pond. The bottom of the pond is designed to be sloped towards the discharge pit to facilitate complete drainage. The pond is washed each time it is emptied to significantly reduce the potential for accumulation of residual contamination. Further, a radiation monitor is located close to the pump discharge to monitor the radiation level of the contents. The radiation monitor will alarm in the Main Control Room and the Radwaste Operator Control Room and will also isolate the pump and its discharge valve in the unlikely event of the content exceeding the setpoint. The radiation monitor setpoint for the evaporation pond discharge is the same as that used at the Waste Monitor Tank discharge.

(4) The evaporation pond is designed with two layers of high density polyethylene (HDPE) with smooth surfaces and a drainage net in between the layers for leak detection and collection. The bottom of the pond is sloped towards the leak drainage pit and a separate discharge pump pit. The leak drainage pit is a small pit underneath the two layers of HDPE, and leakage through the HDPE will be caught and detected in this pit. The discharge pump pit is designed to facilitate pumping water out of the pond and is equipped with a discharge pump. An operating requirement is established to wash the pond and discharge the wash water to the flow receiver and head box for disposal each time the pond is drained. Based on the design evaluation, the pond will not need to be used continuously, because during normal operating conditions and anticipated operational occurrences, diversion of flow is not required. Diversion is required only when the tritium concentration in the SCR is approaching the set limit due to

adverse meteorological conditions (e. g., drought condition leading to minimal spillover). The pond also has a berm to minimize infiltration of storm water. These design features (using HDPE, the leak detection pit, and sloping towards the drainage pit for discharge) and operating procedures (cleaning, diversion only when required) will ensure ease of decontamination and minimization of cross contamination (leakage to the groundwater), and thus satisfy 10 CFR 20.1406 and RG 4.21.

(5) The evaporation pond is designed to be non-seismic and non-safety-related. As discussed in item (1) above, the evaporation pond is not part of the LWMS, so the requirements in RG 1.143 are not applicable.

Impact on R-COLA

Attached FSAR Revision 0 pages 11.2-3 and 11.2-25 mark up are revised to reflect this response.

See attached changes for pages 11.2-5, 11.2-6 and 11.2-30. Because of text additions and deletions, the page numbers on the marked-up FSAR pages may not be the same as the page numbers in FSAR Revision 0.

Impact on S-COLA

None.

Impact on DCD

None.

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.: 2747 (CP RAI #29)

SRP Section: 11.02 – Liquid Waste Management System

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

DATE OF RAI ISSUE: 8/14/2009

QUESTION NO.: 11.02-4

10 CFR Part 50, Appendix A, General Design Criterion 60 states, "The nuclear power unit design shall include means to control suitably the release of radioactive materials in gaseous and liquid effluents and to handle radioactive solid wastes produced during normal reactor operation, including anticipated operational occurrences."

(1) Provide additional information in the FSAR relating to the bypass around the discharge radiation monitor, which includes VLV-531, on Figure 11.2-201 (Sheet 6 of 9).

(2) Explain in the FSAR when this pathway will be used and the precautions in place to prevent an unmonitored release.

(3) Provide a discussion that includes, but is not limited to, valve leakage, valve failure, and operator error.

(4) Finally, explain in the FSAR how a single failure will not result in an unmonitored release.

ANSWER:

(1) Valve VLV-531 is a manually operated valve that is administratively controlled and normally maintained in the locked-closed position. Its use is limited to unlikely situations such as the failure of the remotely operated valves (RCV-035A and RCV-035B) or the radiation monitor (RE 35). Prior to opening VLV-531 to establish the alternate flow path, the tanks (ATK-006A and ATK-006B) will be sampled and the contents confirmed to meet the discharge specifications. The valve can only be opened with a key controlled by CPNPP Operations and verified by two technically qualified members of CPNPP Operations for valve position.

(2) Please refer to response (1) above.

(3) The bypass valve, VLV-531, is located in the same area as 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 valve is collected in the floor drain sump and is forwarded to the waste holdup tank for re-processing. The discharge control valves are downstream of the discharge isolation valves (AOV-522A and AOV-522B). During normal operation, 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.

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 will not result in an unmonitored release. In the unlikely event that the valve is inadvertently left open, or partially open, the flow element will detect flow and initiate alarm for operator action. Also at least a portion of the flow will go through the radiation monitor. If the monitor reaches the high setpoint, it sends signals to initiate pump shutdown, valve closure, and operator actions.

(4) The last paragraph of FSAR Subsection 11.2.2 has been revised. Please refer to attached mark-up for this response.

<u>Impact on R-COLA</u>

Attached FSAR Revision 0 page 11.2-2 is revised to reflect this response.

See attached changes for pages 11.2-2 and 11.2-3. Because of text additions and deletions, the page numbers on the marked-up FSAR pages may not be the same as the page numbers in FSAR Revision 0.

<u>Impact on S-COLA</u>

None.

<u>Impact on DCD</u>

None.

Attachment 2

Response to Request for Additional Information No. 3214 (CP RAI #28)

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.: 3214 (CP RAI #28)

SRP SECTION: 19 – Probabilistic Risk Assessment and Severe Accident Evaluation

QUESTIONS for PRA Licensing, Operations Support and Maintenance Branch 1 (AP1000/EPR Projects) (SPLA)

DATE OF RAI ISSUE: 8/14/2009

QUESTION NO.: 19-4

The regulatory basis for these questions is 10 CFR 52.47(a) and RG 1.206 which provides guidance regarding the appropriate way to address severe accidents, assess risk and use of the PRA.

On page 19.1-2 of the Comanche Peak Nuclear Power Plant, Units 3 and 4 (Comanche Peak) FSAR, the combined license (COL) application states: "The only site-specific design [feature] that has potential effect on level 1 PRA for operation at power is the site-specific UHS."

(1) Please clarify whether this statement refers to internal events only.

(2) Discuss whether a systematic search for assumptions (explicit or implicit) made in the design certification PRA about site-specific or interface design features, parameters and characteristics is necessary, and whether such assumptions should be re-evaluated for the site. Examples of such assumptions include but are not limited to the frequency of loss of offsite power, offsite power recovery probability and the maximum ambient temperature used in the HVAC design calculations.

Site specific issues are listed in Table 1.8-1 of the Comanche Peak FSAR, which concludes that none of these issues, except for the essential service water system (ESWS) and ultimate heat sink (UHS), are considered as having an impact on the results and insights of the PRA.

(1) Please verify that the assumed values of such parameters in the design certification envelop the actual site-specific and plant-specific values, or re-evaluate the affected assumptions accordingly.

(2) Please provide a discussion to explain how the assumed values envelope the actual site-specific and plant-specific values and to document any re-evaluation of assumptions.

ANSWER:

(1) The specific statement raised in the question refers to internal events only. However, as documented in Subsections 19.1.5.2.2 and 19.1.5.3.2, the conclusion is the same for fires and floods (external events).

(2) Site-specific design features were systematically reviewed and design features that potentially impact the PRA were identified. Table 1 shows the results of a systematic search that was performed based on the site-specific interfaces with the standard US-APWR design listed in FSAR Table 1.8-1. The necessity to re-evaluate assumptions based on site-specific and plant-specific design features is based on their impact on risk. The UHS design was considered to have impact on risk and the design feature was incorporated in the PRA.

Environmental conditions that can cause additional initiating events, such as high winds, are considered to be external events and were assessed separately from internal events. Site-specific external events are discussed in response to Questions 19-2 and 19-7. Justification that the offsite power reliability and maximum ambient temperature assumed for the design certification PRA envelopes the site-specific conditions is provided below.

Offsite power reliability

NUREG/CR-6890 provides data to estimate the site-specific loss of offsite power (LOOP) frequency. The site-specific LOOP frequency utilizing the grid-specific LOOP data of the Electric Reliability Council of Texas is estimated to be 2.6E-2 per reactor years. This value is lower than the generic LOOP frequency of 4.0E-2 /RY used in the DCD PRA. Regarding offsite power recovery probability, the PRA applies the generic offsite power recovery probability. Offsite power recovery probability varies with the profile of LOOP frequency, in terms of fraction of LOOP causes (i.e. plant-centered, switchyard-related, grid-related or weather-related). Even though the site-specific offsite power recovery probability is different from the generic data, the application of generic LOOP frequency - that is a bounding value for CPNPP Units 3 and 4 - implies that the combined frequency of LOOP and failure of offsite power recovery used in the DCD PRA envelopes the site-specific condition.

Maximum ambient temperature

Comparison of key site parameters with the design certification parameters are listed in Table 2.0-1R of the FSAR. The ambient design air temperature of the DCD envelopes those parameters of CPNPP Units 3 and 4. The maximum ambient temperature used in the HVAC design calculations for the DCD PRA envelopes the site-specific parameters. Hence, calculation results from the design certification are applicable to CPNPP Units 3 and 4.

Table 1 - Site-Specific Interface and Potential Impact on PRA (sheet 1)

No.	Site-Specific Interface	Description of the Interface in the FSAR	Potential Impact on PRA
1	Circulating Water System	CWS is cooled by non-safety-related mechanical draft cooling towers. The makeup water and blowdown system is provided to supply water to the cooling tower to compensate losses due to evaporation and wind drift, and control water chemistry of cooling tower basins. The makeup water and blowdown system final configuration and design parameters are determined as follows subject to site-specific. • Makeup water system configuration and intake structure are specified and water source is determined as Lake Granbury. • Means for blowdown is determined as gravity drain into Lake Granbury. • A spare makeup pump is common to both units.	This system is not modeled in the PRA. Site-specific design has no impact on PRA.
2	Essential Service Water System and Ultimate Heat Sink	The UHS consists of four 50 percent capacity mechanical draft cooling towers, one for each ESWS train, and four 33-1/3 percent capacity basins and four transfer pumps. ESWPs are respectively located in each basin with adequate submergence of the pumps to assure the NPSH for the pumps. A portion of the basin water is discharged through the blowdown via the ESWS when the makeup water is available to maintain an acceptable water chemistry composition. The blowdown water is discharged to Lake Granbury.	This system is modeled in the PRA. Site-specific design may impact the PRA. Fault tree analysis was performed to assess the impact of site-specific design on the PRA.
3	Electric Power	Interface to transmission system is the low-voltage terminals of the main and reserve auxiliary transformers in the transformed yard. Generator voltage is stepped up to 345 kV and transmitted through overhead transmission tie lines to the 345 kV plant switching station. Reserve transformer steps down 345 kV to onsite medium voltage bus voltage.	Site specific design may impact the PRA. The site specific offsite power reliability needs to be reviewed. Site specific loss of offsite power frequency and its duration has been estimated. It has been confirmed that the reliability of offsite power used in the DCD PRA envelopes the site-specific condition.

Table 1 - Site-Specific Interface and Potential Impact on PRA (sheet 2)

No.	Site-Specific Interface	Description of the Interface in the FSAR	Potential Impact on PRA
4	Potable and Sanitary Water Systems	Potable water supply to CPNPP Units 3 and 4 is from the Somervell County Water District. Sanitary/domestic wastes generated in the plant are transferred to the domestic waste treatment facility. Treated liquid effluent is discharged into Squaw Creek Reservoir and dewatered sludge is bagged for disposal.	This system is not modeled in the PRA. Site-specific design has no impact on PRA.
5	Communications Systems	Onsite and offsite communications, and general alarm for emergency evacuation of the site, are accomplished by a multi-tiered communications and notification system.	This system is not modeled in the PRA. Site-specific design has no impact on PRA.
6	Administrative, Emergency Response and Training Facilities	Operations, administration, training, and emergency preparedness functions are conducted in dedicated spaces around the plant site.	This system is not modeled in the PRA. Site-specific design has no impact on PRA.
7	Security Systems	Security systems and procedures are discussed separately in the CPNPP Physical Security Plan and Safeguards Contingency Plan, and Security Training and Qualification Plan.	This system is not modeled in the PRA. Site-specific design has no impact on PRA.
8	General Site Improvements	A site arrangement plan is provided in Figure 1.2-1R, which shows site-specific features and improvements, as well as the standard US-APWR buildings and features.	The site-specific design has no impact on the internal events PRA.
9	Fire Protection	Site-specific fire protection systems are provided throughout the plant. Each of the ESW lines in the R/B and in the ESWP house is tapped to supply water to the fire protection system.	Fire protection system is modeled in the PRA. The fire protection system design does not impact the PRA assumptions of DCD. Site-specific design has no impact on PRA.

Table 1 - Site-Specific Interface and Potential Impact on PRA (sheet 3)

No.	Site-Specific Interface	Description of the Interface in the FSAR	Potential Impact on PRA
10	Effluent Monitoring and Sampling	The Offsite Dose Calculation Manual is implemented as part of the operational program.	This site-specific feature has no impact on PRA.
11	Compressed Gases	Bulk and bottled nitrogen are provided to equipment that requires N2. Bulk hydrogen is supplied to equipment that requires H2. Carbon dioxide gas cylinders supply gas to equipment that requires the carbon dioxide. Miscellaneous gases are delivered to gas analyzers that require the gases.	Compressed nitrogen is required for pressurization of the CCWS when performing alternate containment cooling. The site-specific design satisfies the function credited in the PRA. This site-specific design has no impact on PRA assumptions.

Impact on R-COLA

None.

Impact on S-COLA

None.

Impact on DCD

None.

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.: 3214 (CP RAI #28)

SRP SECTION: 19 – Probabilistic Risk Assessment and Severe Accident Evaluation

QUESTIONS for PRA Licensing, Operations Support and Maintenance Branch 1 (AP1000/EPR Projects) (SPLA)

DATE OF RAI ISSUE: 8/14/2009

QUESTION NO.: 19-5

The site-specific essential service water system (ESWS)/ultimate heat sink (UHS) used at Comanche Peak Units 3&4 introduces many changes in the risk insights and assumptions identified at the design certification Design Control Document (DCD). Even though the numerical impact of the change on the estimated CDF is small, there are important changes in the risk insights and assumptions as a result of the site-specific ESWS/UHS change. Therefore, the Comanche Peak FSAR should include changes to all impacted areas (sections) of the incorporated by reference US-APWR DCD. Examples are: (1) DCD tables, such as Tables 19.1-27 to 19.1-34, include failures of components and human actions that are not part of the site-specific design (e.g., failure to cool the ESWS pumps) and leave out risk important components and human actions that are part of the site-specific design (e.g., failure of the cooling tower fans); (2) DCD table 19.1-115 listing key assumptions and important design features; and (3) results of the PRA-based seismic margins analysis (e.g., HCLPF values of the cooling towers and related structures and any changes in the major seismic contributors identified in the DCD). Please perform a systematic search to identify all sections of the incorporated by reference DCD, including both internal and external events at power and shutdown modes of operation, that are impacted by the site-specific ESWS/UHS, update all such sections and clearly describe the changes in Chapter 19 of the Comanche Peak FSAR.

ANSWER:

DCD sections to be incorporated by reference were determined based on the numerical impact on risk of each item in the section. However, as pointed out by the staff, the site-specific design can potentially change risk insights even if the numerical impact of the change on core damage frequency (CDF) is small. Chapter 19 has been reviewed to determine which sections have risk insights that are impacted in addition to the risk insights resulting from site-specific ESWS/UHS changes.

- The importance results are items that need to be changed as discussed in Part (1) of this response. CDF for each initiating events, risk-important sequences, and results of sensitivity analyses do not change more than 10%. Parametric uncertainty will not be influenced since the site-specific designs have only a small impact on CDF.

- Key site-specific design features, PRA insights and assumptions need to be described in the FSAR. Treatment of site-specific design features and key assumptions is described in Part (2) of this response.
- Figure 19.1-2R has been added to the FSAR to provide site-specific details.

Treatment of site-specific issues raised as examples in the question are described below.

(1) Regarding risk importance results, the site-specific design may impact the risk achievement worth (RAW) results and thus be different than the reference US-APWR DCD. Additional events, such as failure in the UHS that have a high RAW, need to be included in the table. Since the numerical change of the CDF is small, the Fussel-Vesley importance and the RAW of events that are not plant-specific will not significantly change. The FSAR will be revised in the next COLA revision to indicate the basic events and RAW values of the site-specific events (i.e., failure of cooling tower fans) that are different from the reference US-APWR DCD. New FSAR Table 19.1-202 (attached) lists risk important basic events related to the site-specific design.

(2) Site-specific key assumptions and design features will be described in the subsection that references DCD Table 19.1-115. Design features and key assumptions that will be included in the FSAR are:

- Design features and assumptions that contribute to high reliability of continuous operation after the 24 hour mission time. These design features and assumptions are discussed in response to Question 19-6 (b).
- Design features to prevent degradation of the ESWS caused by overfilling of the basin due to failure in the transfer pump or circulation system. It is assumed that a drain line is provided as overfill protection of the basin to prevent failing the pump(s).
- Backup actions to avoid excessive room heatup in the event of loss of ESW room ventilation. Preparation of operational procedures to avoid excessive room heat up is assumed.
- Seismic capacity of plant-specific systems, structures, and components (SSCs). This assumption is discussed in Part (3) of this response.

(3) Plant-specific SSCs that potentially impact plant safety are seismically designed and will not impact the plant high confidence of low probability of failure (HCLPF). HCLPF values for the plant-specific SSCs, such as cooling towers, will be confirmed with a calculation using EPRI TR-103959 methodology after completion of seismic design and stress analysis of the SSCs. When the seismic margin analysis for the design certification is available, we will confirm that the analysis envelopes the plant-specific design.

Impact on R-COLA

See attached marked-up FSAR Revision 0 pages 19.1-3 and an additional Table 19.1-202, page 19-35 which lists risk important basic events related to the site-specific design.

The attached changed pages (19.1-10 and 19.1-11, and Table 19.1-206, page 19.1-39) reflect the response to the questions regarding key assumptions.

Figure 19.1-2R, page 19.1-40 has been added to describe the site-specific UHS.

Impact on S-COLA

None.

Impact on DCD

None.

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.: 3214 (CP RAI #28)

SRP SECTION: 19 – Probabilistic Risk Assessment and Severe Accident Evaluation

QUESTIONS for PRA Licensing, Operations Support and Maintenance Branch 1 (AP1000/EPR Projects) (SPLA)

DATE OF RAI ISSUE: 8/14/2009

QUESTION NO.: 19-6

The staff needs additional information/clarification, beyond what is provided in the Comanche Peak FSAR (CP COL 19.3(4)), about the design features of the site-specific essential service water system (ESWS) and ultimate heat sink (UHS) proposed for use at Comanche Peak Units 3 & 4,in order to understand how this system was modeled in the PRA.

(a) Please explain the basis for the statement: "Failure of both fans in a single cooling tower (CTW) train is considered a potential failure mode of the ESWS." Explain how the failure of the CTW fans, including their support systems, is modeled in the PRA. For example, what group size was considered in the common cause failure analysis and what data were used? Are all fans normally running? What failure modes were considered? Also, please explain the basis for the statement: "Failure of both fans in a single CTW train is considered a potential failure mode of the ESWS."

(b) Explain how the failure of one or more UHS transfer pumps was modeled in the PRA. Also, provide a discussion in Chapter 19 about how the evaporated water in the basins is replenished. List important modeling assumptions as well as assumptions about design and operational features (e.g., testing intervals).

(c) In the brief description of the ESWS/UHS (page 19.1-2), the application states: "....four 33-1/3 percent capacity basins to supply cooling water more than 30 days." However, in the list of assumptions (page 19.1-3), the application states: "Should the plant trip, the basins can be effective in removing decay heat more than 24 hours assuming nominal conditions but the hottest day of the year. This can be achieved by one fan per tower operating." Please explain this apparent discrepancy. In addition, explain how decay heat is removed after 24 hours and provide examples of "nominal" conditions that were assumed in the analysis.

(d) The assumptions and important design features listed on page 19.1-3 of the Comanche Peak FSAR should be used to supplement and revise in the Comanche Peak FSAR, as appropriate, the information provided in related portions of DCD table 19.1-115 (which is incorporated in the FSAR by reference), with similar disposition. For example, the assumption stating that "[t]he transfer line is a high integrity line, regularly tested and inspected for corrosion," should be cross-referenced to appropriate Comanche Peak FSAR sections, or include a new COL holder action, to ensure that this assumption will be verified for the as-built, as-operated plant.

(e) The Comanche Peak FSAR states, at page 19.1-3, that: "Ventilation of the [emergency service water pump] ESWP room is reliable not to significantly degrade the unavailability of ESWP." Please provide the basis for this assumption. Also, if this assumption is based on site-specific factors, provide those factors and explain how the failure of pump room ventilation was modeled in the PRA.

(f) The Comanche Peak FSAR states, at page 19.1-3, that: "The effect of the site-specific ESWS designs on the internal [core damage frequency] CDF is very small." Provide a similar discussion about the effect of the site-specific ESWS designs on the CDF and large release frequency (LRF) from both internal and external events at both power and shutdown operation.

(g) The Comanche Peak FSAR states in Section 19.1.4.2.2 that: "... the contribution of total loss of [component cooling water] CCW initiation event to the large release frequency (LRF) for operations at power is considered insignificant. It has been therefore determined that consideration of the site-specific UHS would have no discernible effect on the level 2 PRA results.

  (i) Please explain the basis for your conclusion that there is insignificant or no change in risk associated with the site-specific ESWS design beyond the one due to the total loss of CCW/ESW initiating event (i.e., change in risk due to partial loss of CCW/ESW and to the change in reliability of the ESW system).

  (ii) Please discuss the change in risk due to partial loss of CCW/ESW and the reliability of the ESW system.

ANSWER:

(a) Failures considered for the CTW fans are failure to run, failure to start (for those that are in standby), and loss of power supply. Each train of the UHS has two CTW fans that are both running when the associated ESW train is running. The CTW fans associated with standby ESW trains are in standby. Accordingly, the four CTW fans associated with the two normally running ESW trains are normally running. Common cause failures (CCFs) are considered for the fans to start and run, respectively. The CCF group size of the CTW fans to run is eight, considering four fans that are initially running and four fans that are in standby. The CCF group size of fans to start is four. CCF probabilities were estimated by the Multiple Greek Letter Method. Regarding the standby fans, the beta factor of generic components reported in NUREG/CR-5485 were applied. The Beta value is 0.05 for CCF group size of four. For the Gamma and Delta, 0.5 was applied in view of the weak evidence available to support such generic estimates. Regarding normally running pumps, the Beta value was set to 0.001 and parameters above Gamma were set to 1.0. CCFs between the standby pumps and normally running pumps were also considered. The standby pumps are assumed to fail with a probability of 0.1 when the normally running pumps have all failed due to CCF.

The statement "Failure of both fans in a single CTW train is considered a potential failure mode of the ESWS" describes the success criteria of CTW fans of each train to maintain the associated ESWS train operable during normal plant operation. The UHS is designed assuming two-train operation of the ESWS for accident conditions (i.e. LOCA). The CTW fans (two installed for each ESWS train) are designed to remove heat loads during accident conditions. During normal plant operation heat loads are low compared to accident conditions. Therefore, during normal operating conditions, it is assumed that failure in one of the two CTW fans may degrade the ESWS train, but will not result in loss of the affected ESWS train. Therefore, in the PRA, the success criteria of CTW fans per EFWS train is one out of two during pre-initiating events, and two out of two for post-initiating events.

(b) Transfer pumps are not modeled in the PRA. The success criteria for containment heat removal functions, such as containment spray system and alternate containment cooling, require two ESWS trains to be operable. As discussed in item (c) of this response, two basins can supply cooling water for more than 24 hours post-shutdown and operators have sufficient time available to perform actions to replenish the basin. In addition, if the transfer pumps mechanically fail, the circulating water system can be used to supply water to the basin. For these reasons, the basin refill reliability is considered to be high and the failure of transfer pumps were considered negligible.

Design features and assumptions that contribute to high reliability of basin refill are the following.

- Makeup water to the UHS inventory can be supplied from Lake Granbury via the circulating water system. (Subsection 9.2.5.2.2)
- UHS transfer pumps and the ESW pumps located in each basin are powered by the different Class 1E buses. UHS transfer pumps operate to permit the use of three of the four basin water volumes. (Subsections 9.2.5.2.2 and 9.2.5.3)
- The transfer line is a high integrity line, regularly tested and inspected for corrosion. (Subsections 9.2.1.2.1 and 9.2.5.4)
- There are adequate low-level and high-level alarms to provide rapid control room annunciation of a basin water level problem, and to allow adequate time to confirm the level and take effective action to address it. (Subsection 9.2.5.5)
- Two basins contain enough water to supply water to remove decay heat for at least 24 hours after plant trip. (PRA assumption)

(c) In the PRA, the success criterion for ECCS is two trains out of four. The PRA assumes that the two CCW/ESWS trains associated with the operable ECCS trains can successfully remove decay heat for a minimum of 30 days. Water in two basins have the capacity to supply cooling water for 24 hours, however with basin replenishment, a minimum of a 30 day water supply is achieved. Water can be supplied from redundant basins utilizing the transfer pump or from Lake Granbury via the circulating water system. Also, if the unavailable ESWS/UHS should be restored and three ESWS trains become available, decay heat can be removed for 30 days without supply to the basin. Since there are multiple methods to refill the basin and sufficient refill time, the probability of a failure to refill the basin is considered negligible.

Regarding the term "nominal," LOCA and safe shutdown conditions are considered as examples of "nominal" conditions. The PRA considers that the assumption related to the effectivity of basins for the 24 hours can also be applied under the maximum ambient temperature of CPNPP site described in FSAR Chapter 2.

The statement regarding plant trip and the effectiveness of the basins on FSAR page 19.1-3 has been revised (attached).

(d) New FSAR Table 19.1-206 (attached) provides site-specific key assumptions and cross-references the related FSAR subsections.

(e) The PRA assumes that reliable backup actions can avoid excessive room heat up in the event of loss of ESW room ventilation. Backup actions that can be implemented are, but not limited to, opening the ESW room and ventilation by portable fans. Based on this assumption, loss of ESW room ventilation is not modeled in the PRA model.

(f) The Level 2 PRA evaluates two aspects, i.e., system and physical phenomena in the containment. The Level 2 PRA models the containment systems and functions that are provided to prevent containment failure and to mitigate the consequences of accidents. The Level 2 PRA also models the physical phenomena in the containment that influence containment failure and fission product release to the environment. The CDF is an input to the level 2 PRA.

The site-specific ESWS design has almost no effect on containment physical phenomena because the ESWS is physically separated from the containment. Therefore, the effect of the site-specific ESWS design on the level 2 PRA appears as a change to the CDF and the reliability of the containment systems and functions which depend on the CCWS.

The Level 1 PRA for operations at power determined that the modeling of the site-specific ESWS design had only a small effect on the reliability of the CCWS for internal events. This is because there is only a small increase in the CDF compared to the increase of the initiating event frequency. Therefore, the effect of the site-specific ESWS design is also small for the reliability of the containment systems and functions which are modeled in the Level 2 PRA. In addition, there is only a small increase in the CDF resulting from the total loss of CCW initiating events in relation to the site-specific ESWS design.

As a result, modeling the site-specific ESWS design has only a small effect on the LRF, which is the result of the Level 2 PRA for operations at power. The site-specific ESWS design has only a small effect on the LRF from external events because modeling the site-specific ESWS design resulted in only a small effect on the external events Level 1 PRA. Regarding shutdown operations, it is assumed that the LRF is equivalent to the CDF.

(g) (i) The system reliability of the ESW system has been evaluated by fault tree analysis. The change in ESW system due to the site-specific design has only a small impact on the reliability of mitigation systems. The partial loss of CCW/ESW initiating event frequency is based on generic data of U. S. plants. The data used to estimate the initiating event frequency includes plants with various UHS designs and therefore the generic data is considered applicable to the PRA for Comanche Peak Units 3 and 4. There is only a small increase in the initiating event frequency for the total loss of CCW/ESW. However, as discussed in the answer to part (f), modeling of the site-specific ESWS design has only a small effect on the LRF, which is the result of the Level 2 PRA for operations at power.

(ii) See answer (f) and (g)(i).

<u>Impact on R-COLA</u>

The attached FSAR Revision 0, Subsection 19.1.4.1.2 (page 19.1-3) reflects the response to this question.

The attached FSAR Revision 0, Subsection 19.1.7.1 (pages 19.1-10 and 19.1-11 and Table 19.1-206, page 19.1-39) reflect the response to the questions regarding key assumptions and design features.

<u>Impact on S-COLA</u>

None.

Impact on DCD

None.

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.: 3214 (CP RAI #28)

SRP SECTION: 19 – Probabilistic Risk Assessment and Severe Accident Evaluation

QUESTIONS for PRA Licensing, Operations Support and Maintenance Branch 1 (AP1000/EPR Projects) (SPLA)

DATE OF RAI ISSUE: 8/14/2009

QUESTION NO.: 19-7

Comanche Peak FSAR Section 19.1.5 states: "The first four events are subject to the screening criteria consistent with the guidance of ANSI/ANS-58.21-2007, taking into consideration the features of advanced light water reactors." Please provide the following information:

(a) In principle, an external hazard can be screened out of the analysis if it can be shown that its contribution to the total plant risk is very small (e.g., one percent or less depending on the number of external hazards that are screened out). Accordingly, for the US-APWR design, an event with a CDF contribution of about 5E-8 or less is considered insignificant. Similarly, an event with a frequency of occurrence of 1E-7 per year or less is considered an insignificant contributor to the plant CDF (especially if it is also shown qualitatively that such an event does not lead directly to core damage. Since the features of advanced light water reactors contribute to the lower risk of such reactors, as compared to operating reactors, the screening criteria should be adjusted accordingly. Using the above factors, please clarify and state in the FSAR how "the features of advanced light water reactors" are taken into consideration in the screening criteria.

(b) In addition to the four external hazards listed in Section 19.1.5 of the DCD (i.e., high winds and tornadoes, external flooding, transportation and nearby facility accidents, and aircraft impact), COL applicants that reference this DCD are expected to verify that there are no other site-specific hazards within the site vicinity (e.g., dam breaks, flash floods, external fires and high air temperature) which have the potential to initiate an accident that could lead to core damage. The same criteria used to screen out the four external hazards listed in Section 19.1.5 of the DCD should also be used for any other potential site-specific hazard.

(i) Please identify whether information included in another FSAR chapter (e.g., Chapter 2) can be used to justify not mentioning all potential external events in Chapter 19.

(ii) If this information does not support the conclusion that a certain external event can be screened out without even mentioning it in Chapter 19 (PRA), where its risk is assessed, provide clarification in Chapter 19 that any external event which is not mentioned in Chapter 19 has been determined elsewhere in the FSAR (e.g., in Chapter 2) to have a frequency of occurrence of 1E-7 per year or less. For more frequent site-specific external hazards, such as external fires, provide a discussion of such events in Chapter 19.

ANSWER:

Question (a):

The qualitative and quantitative screenings for Comanche Peak Units 3 and 4 other external events are performed taking into consideration the features of advanced light water reactors. At the first, qualitative screenings are performed because they are easy to obtain lower risk from advanced reactors design features or site characteristics. Following the qualitative screenings, quantitative screenings are performed using the screening criterion that frequency of occurrence is less than 10^{-7}/year. If an event frequency is greater than 10^{-7}/year, a bounding analysis or PRA is performed to confirm that the risk is sufficiently lower for advanced light water reactors, such as less than 1% of total CDF.

The qualitative screenings are performed for the events that are identified in FSAR Chapter 2 in accordance with the guidelines of ANSI/ANS-58.21-2007. Section 4.4 of the standard defines the initial preliminary screening criteria as supporting technical requirement EXT-B1. Five qualitative screening criteria are defined referring the guidelines of ANSI/ANS-58.21-2007.

1. Lower damage potential than a design basis event
2. Lower event frequency of occurrence than another event
3. Cannot occur close enough to the plant to have an affect
4. Included in the definition of another event
5. Sufficient time to eliminate the source of threat or to provide an adequate response

If the qualitative screenings do not screen out some external events, then quantitative screenings are performed for the events. The supporting technical requirement EXT-B2 of ANSI/ANS-58.21-2007 states that the criteria provided in the 1975 Standard Review Plan can be used as an acceptable basis for the screening criteria of external events. The criteria are:

(i) the contribution to core damage frequency (CDF) is less than 10^{-6}/year, or

(ii) the design-basis event at annual frequencies of occurrence is between 10^{-7} and 10^{-6}.

For Comanche Peak Units 3 and 4, a value of 10^{-7} for the annual frequency of occurrence is used as a more conservative quantitative screening criterion. This is because the design features in the advanced design of the US-APWR reduce total CDF to approximately an order of magnitude smaller than typical operating PWR designs. Therefore, conservatively, the US-APWR criterion for annual frequency of occurrence being used is the lowest value (10^{-7}) recommended in the SRP.

Question (b):

The other external events for which qualitative and quantitative screenings are performed for Comanche Peak Units 3 and 4 are those events in FSAR Sections 2.2, 2.3, 2.4, and 3.5. The events that do not meet the screening criteria are assessed using a bounding analysis.

The results of screenings for other external events that are identified in FSAR Chapter 2 are summarized in Table 19-7-1.

Table 19-7-1 involves the general climate of the region and local meteorological information for severe weather phenomena such as hurricanes, tornadoes, thunderstorms, lightning, hails, air pollution potential, precipitation, dust storms, ultimate heat sink extreme winds, surface winds, temperatures, water vapor, fog, atmospheric stability and mixing heights.

Table 19-7-1 does not involve external hazards such as seismic, internal fires and internal flooding because those are already described in DCD Chapter 19.5.1 using seismic margin method or PRA method. Also the external events categorized in "hydrologic engineering" and in "nearby industrial, transportation, and military facilities" are not involved in Table 19-7-1. Those events such as external flood, explosions, fires and aircraft hazards are summarized in Table 19-2-1 of the response to RAI #26 Question 19-2.

Thus, the other external events except tornadoes are not considered to be risk-important. Only tornadoes are not screened out because the probability of expected maximum tornado wind speed on the site is close to 10^{-7}. Therefore, a bounding analysis is performed and the result is described in Subsection 19.1.5.

Impact on R-COLA

See attached changed FSAR Revision 0 page 19.1-4 and additional page 19.1-5, and additional Table 19.1-201, pages 19.1-12 to 34.

The page numbers on the changed FSAR pages may not be the same as the page numbers in FSAR Revision 0. The pages are revised to reflect responses to RAI #26 Question 19-2 and RAI #28 Question 19-7.

Impact on S-COLA

None.

Impact on DCD

None.

Table 19-7-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
Meteorology	Hurricanes	2.3.1.2.2	The Gulf of Mexico and the Atlantic Coast areas are the most susceptible to tropical cyclones. The number of tropical storms passing within 50 statute mi of the CPNPP site are listed on Table 2.3-208 and shown on Figure 2.3-213. These data, obtained from the NOAA Coastal Services Center, show that only one hurricane, in 1900, passed within 50 mi of the site during the period 1851 – 2006. After a hurricane or tropical storm makes landfall, it begins to break apart, although remnants of the storm can continue moving inland. These remnants have been known to bring heavy precipitation, high winds, and tornadoes to locations near the CPNPP site. Tropical cyclones including hurricanes lose strength rapidly as they move inland, and the greatest concern is potential damage from winds or flooding due to excessive rainfall. Figure 2.3-214 shows the decay of tropical cyclone winds after landfall. As seen, only the fastest moving storms will maintain any significant wind speed by the time they reach the CPNPP site. From this figure, a tropical cyclone with 86 mph winds traveling at 18 mph will have dissipated to less than 40 mph at the CPNPP site. The Probable Maximum Hurricane (PMH) for the CPNPP site, the PMH sustained (10-minute average) wind speed at 30 ft aboveground is 81 mph.	1	Not determined	No
	Tornadoes	2.3.1.2.3	The tornadoes reported during the years 1950 – 2006 in the vicinity of the site (Bosque, Erath, Hood, and Johnson Counties) are shown in Tables 2.3-209 and 2.3-210. During this period, a total of 158 tornadoes touched down in these counties that have a combined area of 3414 sq mi. These local tornadoes have a mean path area of 0.21 sq mi excluding tornadoes with a zero length or without a length specified. The site recurrence frequency of tornadoes can be calculated using the point probability method as follows: Total area of tornado sightings = 3414 sq mi	Not screening	Close to 10^{-7}	Yes (Section 19.1.5)

Table 19-7-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability Criteria(1)	Freq. (/yr)	Site Appl.
			Average annual frequency = 158 tornadoes/56.58 yr = 2.79 tornadoes/yr Annual frequency of a tornado striking a particular point P = ([0.21 mi2/tornado] [2.79 tornadoes/yr]) / 3414 sq mi = 0.00017 yr-1 Mean recurrence interval = 1/P = 5883 yr The corresponding expected maximum tornado wind speed and upper limit (95 percentile) of the expected wind speed based on a 2 degree longitude and latitude box centered on the CPNPP site are given below with the associated probabilities. Probability / Expected maximum tornado wind speed (mph) / Upper limit (90percent) of the expected tornado wind speed(mph) 10-5 / 133 / 139 10-6 / 171 / 177 10-7 / 205 / 212 The design basis tornado parameters used in the design and operation of CPNPP are based on Revision 1 of Regulatory Guide 1.76. For Region I, as described in RG 1.76, the design parameters are listed below: Translational Speed 46 mph (21 meter/sec) Rotational Speed 184 mph (82 meters/sec) Maximum Wind Speed (sum of the translational and rotational speed) 230 mph (103 meters/sec) Radius of Maximum Rotational Speed 150 ft (45.7 meters) Compliance with Regulatory Guide 1.76 is discussed in Section 1.9. Tornado loadings are discussed in Subsection 3.3.2. It is easily lost when stand alone.			

Table 19-7-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability						
Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
	Thunder-storms	2.3.1.2.4	Thunderstorms, from which damaging local weather can develop (tornadoes, hail, high winds, and flooding), occur about eight days each year based on data from the counties surrounding the site. The maximum frequency of thunderstorms and high wind events occurs from April to June, while the months from November through February have few thunderstorms. The monthly and regional distributions of thunderstorms and high wind events are displayed in Table 2.3-211. Impact of this event is less than by hurricanes or tornadoes.	1,4	Not determined	No
	Lightning	2.3.1.2.5	The annual mean number of thunderstorm days in the site area is conservatively estimated to be 48 based on interpolation from the isokeraunic map; therefore it is estimated that the annual lightning stroke density in the CPNPP site area is 25 strikes/sq mi/yr. Recent studies based on data from the National Lightning Detection Network (NLDN) indicate that the above strike densities are upper bounds for the CPNPP site. Impact of this event is less than by hurricanes or tornadoes.	1,4	None	No
	Hails	2.3.1.2.6	Almost all localities in Texas occasionally experience damage from hail. While the most commonly reported hailstones are 1/2 to 3/4 inch in diameter, hailstones 3 to 3-1/2 inch in diameter are reported in Texas several times a year. Fortunately, recurrence of damaging hail at a specific location is very infrequent. The monthly and seasonal breakdown of large-hail occurrences (3/4 in diameter or larger) for the area around the CPNPP site is given in Table 2.3-212. Impact of this event is less than by hurricanes or tornadoes.	1,4	None	No

Table 19-7-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
	Air Pollution Potential	2.3.1.2.7	The Clean Air Act, which was last amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set National Air Quality Standards for pollutants considered harmful to the public health and the environment. The EPA Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards for six principle pollutants, which are called "Criteria" pollutants. The newly promulgated EPA 8-hour ozone standard (62 FR 36, July 18, 1997) is 0.08 ppm in accordance with 40 CFR 50.10 (Reference 2.3-226). Somervell County is in attainment for all criteria pollutants (carbon monoxide, lead, nitrogen dioxide, particulate matter ([PM10, particulate matter less than 10 micron], [PM2.5, particulate matter less than 2.5 micron]), ozone, and sulfur oxides. The ventilation rate is a significant consideration in the dispersion of pollutants. Higher ventilation rates are better for dispersing pollution than lower ventilation rates. The atmospheric ventilation rate is numerically equal to the product of the mixing height and the wind speed within the mixing layer. Conditions in the region generally favor turbulent mixing. Two conditions which reduce mixing, increasing the air pollution potential, are surface inversions and stable air layers aloft. The surface inversion is generally a short-term effect and surface heating on most days creates a uniform mixing layer by mid-afternoon. The air stagnation trend for this general area is negative (Figure 2.3-246) over the 50-yr period of record. This event is not significant impact than toxic chemicals.	1,4	None	No
	Precipitation	2.3.1.2.8 2.3.2.1.5	Probable Maximum Precipitation (PMP), sometimes called maximum possible precipitation, for a given area and duration is the depth which can be reached but not exceeded under	1	None	No

Table 19-7-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability Criteria[1]	Freq. (/yr)	Site Appl.
			known meteorological conditions. For the site area, using a 100-yr return period, the PMP for 6, 12, 24, and 48 hours is 6.9, 8.3, 9.5, and 11.0 in, respectively (Table 2.3-217). The annual average and maximum 24-hour snowfall for these stations are given below: Annual Average Snowfall (in) / Maximum 24-hr Snowfall (in) and Yr Fort Worth 2.5 12.1 (1964) Dallas Love Field 1.7 6.0 (1978) Mineral Wells 1.8 4.0 (1978) Glen Rose 1.8 4.5 (1973) To estimate the weight of the 100-yr snowpack at the CPNPP site, the maximum reported snow depths at Dallas Fort Worth Airport were determined. Table 2.3-202 shows that the greatest snow depth over the 30-yr record is 8 in. The 100-yr recurrence snow depth is 11.2 in using a factor of 1.4 to convert from a 30 yr recurrence interval to 100-yr interval. In the CPNPP site area, snow melts and/or evaporates quickly, usually within 48 hours, and does so before additional snow is added; thus, the water equivalent of the snowpack can be considered equal to the water equivalent of the falling snow as reported hourly during the snowfall. A conservative estimate of the water equivalent of snowpack in the CPNPP site area would be 0.20 in of water per inch of snowpack. Then, the water equivalent of the 100-yr return snowpack would be 11.2 in snowpack x 0.2 in water equivalent/inch snowpack = 2.24 in of water. The 100-yr return period snow and ice pack for the area in which the plant is located, in terms of snow load on the ground and water equivalent, is listed below: • Snow Load = 11.7 lb/ft2			

Table 19-7-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
			• Ice Load = 5.06 in * 5.20 lb/ft2/in = 26.1 lb/ft2 As stated in the US-APWR DCD Subsection 3.4.1.2, if PMWP was to occur, US-APWR safety-related systems and components would not be jeopardized. US-APWR seismic category I building roofs are designed as a drainage system capable of handling the probable maximum winter precipitation (PMWP). The US-APWR DCD also states that seismic category I structures have sloped roofs designed to preclude roof ponding. This is accomplished by channeling rainfall expeditiously off the roof. Also in subsection 3.4.1.2, the design-basis flooding level (DBFL) listed in Section 2.4, and adequate sloped site grading and drainage prevents flooding caused by probable maximum precipitation (PMP) or postulated failure of non safety-related, non seismic storage tanks located on site.			
	Dust Storms	2.3.1.2.9	Blowing dust or sand may occur occasionally in West Texas where strong winds are more frequent and vegetation is sparse. While blowing dust or sand may reduce visibility to less than five mi over an area of thousands of sq mi, dust storms that reduce visibility to one mi or less are quite localized and depend on soil type, soil condition, and vegetation in the immediate area. The NCDC Storm Event database did not report any dust storms in Somervell County between January 1, 1950 and August 31, 2007. This event is not significant impact to the plant.	1	None	No
	Ultimate Heat Sink	2.3.1.2.10 2.3.2.1.3	The performance of the ultimate heat sink is discussed in Subsection 9.2.5. The wet bulb design temperature for the ultimate heat sink was selected to be 80°F based on 30 yr (1977 – 2006) of climatological data obtained from National Climatic Data Center/National Oceanic and Atmospheric Administrator for Dallas/Fort Worth International Airport Station	1	None	No

Table 19-7-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability Criteria[1]	Freq. (/yr)	Site Appl.
			in accordance with RG 1.27. The worst 30 day period was selected from the above climatological data between June 1, 1998 and June 30, 1998, with an average wet bulb temperature of 78.0°F. A 2°F margin was added to the maximum average wet bulb temperature for conservatism. These are not significant impact to ultimate heat sink.			
	Extreme Winds	2.3.1.2.11	Estimated extreme winds (fastest mile) for the general area based on the Frechet distribution are: Return Period (year) / Wind Speed (mi per hr) 2 / 51 10 / 61 50 / 71 100 / 76 Fastest mile winds are sustained winds, normalized to 30 ft aboveground and include all meteorological phenomena except tornadoes. The design basis wind velocity is based on the data from ANSI/ASCE 7-05. From Figure 6-1 of ANSI/ASCE 7-05, the 3-second gust wind speed at 33 ft (10 m) aboveground for the CPNPP site is 90 mph (40 m/sec). The 3-second gust wind speed for a 100-yr return period is 96 mph. The importance factor is 1.15 and the exposure category is C. Wind loadings for the site are discussed in Subsection 3.3.1. This event is not significant impact than hurricanes and tornadoes.	1,4	None	No
	Surface Winds	2.3.2.1.2	Annually, the prevailing surface winds in the region are from the south to southeast while the average wind speed is about 10 mi per hour (mph) based on-site data from 2001 through 2006. As shown on Figures 2.3-208 through 2.3-210, the annual resultant wind vectors for the Dallas Fort Worth Airport, Mineral Wells, and CPNPP are 149°, 138°, and 153°, respectively. The annual average wind speeds for Dallas Fort Worth Airport, Mineral Wells, and CPNPP are 10.3, 9.0, and	1	None	No

Table 19-7-1 Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability Criteria[1]	Freq. (/yr)	Site Appl.
			9.8 mi per hour, respectively. In winter there is a secondary wind direction maximum from the north to northwest due to frequent outbreaks of polar air masses (Figures 2.3-274 and 2.3-306). Monthly and seasonal wind roses for the lower level CPNPP data are provided on Figures 2.3-278 through 2.3-293. On a monthly basis, these figures show the dominant south south-southeast wind direction. The seasonal wind rose plots show a significant additional north and north-northwest component in the winter and fall. The annual wind rose plot for CPNPP is provided on Figure 2.3-210. Monthly and seasonal wind roses for the upper level CPNPP data are provided on Figures 2.3-294 through 2.3-309. On a monthly basis, these figures show the dominant south-southeast wind direction. The seasonal wind rose plots show that the only significant north and north-northwest component is in the winter. The annual wind rose plot for CPNPP is provided on Figure 2.3-310. This event is not significant impact than hurricanes and tornadoes.			

NOTES
(1) Screening criteria categories
- "1" Lower damage potential than a design basis event
- "2" Lower event frequency of occurrence than another event
- "3" Cannot occur close enough to the plant to have an affect
- "4" Included in the definition of another event
- "5" Sufficient time to eliminate the source of threat or to provide an adequate response

Attachment 3

Marked-up FSAR Pages

11.2 LIQUID WASTE MANAGEMENT SYSTEM

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

11.2.1.5 Site-Specific Cost-Benefit Analysis

CP COL 11.2(5)

Replace the third paragraph in DCD Subsection 11.2.1.5 with the following.

A site-specific cost benefit analysis using the guidance of regulatory guide (RG) 1.110 was performed based on the site-specific calculated radiation doses as a result of radioactive liquid effluents during normal operations, including anticipated operational occurrences (AOOs). The result of the dose analysis indicated a public exposure of less than 1 person-rem per year resulting from the discharge of radioactive effluents, effecting a dose cost of less than $1000 per year, in 1975 dollars. Based on a population dose results of 2.14 person-rem per year (Total Body), 2.04 person-rem per year (Thyroid) and the equipment and operating costs as presented in RG 1.110, the cost benefit analysis demonstrates that addition of processing equipment of reasonable treatment technology is not favorable or cost beneficial, and that the design provided herein complies with Title 10, Code of Federal Regulations (CFR), Part 50, Appendix I.

11.2.1.6 Mobile or Temporary Equipment

CP COL 11.2(1)

Add the following text at the end of the paragraph in DCD Subsection 11.2.1.6.

Process piping connections ~~are designed to~~ have connectors different from the utility connectors to prevent cross-connection and contamination. The use of mobile or temporary equipment will require Luminant to address applicable regulatory requirements and guidance such as 10 CFR 50.34a, 10 CFR 20.1406 and RG 1.143. As such the purchase or lease contracts for any temporary and mobile equipment will specify the applicable criteria.

CTS-00839
RCOL2_11.02-1

11.2.2 System Description

CP COL 11.2(6)
CP COL 11.2(2)

Replace third paragraph in DCD Subsection 11.2.2 with the following.

Process flow diagrams with process equipment, flow data, tank batch capabilities, and key control instrumentation are provided to indicate process design, method of operation, and release monitoring for the site specific liquid waste management system (LWMS).

Figure 11.2-201, Sheets 1 through 910 illustrate the piping and process equipment, instrumentation and controls for Comanche Peak Nuclear Power Plant (CPNPP) Units 3 and 4 LWMS. RCOL2_11.02-2

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 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. RCOL2_11.02-2

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

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. RCOL2_11.02-4

Any leakage from the bypass valve 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_11.02-4

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.

11.2.3.1 Radioactive Effluent Releases and Dose Calculation in Normal Operation

CP COL 11.2(2) CP COL 11.2(4) Replace the ~~second and third sentences of the second paragraph~~last five paragraphs in DCD Subsection 11.2.3.1 with the following. CTS-00728

The annual average release of radionuclides is estimated by the PWR-GALE Code (Ref.11.2-13) with the reactor coolant activities that is described in Section 11.1. The parameters used by the PWR-GALE Code are provided in Table 11.2-9, and the calculated effluents are provided in Table 11.2-10R. The calculated effluents for the maximum releases are provided in Table 11.2-11R. On this site-specific application, handling of contaminated laundry is contracted to off-site services. Therefore, the detergent waste effluent need not be considered.

~~CP COL 11.2(2)~~ ~~CP COL 11.2(4)~~ ~~Replace the last four paragraphs in DCD Subsection 11.2.3.1 with the following.~~ CTS-00728

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

Once it is confirmed that the treated effluent meets discharge requirements, the effluent is released into Squaw Creek Reservoir via the CPNPP Units 1 and 2 circulating water return line. The liquid effluent is maintained at ambient temperature, as it is stored inside the auxiliary building (A/B) waste monitoring tanks. Currently, Squaw Creek Reservoir has a tritium concentration limit of

30,000 pCi/L (Reference 11.2-201). Based on an analysis, the tritium concentration in Squaw Creek Reservoir~~, the tritium concentration in Squaw Creek Reservoir~~ is anticipated to ~~be~~remain within the tritium limit due to the local rainfall, evaporation, and spillover (control release) from Squaw Creek Reservoir to Squaw Creek. CTS-00482 CTS-00729

However, during the maximum tritium generation condition (i.e., all four units operating at full power), the tritium concentration could be exceeded. When the tritium concentration in Squaw Creek Reservoir is determined to be close to the offsite dose calculation manual (ODCM) limit, as much as half of the liquid effluent from CPNPP Units 3 and 4 can be diverted to the evaporation pond for temporary staging. ~~A portion of the liquid effluent from CPNPP Units 3 and 4 discharge header can be diverted to an evaporation pond located within the site boundary. Under this maximum tritium generation condition, and maintaining a 20 percent margin below the offsite dose calculation manual (ODCM) limit, up to half of liquid effluent is diverted into the evaporation pond.~~ CTS-00805 HPSV-02 HPSV-02

When the tritium concentration in Squaw Creek Reservoir again decreases below the operating target, the effluent in the pond is sampled and analyzed for suitability to discharge back into Squaw Creek Reservoir. In the event that both CPNPP Units 1 and 2 are temporarily not in operation, or when there is no dilution flow, the CPNPP Units 3 and 4 waste holdup tanks (WHTs) and waste monitor tanks (WMTs) have enough capacity to store more than a month of the daily waste input. The evaporation pond can also receive 100 percent of the CPNPP Units 3 and 4 liquid effluent on a temporary basis. ~~It is noted that before CPNPP Units 1 and 2 retire, an evaluation is needed to address the requirement of the circulating water as dilution water to CPNPP Units 3 and 4 effluents.~~ CTS-00730 CTS-00730 HPSV-02

~~CPNPP Units 3 and 4 discharge header and the evaporation pond discharge lines are connected to the circulating water return line for CPNPP Units 1 and 2 in two locations before the circulating water is discharged into Squaw Creek Reservoir. The locations of the connections provide sufficient distance for thorough mixing before the liquid is released into Squaw Creek Reservoir.~~ The treated effluent release piping is non-safety and does not have any safety function. In addition, the Unit 1 flow receiver and head box, circulating water system and discharge box are not required to perform any safety function or important to safety functions. ~~The exact locations of the connections into the circulating water discharge header is determined in the detail design phase with consideration of the impact of sharing structure, system, and components (SSCs) among the nuclear units.~~ RCOL2_11.02-2 CTS-00731

The evaporation pond is designed to provide sufficient surface area for natural evaporation based on the local area rainfall, ~~and~~ evaporation ~~rate~~, and half of the liquid effluent. The evaporation pond is sized to prevent overflow due to local maximum rainfall condition. The pond design includes a transfer pump and discharge line ~~and transfer pump. A discharge line connects~~ into the CPNPP Units 1 and 2 circulating water return line to keep the pond from overflowing during periods of extreme weather conditions, and to forward the effluent to Squaw CTS-00732 CTS-00733

Creek Reservoir. The effluent is sampled before discharge and is monitored for radionuclide concentration by a radiation monitor which can turn off the pump, shut off the discharge valve and initiate an alarm signal to the Main Control Room and the Radwaste Control Room for operator actions. Doses from airborne particulates from the evaporation pond are described in Subsection 11.3.3. HPSV-02 HPSV-02

The 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. The bottom of the pond is sloped towards the leak drainage pit and a separate discharge pump pit. The leak drainage pit is a small pit underneath the two layers of HDPE, and leakage through the HDPE is caught and detected in this pit. The discharge pump pit is designed to faciliate pumping water out of the pond and is equipped with a discharge pump. An operating requirement is established to wash the pond and discharge the wash water to a flow receiver and head box for disposal each time the pond is drained. Based on the design evaluation, the pond does not need to be used continuously, because during normal operating conditions and anticipated operational occurrences, diversion of flow is not required. Diversion is required only when the tritium concentration in the SCR is approaching the set limit due to adverse meteorological conditions (e. g., drought condition leading to minimal spillover). The pond also has a berm to minimize infiltration of storm water. These design features (using HDPE, the leak detection pit, and sloping towards the drainage pit for discharge) and operating procedures (cleaning, diversion only when required) ensure ease of decontamination and minimization of cross contamination (leakage to the groundwater), and thus satisfy 10 CFR 20.1406 and RG 4.21. RCOL2_11.02-3

The evaporation pond discharge pump and discharge isolation valve are under supervisory control. Prior to discharge, multiple effluent samples around the pond perimeter are required to ensure the pond effluent meets the discharge specifications. The evaporation pond is a relatively small pond. The effluent to the pond has been filtered and ion exchanged and it is expected that effluent concentration in the pond is uniform. Stagnation and stratification of concentrations is not expected. This is confirmed by obtaining representative samples from the pond. The bottom of the pond is designed to be sloped towards the discharge pit to facilitate complete drainage. The pond is washed each time the contents are emptied to significantly reduce the potential for accumulation of residual contamination. Further, a radiation monitor is located close to the pump discharge to monitor the radiation level of the contents. The radiation monitor alarms in the Main Control Room and the Radwaste Operator Control Room and also isolates the pump and its discharge valve in the unlikely event of the content exceeding the setpoint. The radiation monitor setpoint for the evaporation pond discharge is the same as that used at the Waste Monitor Tank discharge.

Isotopic concentrations are calculated, assuming 247,500 gpm per unit of circulating water from CPNPP Units 1 and 2 (Reference 11.2-201, ODCM for CPNPP Units 1 and 2). The isotopic ratios between the expected releases and the concentration limits of 10 CFR 20 Appendix B are listed in Table 11.2-12R. The isotopic ratios between the maximum releases and the concentration limits of 10

CFR 20 Appendix B are listed in Table 11.2-13R. These ratio values are less than the allowable value of 1.0.

The individual doses and population doses are evaluated with the LADTAP II Code (Reference 11.2-14). The site-specific parameters used in the LADTAP II Code are listed in Table 11.2-14R, and the calculated individual doses are listed in Table 11.2-15R. And the calculated population dose from liquid effluents is 2.14 person-rem for whole-body and 2.04 persom-rem for thyroid. Based on these parameters, the maximum individual dose to total body is 0.90 mrem/yr (adult) and the maximum individual dose to organ is 1.28 mrem/yr (teenager's liver). These values are less than the 10 CFR 50 Appendix I criteria of 3 mrem/yr and 10 mrem/yr, respectively. Evaluating the dose contribution from the evaporation pond (conservatively assuming 50% evaporation of the diverted flow) amounts to 1.15E-01 mrem/yr (Adult's GI-Tract) described in FSAR Table 11.3-204 and the combined dose from the vent stack gaseous emission and the evaporation pond emission amounts to 2.73E+00 mrem/yr (Adult's GI-Tract) described in FSAR Table 11.3-205, which is well within the 10 CFR Appendix I limit. Based on the above, the evaporation pond meets the acceptance criteria of SRP 11.2. With regards to RG 1.143, RG 1.143 does not provide any guidance on specific design requirements for an evaporation pond. Hence RG 1.143 is not applicable to the desing of the evaporation pond.According to NUREG-0543 (Reference 11.2-202), there is reasonable assurance that sites with up to four operating reactors that have releases within Appendix I design objective values are also in conformance with the EPA Uranium Fuel Cycle Standard, 40 CFR 190. Once the proposed CPNPP Units 3 and 4 are constructed, the Comanche Peak site will consist of four operating reactors. RCOL2_11.02-3

11.2.3.2 Radioactive Effluent Releases Due to Liquid Containing Tank Failures

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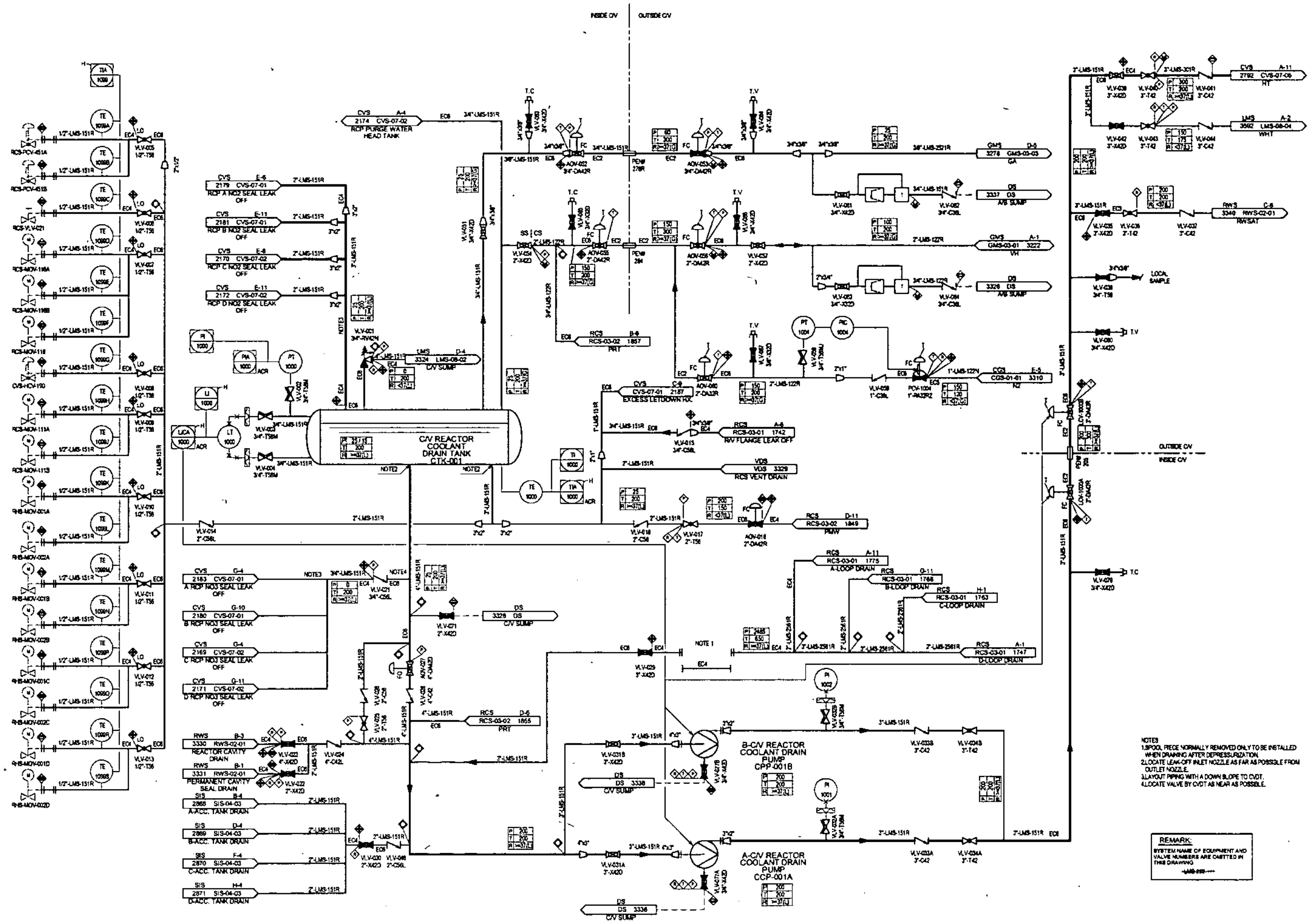
CP COL 11.2(3) Replace the last paragraph in DCD Subsection 11.2.3.2 with the following.

Site-specific hydrogeological data indicate that contaminant migration time is about two years (see Subsection 2.4.12), exceeding the travel time used in the above analysis. Additionally, the tank cubicles are equipped with drainpipes to a local sump that is designed to detect leakage and/or overflow, and initiate an alarm for operator action. Hence, the potential for groundwater contamination is greatly reduced and further analysis is not warranted.

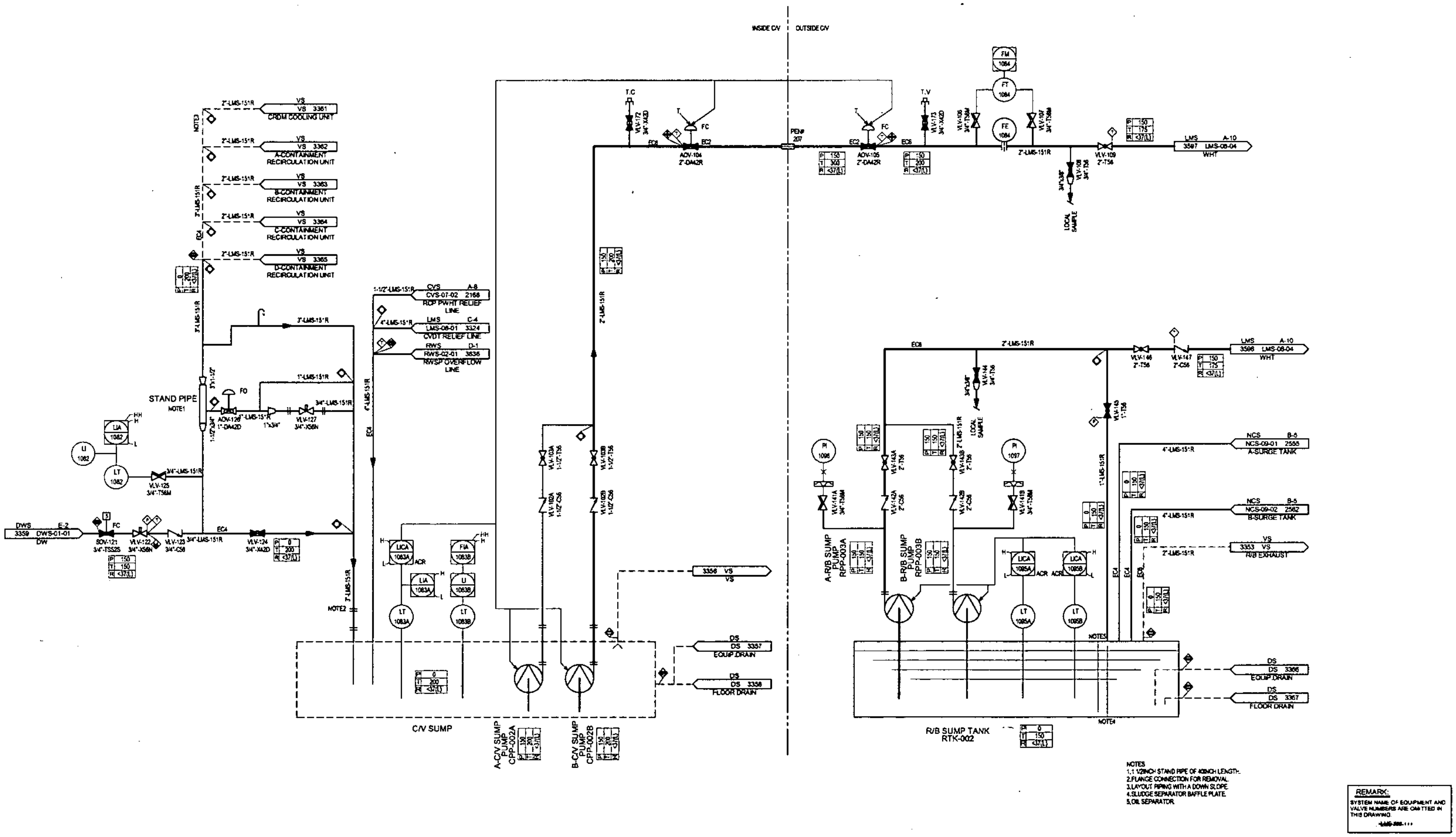
CP SUP 11.2(1) Add the following Subsection after DCD Subsection 11.2.3.3. HPSV-02



CP COL 11.2(6)

Figure 11.2-201 Liquid Waste Management System Piping and Instrumentation Diagram (Sheet 1 of ~~9~~10)

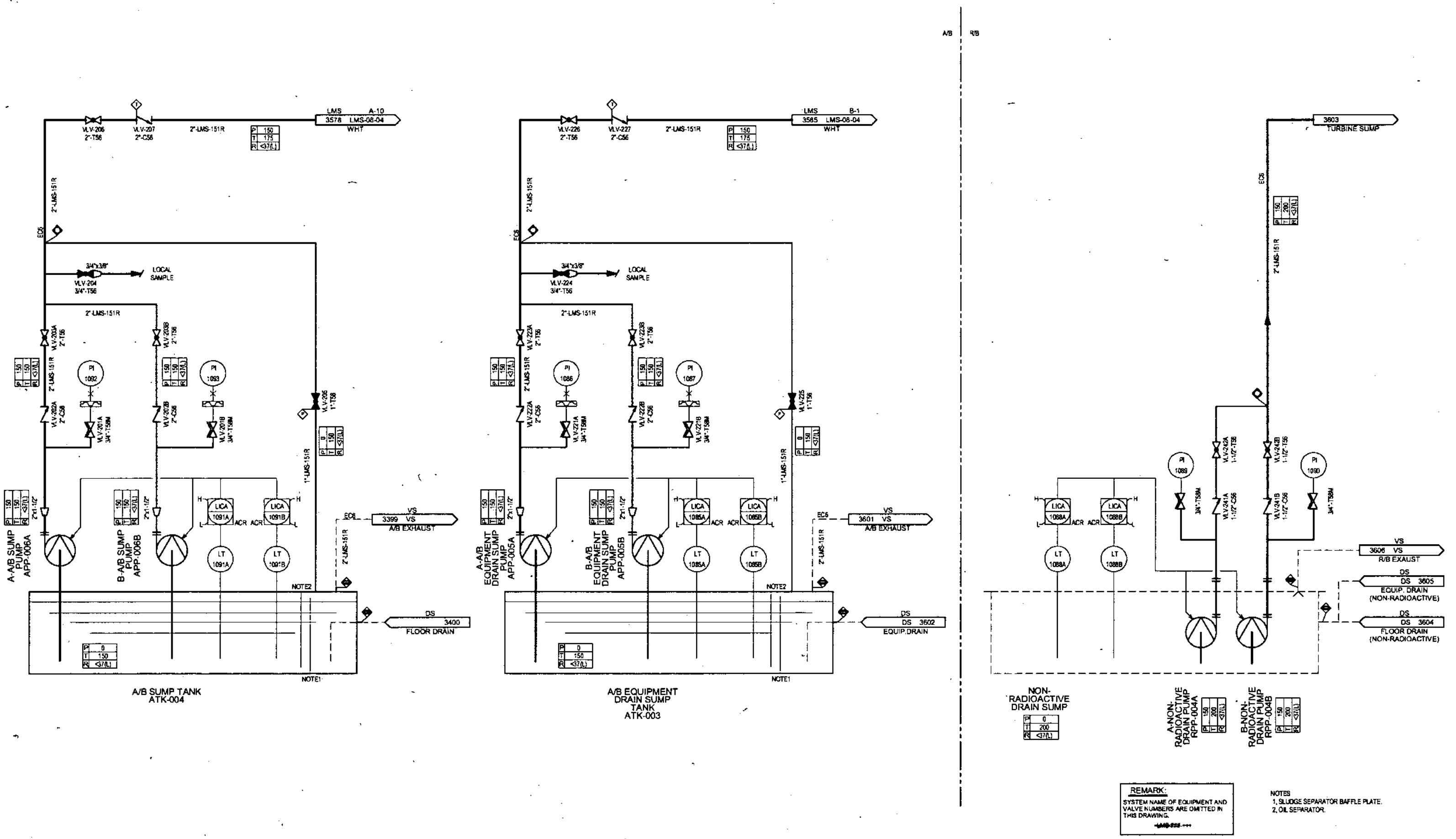
RCOL2_11.0 2-2



CP COL 11.2(6)

Figure 11.2-201 Liquid Waste Management System Piping and Instrumentation Diagram (Sheet 2 of ~~9~~10)

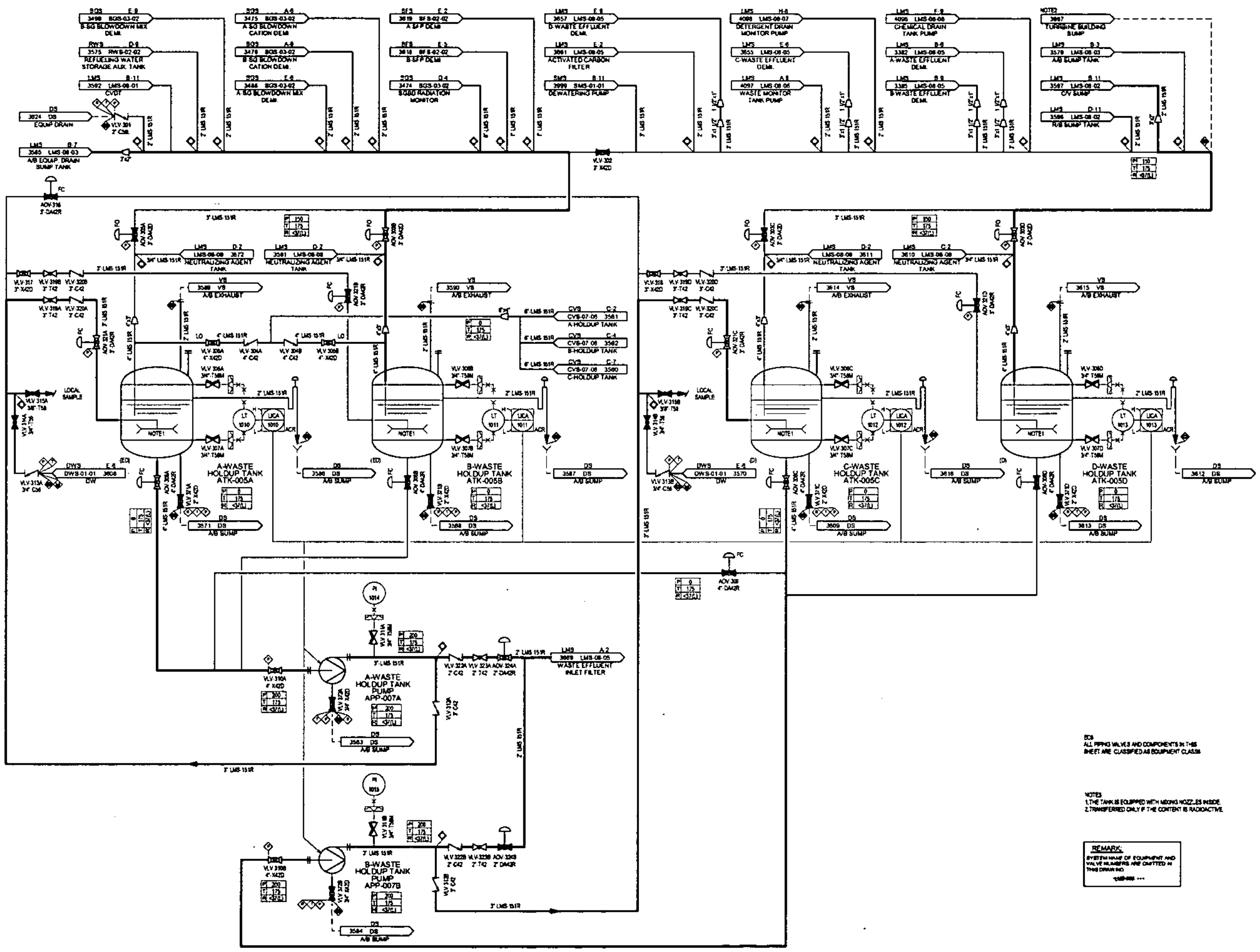
RCOL2_11.0 2-2



CP COL 11.2(6)

Figure 11.2-201 Liquid Waste Management System Piping and Instrumentation Diagram (Sheet 3 of ~~9~~10)

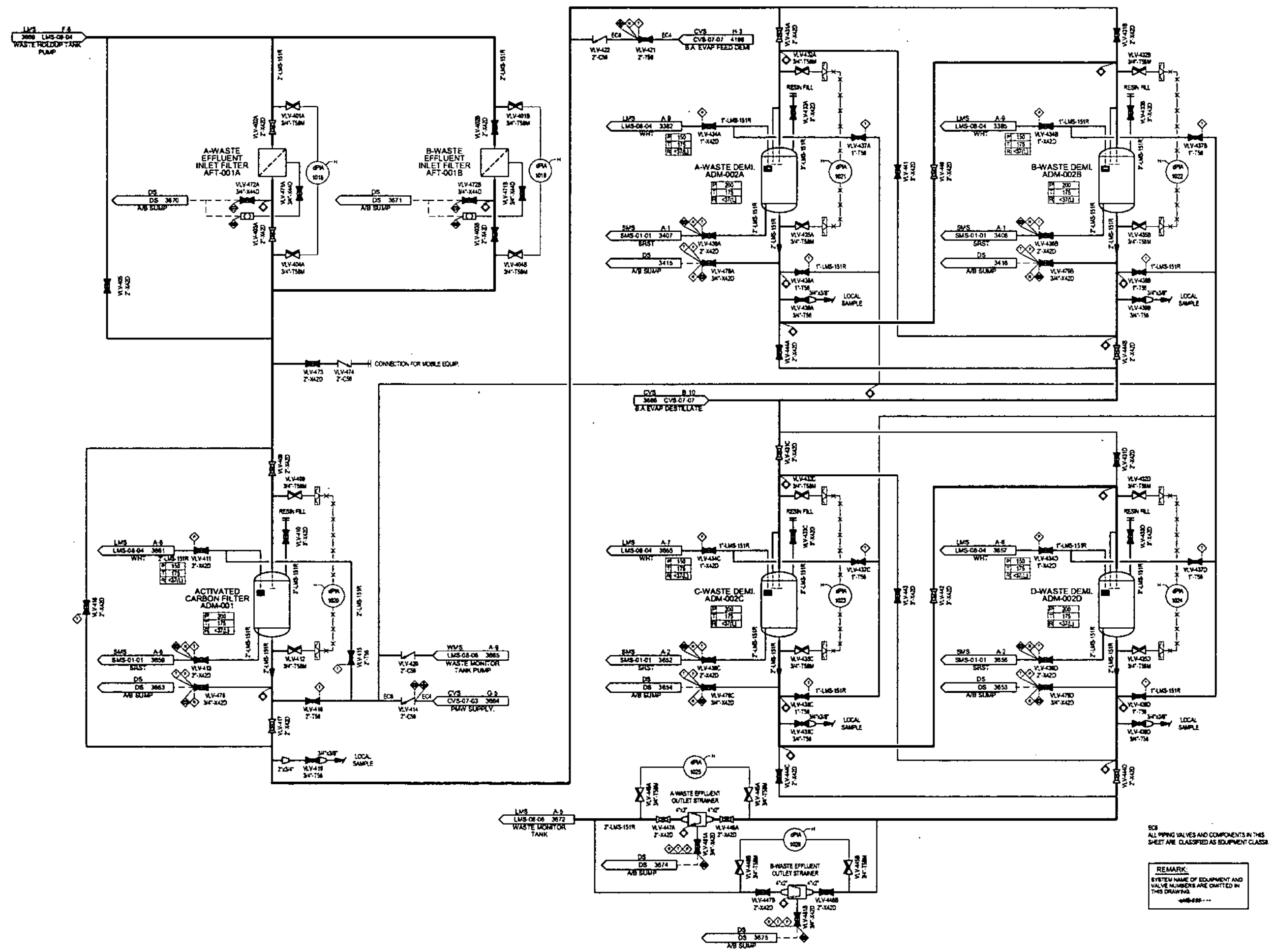
RCOL2_11.02-2



CP COL 11.2(6)

Figure 11.2-201 Liquid Waste Management System Piping and Instrumentation Diagram (Sheet 4 of ~~9~~10)

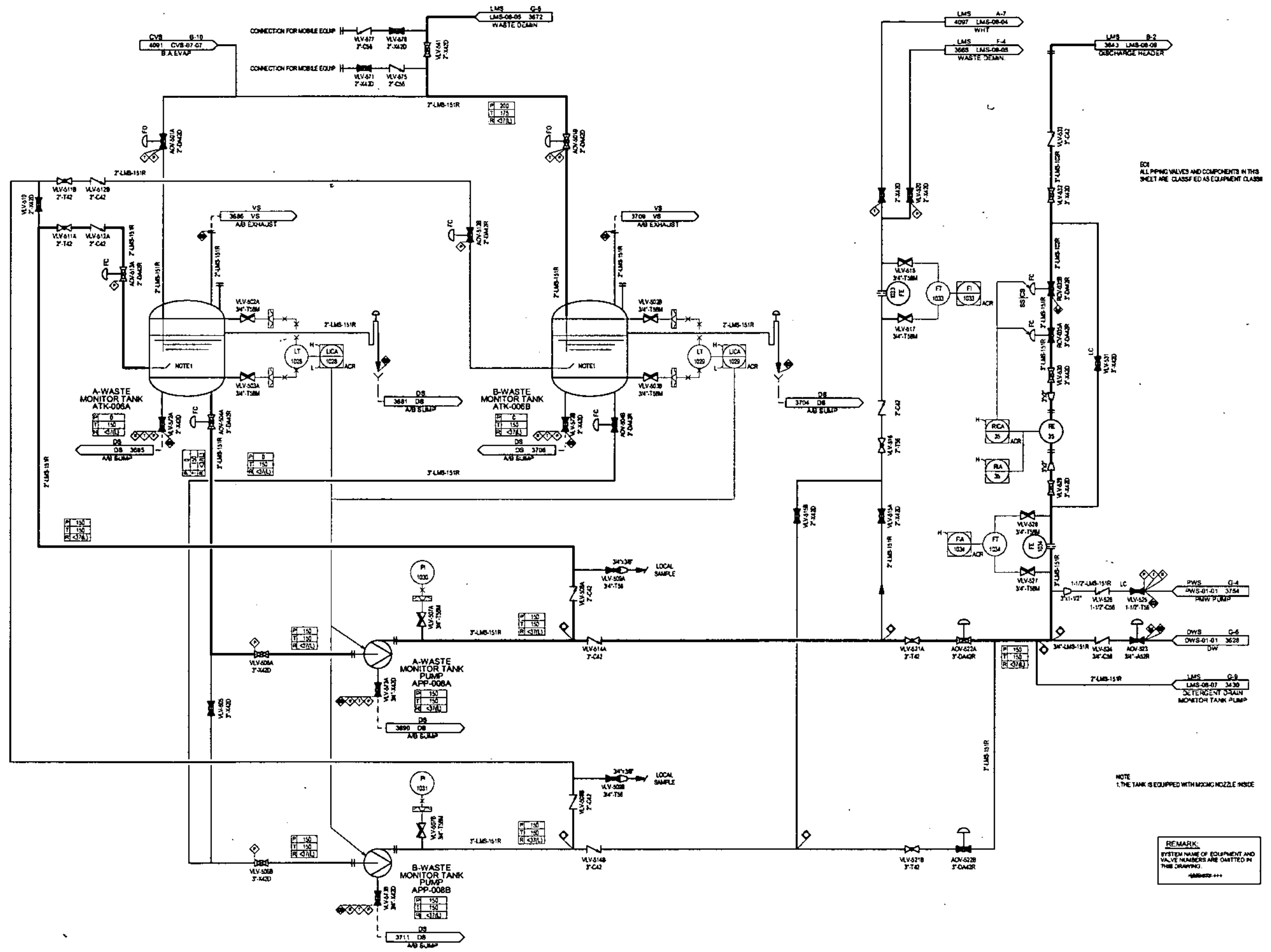
RCOL2_11.02-2



CP COL 11.2(6)

Figure 11.2-201 Liquid Waste Management System Piping and Instrumentation Diagram (Sheet 5 of ~~9~~10)

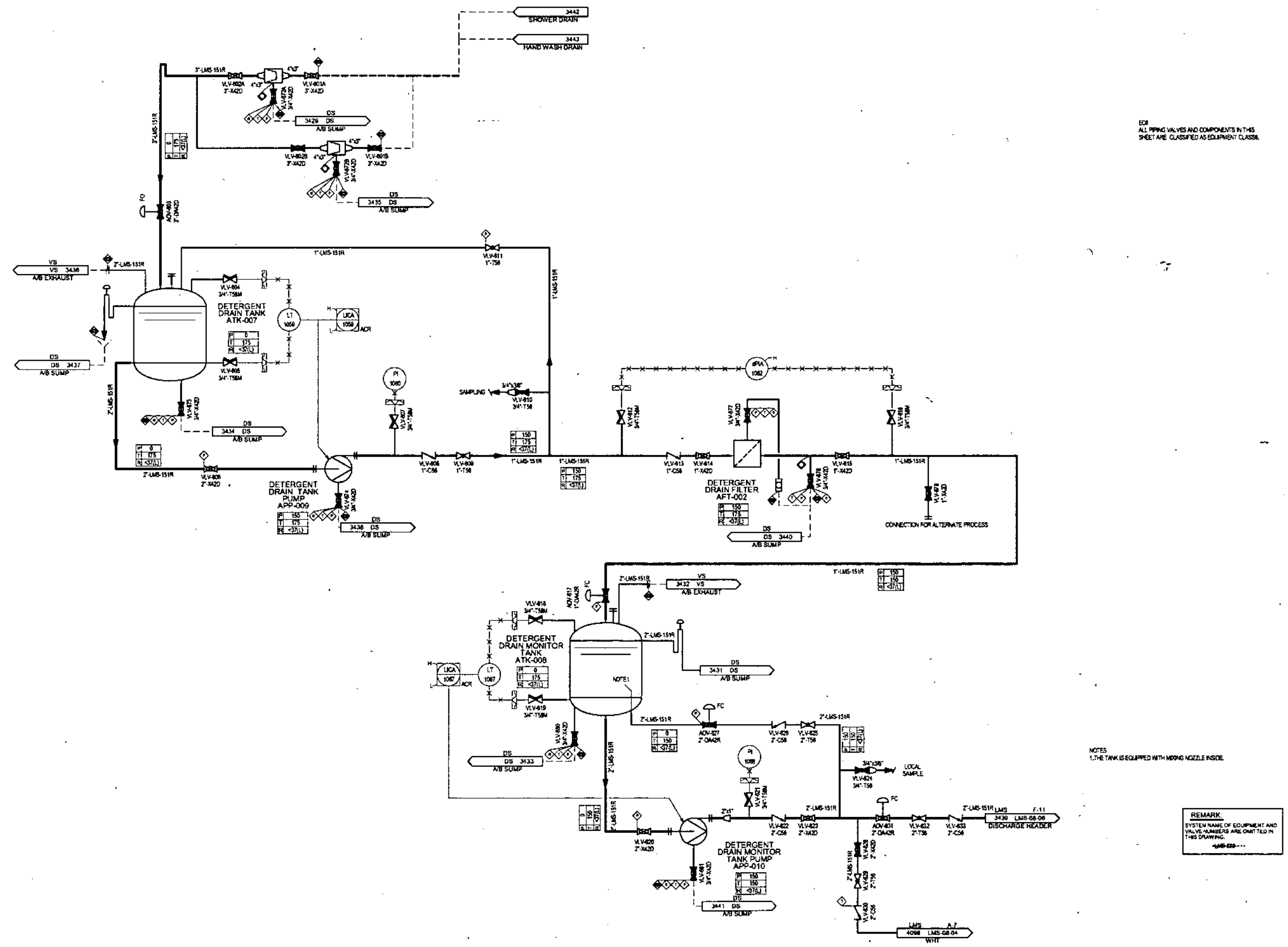
RCOL2_11.0 2-2



CP COL 11.2(6)

Figure 11.2-201 Liquid Waste Management System Piping and Instrumentation Diagram (Sheet 6 of ~~9~~10)

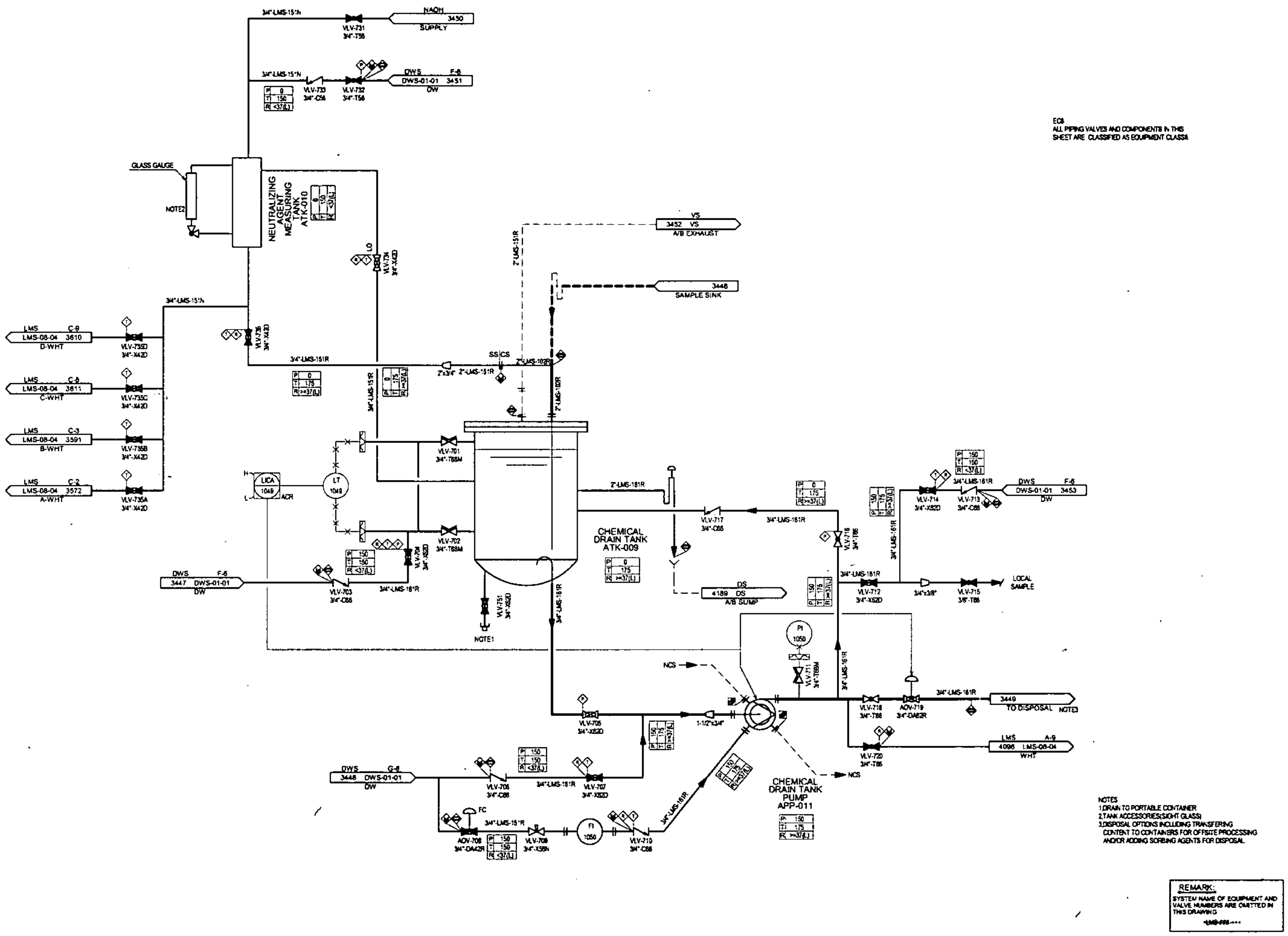
RCOL2_11.02-2



CP COL 11.2(6)

Figure 11.2-201 Liquid Waste Management System Piping and Instrumentation Diagram (Sheet 7 of ~~9~~10)

RCOL2_11.02-2

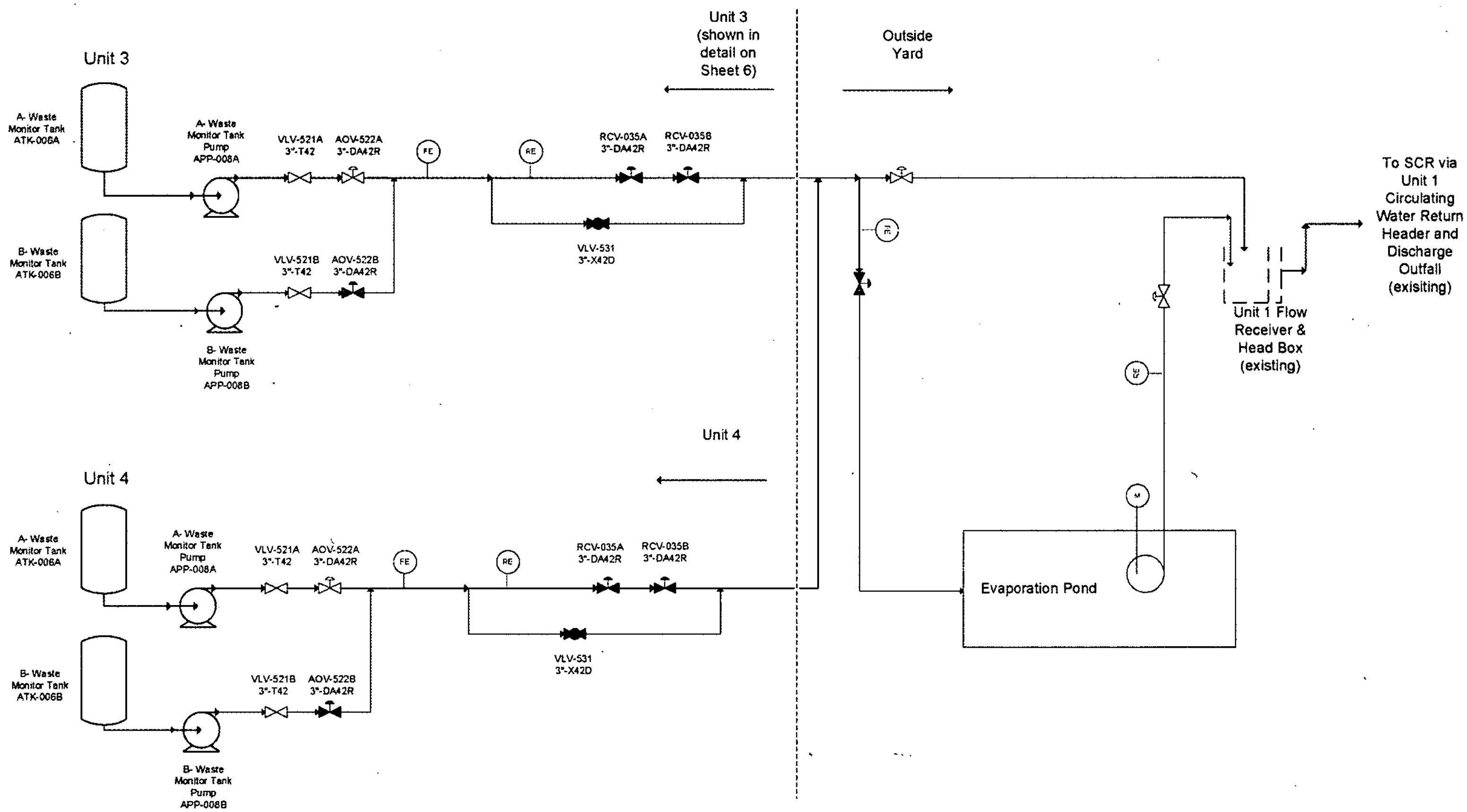


CP COL 11.2(6)

Figure 11.2-201 Liquid Waste Management System Piping and Instrumentation Diagram (Sheet 8 of ~~9~~10)

RCOL2_11.02-2

RCOL2_11.0 2-3



HPSV-02

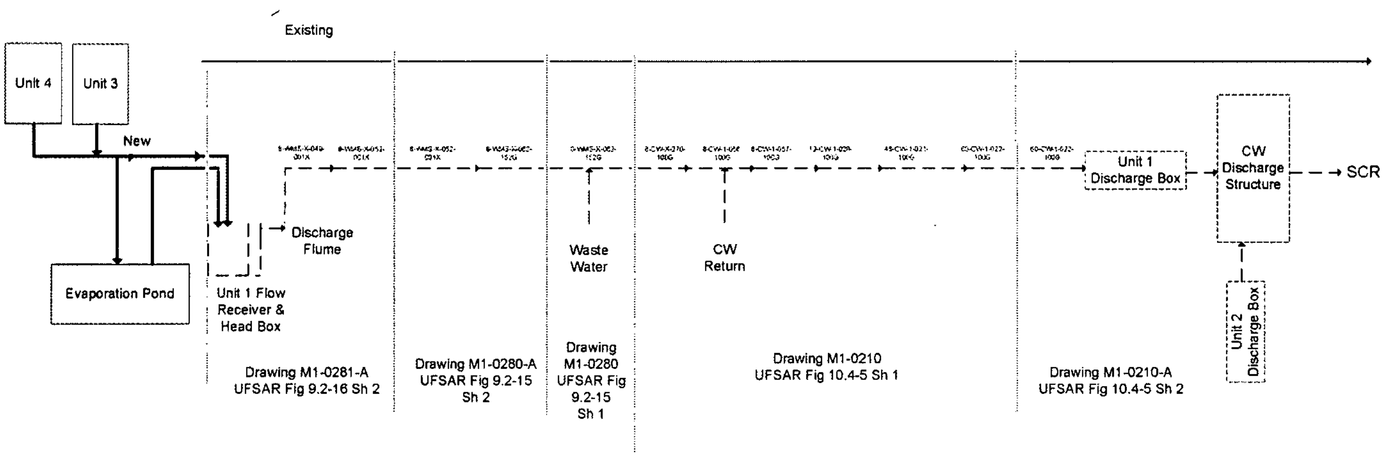
CP COL 11.2(6)

Figure 11.2-201 Liquid Waste Management System Piping and Instrumentation Diagram (Sheet 9 of ~~9~~10)

RCOL2_11.0 2-2

CPNPP Units 3 and 4 Discharge Schematic

RCOL2_11.0
2-2



CP COL 11.2(6)

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

RCOL2_11.0
2-2

Adoption of CTWs to the UHS for the ESWS raises an additional failure mode for the ESWS, which is the failure of CTW fans. Failure of the CTW fans would cause degradation of heat release from the ESWS to the atmosphere, which would result increase of the ESWS temperature in the faulted train. Failure of both fans in a single CTW train is considered a potential failure mode of the ESWS.

Failures of CTW fans were modeled in ESWS fault tree to address the effect of site-specific UHS. The reliability of ESWS affects both the initiating event frequency of loss of CCW and the reliability of ESWS after the initiating event. Therefore, the initiating event frequency given later in this subsection based on the US-APWR design was re-quantified based on the site-specific ESWS designs along with re-quantification of post-initiating event ESWS reliability.

Assumptions and important design features regarding the UHS and ESWS are as follows:

- A drain line is provided as an overfill protection from overfilling the basin and failing the pump(s).
- There are adequate low-level and high-level alarms to provide rapid control room annunciation of a level problem and to allow adequate time to confirm the level and take effective action to address it.
- On failure of the fans during normal plant operation, operating status of each fan is indicated in the main control room (MCR).
- Should the plant trip, the basins can be effective in removing decay heat more than 24 hours ~~assuming nominal conditions but the hottest day of the year. This can be achieved by one fan per tower operating~~. RCOL2_19-6
- The transfer line is a high integrity line, regularly tested and inspected for corrosion.
- Failure of the transfer line will not drain any CTW basin.
- The basin water is tested regularly and maintained in a condition to preclude corrosion and organic material from plugging strainers.
- Ventilation of the ESWP room is reliable not to significantly degrade the unavailability of ESWP.

The internal event core damage frequency (CDF) was found to be numerically the same as reported later in this subsection with an actual increase in the CDF due to the site-specific designs of less than 1 percent. The initiating event frequency for loss of component cooling water (CCW), as reported later in this subsection in Tables 19.1-2 and 19.1-20, increases from 2.3E-05/reactor-year (RY) to 2.4E-05/RY due to the site-specific ESWS designs. The effect of the site-specific ESWS designs on the internal CDF is very small. Therefore, any discrepancy of ~~importance,~~ cutsets, and dominant sequences from that documented for the standard US-APWR design is considered negligible. Changes in importance are the basic events related to the site-specific design shown in Table 19.1-202. ~~and t~~The results described below are considered sufficient and applicable. RCOL2_19-5

19.1.4.2.2 Results from the Level 2 PRA for Operations at Power

CP COL 19.3(4) Add the following text after the first sentence in DCD Subsection 19.1.4.2.2.

The only site-specific design that has potential effect on level 2 PRA is the site-specific UHS.

As is the case of the Level 1 PRA for operations at power (Subsection 19.1.4.1.2), modeling of the site-specific UHS results in small effect on the reliability of the component cooling water system (CCWS) for internal events. There is only small increase of CDF resulting from loss of CCW initiating events, also the contribution of total loss of CCW initiation event to the large release frequency (LRF) for operations at power is considered insignificant. It has been therefore determined that consideration of the site-specific UHS would have no discernible effect on the Level 2 PRA results that are based on the standard US-APWR design. Therefore, the results described below are considered sufficient and applicable.

19.1.5 Safety Insights from the External Events PRA for Operations at Power

CP COL 19.3(4) Replace the last two paragraphs in DCD Subsection 19.1.5 with the following.

The last three events listed above receive detailed evaluation in the following subsections. The first four events are subject to the screening criteria consistent with the guidance of ANSI/ANS-58.21-2007, taking into consideration the features of advanced light water reactors.

The assessment of the other external events is provided below:

The screenings for other external events are performed using the following steps taking into consideration the features of advanced light water reactors. At first, qualitative screenings are performed because they are easy to obtain lower risk from advanced reactors design features or site characteristics. The qualitative screenings are performed using the analysis reported in Chapter 2 in accordance with the guidelines of ANSI/ANS-58.21-2007. Section 4.4 of the standard defined the initial preliminary screening criteria as supporting technical requirement EXT-B1. The five qualitative screening criteria are: RCOL2_19-2 RCOL2_19-7

1. Lower damage potential than a design basis event

2. Lower event frequency of occurrence than another event RCOL2_19-2 RCOL2_19-7

3. Cannot occur close enough to the plant to have an affect

4. Included in the definition of another event

5. Sufficient time to eliminate the source of threat or to provide an adequate response

Following the qualitative screenings, quantitative screenings are performed. The supporting technical requirement EXT-B2 of ANSI/ANS-58.21-2007 states that the criteria provided in the 1975 Standard Review Plan can be used as an acceptable basis for the screening criteria of external events. The criteria are:

i. the contribution to core damage frequency (CDF) is less than 10^{-6}/year, or

ii. the design-basis event at annual frequencies of occurrence is between 10^{-7} and 10^{-6}.

For Comanche Peak Units 3 and 4, a value of 10^{-7} for the annual frequency of occurrence is used as a more conservative quantitative screening criterion. If an event frequency is greater than 10^{-7}/year, perform bounding analysis or PRA to confirm that the risk is sufficient lower for advanced light water reactors such as less than 1% of total CDF. The remaining external events which do not meet the above screening criteria are assessed using a bounding analysis.

The qualitative and quantitative screenings are performed using the analysis reported in the FSAR Chapter 2 section 2.2, section 2.3, and section 2.4, and Chapter 3 section 3.5. The summary of the screenings are described in Table 19.1-201. Only Tornadoes is not screened because the probability of expected maximum tornado wind speed on the site is close to 10^{-7}.

High Winds and Tornadoes

For high winds and tornadoes, tornadoes are evaluated using level 1 PRA as a bounding analysis from the discussion in subsection 2.3.1.2.3.

The following sections show the results of the tornado PRA elements (1) tornado hazards, (2) plant vulnerabilities, (3) accident scenario, and (4) quantification.

- Tornado hazard

  A tornado wind speed hazard curve for CPNPP Units 3 and 4 was developed following NUREG/CR-4461 which also forms the basis for NRC Regulatory Guide 1.76. The tornado hazard methodology developed in NUREG/CR-4461 fully meets the requirements of ANSI/ANS 58.21-2007 (Reference 19.1-8).

Four-train separation is maintained in the site-specific UHS design. Modeling of the site-specific UHS shows a small effect on the reliability of CCWS for internal fire events. As was the case with the results of the Level 1 PRA for operations at power (Subsection 19.1.4.1.2), it has been determined that consideration of the site-specific UHS would have no discernible effect on the fire PRA results that are based on the standard US-APWR design. Therefore, the results described below are considered sufficient and applicable.

19.1.5.3.2 Results from the Internal Flooding Risk Evaluation

CP COL 19.3(4) Add the following text at the beginning of DCD Subsection 19.1.5.3.2.

The only site-specific design that has potential effect on internal flooding risk is the site-specific UHS.

Four-train separation is maintained in the site-specific UHS design. Modeling of the site-specific UHS shows a small effect on the reliability of CCWS for internal flooding events. As was the case with the results of the Level 1 PRA for operations at power (Subsection 19.1.4.1.2), it has been determined that consideration of the site-specific UHS would have no discernible effect on the internal flooding PRA results that are based on the standard US-APWR design. Therefore, the results described below are considered sufficient and applicable.

19.1.6.2 Results from the Low-Power and Shutdown Operations PRA

CP COL 19.3(4) Add the following text at the beginning of DCD Subsection 19.1.6.2.

The only site-specific design that has potential effect on low-power and shutdown risk is the site-specific UHS.

As was the case with the Level 1 PRA for operations at power (Subsection 19.1.4.1.2), modeling of the site-specific UHS shows a small effect on the reliability of CCWS for internal events. Considering the small increase of loss of CCW initiating event frequency, it has been determined, that consideration of the site-specific UHS would have no discernible effect on the low-power and shutdown (LPSD) results that are based on the standard US-APWR design. Therefore, the results described below are considered sufficient and applicable.

19.1.7.1 PRA Input to Design Programs and Processes

RCOL2_19-5
RCOL2_19-6

CP COL 19.3(4) Add the following text after the last sentence of DCD Subsection 19.1.7.1. RCOL2_19-5 RCOL2_19-6

Site-specific key assumptions are summarized in Table 19.1-206.

19.1.7.3 PRA Input to the Reactor Oversight Process

STD COL 19.3(3) Replace the content of DCD Subsection 19.1.7.3 with the following.

PRA input is provided to evaluate mitigating systems performance indicators and to develop the significant determination process. As part of the reactor oversight process, mitigating systems performance indicators will be evaluated based on the parameters and methodologies described in NEI 99-02 (Reference 19.1-202). PRA inputs to this process are as described in Appendix G of NEI 99-02. The significance determination process will use risk insights, where appropriate, to determine the safety significance of inspection findings.

19.1.7.6 PRA Input to the Technical Specification

CP COL 19.3(1) Replace the last paragraph in DCD Subsection 19.1.7.6 with the following.

Luminant will update PRA and severe accident (SA) evaluation considering the site-specific design before the first fuel load, and the obtained PRA insights will be provided as required to implement the RMTS and SFCP.

19.1.9 References

Add the following references after the last reference in DCD Subsection 19.1.9.

19.1-201 *Risk-Informed Method for Control of Surveillance Frequencies*, NEI 04-10, Rev. 1, Nuclear Energy Institute, Washington DC, April 2007.

19.1-202 *Regulatory Assessment Performance Indicator Guide*, NEI 99-02, Rev. 5, Nuclear Energy Institute, Washington DC, July 2007.

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 1 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[(1)]	Freq. (/yr)	Site Appl.
Nearby Industrial, Transportation and Military facilities	Explosion	2.2.3.1.1	- Transportation Routes (2.2.3.1.1.1) The nearest commercial traffic is FM 56, which passes approximately 1.4 mi west-southwest of the nearest safety-related structure of CPNPP Units 3 and 4. An evaluation performed for materials with a TNT equivalency of 2.24 and using the maximum cargo for two trucks determined the safe distance to be 0.52 mi. There is considerable margin between the required safe distance and the actual distance to the nearest safety-related structure (1.4 mi). Also there are no navigable waterways used for commercial shipping within 5 mi of the CPNPP Units 3 and 4 sites, and there are no main railroad lines within 5 mi of CPNPP Units 3 and 4 . - Nearby Industrial Facilities (2.2.3.1.1.2) Subsection 2.2.2.1 identifies the following facilities located within 5 mi of CPNPP Units 3 and 4, along with any potential hazardous material stored at those locations: the IESI Somervell County Transfer Station; Wolf Hollow 1, LP; the DeCordova SES; the Glen Rose Medical Center; the Glen Rose WWTP; the Texas Department of Transportation Maintenance Station; and Cleburne Propane. Subsection 2.2.1 identifies six registered petroleum storage tanks within 5 mi of the CPNPP Units 3 and 4 sites. The contents, capacities, and locations of the tanks relative to CPNPP Units 3 and 4 are summarized in Table 2.2-201. Those are not to be volatile enough to represent a hazard at the CPNPP Units 3 and 4 sites because of the safe standoff distance or insignificant potential hazards.	1, 3	None	No

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 2 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability Criteria(1)	Freq. (/yr)	Site Appl.
			- On-site Explosion Hazards (2.2.3.1.1.3) Gas explosions from on-site sources outside containment at CPNPP Units 3 and 4 are not credible sources of missile generation per DCD Subsection 3.5.1.1.2.1. The chemicals used for the Makeup Water Treatment System are not flammable or explosive. - Gas Wells - Explosion (2.2.3.1.1.4) One technique used to control wellhead fires is the use of explosives to remove the oxygen from the air and thereby suffocate the fire. Potential wellhead fires in the Barnett Shale formation do not have sufficient flow rates to warrant the use of explosives to extinguish them.			
	Flammable Vapor Clouds	2.2.3.1.2	- Transportation Routes (2.2.3.1.2.1) For the evaluation of the potential effects of accidents on FM 56, a single tanker truck volume of 9600 gal was assumed along with assumed rupture sizes of 4.5 square meters (m2) and 1 m2 located at the bottom of the tank. The release rates, puddle formation, and evaporation rates were calculated by the ALOHA code. These evaluations determined that for all cases there is a negligible overpressure at the site resulting from ignition of a vapor cloud, and the concentrations remain below the lower explosive limit at CPNPP Units 3 and 4. - Industrial Facilities (2.2.3.1.2.2) There are five possible sources that may release prolpane into the environment from Cleburne Propane (four tanks and three trucks). Of these sources, the largest volume of	1, 3	None	No

Table 19.1-201 (Sheet 3 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

RCOL2_19-2
RCOL2_19-7

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
			propane is housed in an 18,000-gal tank. Large rupture sizes of 5 m2 and 1 m2 were examined for this faciliy. The release rates were calculated by the ALOHA code. The evaluation determined that there is a negligible overpressure in the area of CPNPP Units 3 and 4 resulting from a delayed ignition of a valpor cloud, and the concentrations at the CPNPP Units 3 and 4 sites are negligible. - Pipeline (2.2.3.1.2.3) Table 2.2-213 provides detailed information on the pipelines that were evaluated. These pipelines bound the potential effects to CPNPP Units 3 and 4.For the natural gas pipelines, the gas releases were calculated using the ALOHA code assuming each pipeline was connected to an infinite source so that gas escapes from the broken end of the pipeline at a constant rate for an indefinite period of time. The ALOHA results demonstrate that there is a negligible overpressure in the area of CPNPP Units 3 and 4 resulting from ignition of the gas cloud and that the concentration of the natural gas at the CPNPP Units 3 and 4 site remains below 2260 parts per million (ppm), which is well below the lower flammability limit of 44,000 ppm. For the Sunoco crude oil pipeline, both large breaks and small breaks were analyzed. The resulting overpressure at the nearest safety-related structure is 0.274 psi, which is			

Table 19.1-201 (Sheet 4 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

RCOL2_19-2
RCOL2_19-7

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
			much less than the 1 psi acceptance criteria. The vapor concentration at the CPNPP Units 3 and 4 control room intake is less than 8600 ppm, which is less than the LEL of 13,000 ppm. For the small breaks, a leak rate of 0.62 cfs was assumed for a period of 32 hours (hr). The concentration at the CPNPP Units 3 and 4 control room intakes is below 8680 ppm, which is below the LEL of 13,000 ppm. The Sunoco crude oil pipeline does not represent an explosion or flammable vapor cloud hazard at CPNPP Units 3 and 4. - Gas Wells (2.2.3.1.2.4) The closest functioning natural gas well, owned and ogerated by XTO Energy Inc., is 1.2 mi from the center point of CPNPP Units 3 and 4. For the purposes of evaluating the consequences of breaching a well, a gas release rate of 15.6 million cu ft/day was assumed. The analysis shows that, at the assumed release rate, the area of flammability is less than 0.1 mi downwind from a gas well release. The results show that the maximum concentration at the CPNPP Units 3 and 4 control room intakes is 346 ppm, which is well below the LEL concentration of 44,000 ppm. The maximum overpressure at the closest safety-related structure resulting from ignition of the natural gas cloud is negligible. The analysis also shows the overpressure from a gas explosion does not exceed 1 psig at a distance less than 0.1 mi from the cloud. It is concluded that the delayed ignition of vagor clouds from nearby transportation routes, pipelines, and			

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 5 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
			facilities does not pose a hazard to CPNPP Units 3 and 4.			
	Toxic Chemicals	2.2.3.1.3 6.4.4.2	For releases of hazardous chemicals from stationary sources or from frequently shipped mobile sources in quantities that do not meet the screening criteria, detailed analyses for control room habitability are discussed in Section 6.4. - Mobile Sources (2.2.3.1.3.2.1) Of the three mobile sources (road, railroad, and waterway), only roadways are within 5 mi of the site; neither railroads nor waterways need be considered further based on the distance criteria prescribed in Regulatory Guide 1.78. Based on a postulated chlorine release, the quantity of hazardous material that may transverse FM 56 is greater than the acceptable quantity as identified in Regulatory Guide 1.78. The frequency of a hazardous chemical release on roads was also examined. Results show the total frequency for a road-based hazardous material release is higher than the 1.0E-6 screening frequency of Regulatory Guide 1.78. Therefore, a more detailed control room habitability analysis is necessary for roadway transportation. Table 2.2-214 summarizes the chemical, quantity, and distance to the nearest CPNPP Units 3 and 4 MCR inlets to be considered for the control room habitability analysis in Section 6.4. - Stationary Sources (2.2.3.1.3.2.2) The fixed facilities that could not be initially screened out based on the chemicals stored at the facility are: Wolf Hollow I, LP; Cleburne Propane; DeCordova SES; and	1	None	No

Table 19.1-201 (Sheet 6 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

RCOL2_19-2
RCOL2_19-7

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
			Glen Rose WWTP. Table 2.2-214 summarizes the chemicals that do not meet the Regulatory Guide 1.78 screening criteria, and the quantity and distance to the nearest CPNPP Units 3 and 4 MCR inlets to be considered for the control room habitability analysis in Section 6.4. Section 6.4.4.2 performed the analysis on the design based control room habitability to specific toxic chemicals of mobile and stationary sources. Using conservative assumptions and input data for chemical source term, CPNPP Units 3 and 4 control room parameters, site characteristics, and meteorology inputs, postulated chemical releases are analyzed for maximum value concentration to the MCR using the HABIT code, version 1.1. RG 1.78 specifies the use of HABIT 1.1 software for evaluating control room habitability. Instrumentation to detect and alarm a hazardous chemical release in the vicinity of CPNPP Units 3 and 4, and to automatically isolate the control room envelope (CRE) from such releases is not required based on analyses described in Subsection 6.4.4.2. No hazardous chemicals concentrations in the MCR exceeded the IDLH criteria of RG 1.78.			
	Fires	2.2.3.1.4	Fires originating from accidents at any of the facilities or transportation routes discussed previously would not endanger the safe operation of the station because of the distance between potential accident locations and CPNPP Units 3 and 4. The location of CPNPP Units 3 and 4 is at least 0.25 mi awall from any potential accident location. The nuclear island is situated sufficiently clear of trees and	1, 3	None	No

Table 19.1-201 (Sheet 7 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

RCOL2_19-2
RCOL2_19-7

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
			brush. The distance exceeds the minimum fuel modification area requirements of 30 ft. per NFPA-1144. There is no threat from brush or forest fires. Fire and smoke from accidents at nearby homes, industrial facilities. transportation routes, or from area forest or brush fires, do not jeopardize the safe operation of the plant due to the distance of potential fires from the plant. Any potential heavy smoke problems at the MCR air intakes would not affect the plant operators. A potential gas well fire was analyzed using the ALOHA code. This heat flux is sufficiently low as to not result in exceeding any of the thermal acceptance criteria of the structures . On-site fuel storage facilities are designed in accordance with applicable fire codes. and plant safety is not jeopardized by fires or smoke in these areas. A detailed description of the plant fire protection system is presented in DCD Subsection 9.5.1.			
	Collision with Intake Structure	2.2.3.1.5	The only waterway near CPNPP is SCR, which does not provide public access to the site. There is no commercial or recreational traffic on SCR. There are no navigable rivers within 5 mi of the site. Thus, collisions with the intake structure are not considered to be credible.	3	None	No
	Liquid spills	2.2.3.1.6	The only source of liquid spills in the vicinity of CPNPP is the crude oil pipeline. The accidental release of petroleum products into SCR would not affect operation of the plant. Normal operation of the water intake structure pumps requires	1, 3	None	No

Table 19.1-201 (Sheet 8 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

RCOL2_19-2
RCOL2_19-7

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
			submergence. Liquids with a specific gravity less than unity, such as petroleum products, would float on the surface of the river and consequently are not likely to be drawn into the makeup water system.			
	Aircraft Hazards	3.5.1.6	The probability of aircraft-related accidents for CPNPP Units 3 and 4 is less than an order of magnitude of 10^{-7} per year for aircraft, airway, and airport information reflected in Subsection 2.2.2.7.	2	$\leq 10^{-7}$	No
	Site Proximity Missle	3.5.1.5	No potential site-proximity missile hazards.	3	None	No
	Turbine Missile	3.5.1.3.1 3.5.1.3.2	The probability of turbine failure resulting in the ejection of turbine rotor (or internal structure) fragments through the turbine casing, P1, as less than 10^{-5} per year. The acceptable risk rate *P4 = P1 x P2 x P3* is therefore maintained as less than 10^{-7} per year.	2, 3	$\leq 10^{-7}$	No
Meteorology	Hurricanes	2.3.1.2.2	The Gulf of Mexico and the Atlantic Coast areas are the most susceptible to tropical cyclones. The number of tropical storms passing within 50 statute mi of the CPNPP site are listed on Table 2.3-208 and shown on Figure 2.3-213. These data, obtained from the NOAA Coastal Services Center, show that only one hurricane, in 1900, passed within 50 mi of the site during the period 1851 -2006. After a hurricane or tropical storm makes landfall, it begins to break apart, although remnants of the storm can continue moving inland. These remnants have been known to bring heavy precipitation, high winds, and tornadoes to locations near the CPNPP Site.	1	None	No

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 9 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
			Tropical cyclones including hurricanes lose strength rapidly as they move inland, and the greatest concern is potential damage from winds or flooding due to excessive rainfall. Figure 2.3-214 shows the decay of tropical cyclone winds after landfall. As seen, only the fastest moving storms will maintain any significant wind speed by the time they reach the CPNPP site. From this figure, a tropical cyclone with 86 mph winds traveling at 18 mph will have dissipated to less than 40 mph at the CPNPP site. The Probable Maximum Hurricane (PMH) for the CPNPP site, the PMH sustained (10-minute average) wind speed at 30 ft aboveground is 81 mph.			
	Tornadoes	2.3.1.2.3	The tornadoes reported during the years 1950-2006 in the vicinity of the site (Bosque, Erath, Hood, and Johnson Counties) are shown in Tables 2.3-209 and 2.3-210. During this period, a total of 158 tornadoes touched down in these counties that have a combined area of 3414 sq mi. These local tornadoes have a mean path area of 0.21 sq mi excluding tornadoes with a zero length or without a length specified. The site recurrence frequency of tornadoes can be calculated using the point probability method as follows: Total area of tornado sightings =3414 sq mi Average annual frequency =158 tornadoes/56. 58 yr =2.79 tornadoes/yr Annual frequency of a tornado striking a particular point P =([0.21 mi2/tornado] [2.79 tornadoes/yr])/3414 sq mi = 0.00017 yr-1 Mean recurrence interval =1/P =5883 yr	No screening	Close to 10^{-7}	Yes (Section 19.1.5)

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 10 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
			The corresponding expected maximum tornado wind speed and upper limit (95 percentile) of the expected wind speed based on a 2 degree longitude and latitude box centered on the CPNPP site are given below with the associated probabilities. Probability / Expected maximum tornado wind speed (mph) / Upper limit (90 percent) of the expected tornado wind speed (mph) 10-5 / 133 / 139 10-6 / 171 / 177 10-7 / 205 / 212 The design basis tornado parameters used in the design and operation of CPNPP are based on Revision 1 of Regulatory Guide 1.76. For Region I, as described in RG 1.76, the design parameters are listed below: Translational Speed 46 mph (21 meter/sec) Rotational Speed 184 mph (82 meters/sec) Maximum Wind Speed (sum of the translational and rotational speed) 230 mph (103 meters/sec) Radius of Maximum Rotational Speed 150 ft (45.7 meters) Compliance with Regulatory Guide 1.76 is discussed in Section 1.9. Tornado loadings are discussed in Subsection 3.3.2. It is easily lost when stand alone. This event is not screened out. Perform a bounding analysis.			

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 11 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
	Thunder-storms	2.3.1.2.4	Thunderstorms, from which damaging local weather can develop (tornadoes, hail, high winds, and flooding), occur about eight days each year based on data from the counties surrounding the site. The maximum frequency of thunderstorms and high wind events occurs from April to June, while the months from November through February have few thunderstorms. The monthly and regional distributions of thunderstorms and high wind events are displayed in Table 2.3-211. Impact of this event is less than by hurricanes or tornadoes.	1, 4	Not determined	No
	Lightnings	2.3.1.2.5	The annual mean number of thunderstorm days in the site area is conservatively estimated to be 48 based on interpolation from the isokeraunic map; therefore it is estimated that the annual lightning stroke density in the CPNPP site area is 25 strikes/sq mi/yr. Recent studies based on data from the National Lightning Detection Network (NLDN) indicate that the above strike densities are upper bounds for the CPNPP site. Impact of this event is less than by hurricanes or tornadoes.	1, 4	None	No

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 12 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
	Hails	2.3.1.2.6	Almost all localities in Texas occasionally experience damage from hail. While the most commonly reported hailstones are 1/2 to 3/4 inch in diameter, hailstones 3 to 3-1/2 inch in diameter are reported in Texas several times a year. Fortunately, recurrence of damaging hail at a specific location is very infrequent. The monthly and seasonal breakdown of large-hail occurrences (3/4 in diameter or larger) for the area around the CPNPP site is given in Table 2.3-212. Impact of this event is less than by hurricanes or tornadoes.	1, 4	None	No

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 13 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
	Air Pollution Potential	2.3.1.2.7	The Clean Air Act, which was last amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set National Air Quality Standards for pollutants considered harmful to the Public health and the environment. The EPA Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards for six principle pollutants, which are called "Criteria" pollutants. The newly promulgated EPA 8-hour ozone standard (62 FR 36, July 18, 1997) is 0.08 ppm in accordance with 40 CFR 50.10 (Reference 2.3-226). Somervell County is in attainment for all criteria pollutants (carbon monoxide, lead, nitrogen dioxide, particulate matter ([PM10, particulate matter less than 10 micron], [PM2.5, particulate matter less than 2.5 micron]), ozone, and sulfur oxides. The ventilation rate is a significant consideration in the dispersion of pollutants. Higher ventilation rates are better for dispersing pollution than lower ventilation rates. The atmospheric ventilation rate is numerically equal to the product of the mixing height and the wind speed within the mixing layer. Conditions in the region generally favor turbulent mixing. Two conditions which reduce mixing, increasing the air pollution potential, are surface inversions and stable air layers aloft. The surface inversion is generally a short-term effect and surface heating on most days creates a uniform mixing layer by mid-afternoon. The air stagnation trend for this general area is negative (Figure 2.3-246) over the 50-yr period of record.	1, 4	None	No

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 14 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
			This event is not significant impact than toxic chemicals.			
	Precipitation	2.3.1.2.8 2.3.2.1.5	Probable Maximum Precipitation (PMP), sometimes called maximum possible precipitation, for a given area and duration is the depth which can be reached but not exceeded under known meteorological conditions. For the site area, using a 100-yr return period, the PMP for 6, 12, 24, and 48 hours is 6.9, 8.3, 9.5, and 11.0 in, respectively (Table 2.3-217). The annual average and maximum 24-hour snowfall for these stations are given below: Annual Average Maximum 24-hr Snowfall (in) and Yr Snowfall (in) Fort Worth 2.5 12.1 (1964) Dallas Love Field 1.7 6.0 (1978) Mineral Wells 1.8 4.0 (1978) Glen Rose 1.8 4.5 (1973) To estimate the weight of the 100-yr snowpack at the CPNPP site, the maximum reported snow depths at Dallas Fort Worth Airport were determined. Table 2.3-202 shows that the greatest snow depth over the 30-yr record is 8 in. The 100-yr recurrence snow depth is 11.2 in using a factor of 1.4 to convert from a 30 yr recurrence interval to 100-yr interval. In the CPNPP site area, snow melts and/or evaporates quickly, usually within 48 hours, and does so before additional snow is added; thus, the water equivalent of the snowpack can be considered equal to the water equivalent of the falling snow as reported hourly during the snowfall. A conservative estimate of the water equivalent of snowpack in the CPNPP site area	1	None	No

Table 19.1-201 (Sheet 15 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

RCOL2_19-2
RCOL2_19-7

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
			would be 0.20 in of water per inch of snowpack. Then, the water equivalent of the 100-yr return snowpack would be 11.2 in snowpack x 0.2 in water equivalent/inch snowpack =2.24 in of water. The 100-yr return period snow and ice pack for the area in which the plant is located, in terms of snow load on the ground and water equivalent, is listed below: • Snow Load =11.7 lb/ft2 • Ice Load =5.06 in * 5.20 lb/ft2/in =26.1 lb/ft2 As stated in the US-APWR DCD Subsection 3.4.1.2, if PMWP was to occur, US-APWR safety-related systems and components would not be jeopardized. US-APWR seismic category I building roofs are designed as a drainage system capable of handling the probable maximum winter precipitation (PMWP). The US-APWR DCD also states that seismic category I structures have sloped roofs designed to preclude roof ponding. This is accomplished by channeling rainfall expeditiously off the roof. Also in subsection 3.4.1.2, the design-basis flooding level (DBFL) listed in Section 2.4, and adequate sloped site grading and drainage prevents flooding caused by probable maximum precipitation (PMP) or postulated failure of non safety-related, non seismic storage tanks located on site.			

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 16 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
	Dust Storms	2.3.1.2.9	Blowing dust or sand may occur occasionally in West Texas where strong winds are more frequent and vegetation is sparse. While blowing dust or sand may reduce visibility to less than five mi over an area of thousands of sq mi, dust storms that reduce visibility to one mi or less are quite localized and depend on soil type, soil condition, and vegetation in the immediate area. The NCDC Storm Event database did not report any dust storms in Somervell County between January 1,1950 and August 31,2007. This event is not significant impact to the plant.	1	None	No
	Ultimate Heat Sink	2.3.1.2.10 2.3.2.1.3	The performance of the ultimate heat sink is discussed in Subsection 9.2.5. The wet bulb design temperature for the ultimate heat sink was selected to be 80°F based on 30 yr (1977 -2006) of climatological data obtained from National Climatic Data Center/National Oceanic and Atmospheric Administrator for Dallas/Fort Worth International Airport Station in accordance with RG 1.27. The worst 30 day period was selected from the above climatological data between June 1, 1998 and June 30, 1998, with an average wet bulb temperature of 78.0°F. A 2°F margin was added to the maximum average wet bulb temperature for conservatism. These are not significant impact to ultimate heat sink.	1	None	No

Table 19.1-201 (Sheet 17 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

RCOL2_19-2
RCOL2_19-7

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
	Extreme Winds	2.3.1.2.11	Estimated extreme winds (fastest mile) for the general area based on the Frechet distribution are: Return Period (yiear) — Wind Speed (mi per hr) 2 — 51 10 — 61 50 — 71 100 — 76 Fastest mile winds are sustained winds, normalized to 30 ft aboveground and include all meteorological ghenomena excegt tornadoes. The design basis wind velocity is based on the data from ANSI/ASCE 7-05. From Figure 6-1 of ANSI/ASCE 7-05, the 3-second gust wind speed at 33 ft (10m) aboveground for the CPNPP site is 90 mph (40 m/sec). The 3-second gust wind speed for a 100-yr return period is 96 mph. The importance factor is 1.15 and the exposure category is C. Wind loadings for the site are discussed in Subsection 3.3.1. This event is not significant impact than hurricanes and tornadoes.	1, 4	None	No

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 18 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria[1]	Freq. (/yr)	Site Appl.
	Surface Winds	2.3.2.1.2	Annually, the prevailing surface winds in the region are from the south to southeast while the average wind speed is about 10 mi per hour (mph) based on-site data from 2001 through 2006. As shown on Figures 2.3-208 through 2.3-210, the annual resultant wind vectors for the Dallas Fort Worth Airport, Mineral Wells, and CPNPP are 149°, 138°, and 153°, respectively. The annual average wind speeds for Dallas Fort Worth Airport, Mineral Wells, and CPNPP are 10.3, 9.0, and 9.8 mi per hour, respectively. In winter there is a secondary wind direction maximum from the north to northwest due to frequent outbreaks of polar air masses (Figures 2.3-274 and 2.3-306). Monthly and seasonal wind roses for the lower level CPNPP data are provided on Figures 2.3-278 through 2.3-293. On a monthly basis, these figures show the dominant south south-southeast wind direction. The seasonal wind rose plots show a significant additional north and north-northwest component in the winter and fall. The annual wind rose plot for CPNPP is provided on Figure 2.3-210. Monthly and seasonal wind roses for the upper level CPNPP data are provided on Figures 2.3-294 through 2.3-309. On a monthly basis, these figures show the dominant south-southeast wind direction. The seasonal wind rose plots show that the only significant north and north-northwest component is in the winter. The annual wind rose plot for CPNPP is provided on Figure 2.3-310. This event is not significant impact than hurricanes and tornadoes.	1	None	No

Table 19.1-201 (Sheet 19 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

RCOL2_19-2
RCOL2_19-7

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
Hydrologic Engineering	Floods	2.4.2	The maximum flood level at CPNPP Units 3 and 4 is elevation 788.9 ft msl. This elevation would result from a probable maximum precipitation (PMP) on the Squaw Creek watershed. Coincident wind waves would create maximum waves of 4.56 ft (trough to crest), resulting in a maximum flood elevation of 793.46 ft msl. CPNPP Units 3 and 4 safety-related plant elevation is 822 ft msl, providing more than 28 ft of freeboard under the worst potential flood considerations.	1, 3	None	No
	Probable Maximum Flood	2.4.3	The probable maximum flood (PMF) was determined for the Squaw Creek watershed and routed through the Squaw Creek Reservoir (SCR) to determine a water surface elevation of 788.9 ft msl. The CPNPP Units 3 and 4 safety-related facilities are located at elevation 822 ft msl. Therefore, PMF on rivers and streams does not present any potential hazards for CPNPP Units 3 and 4 safety-related facilities. The PMF and maximum coincident wind wave activity results in a flood elevation of 809.28 ft msl. The top elevation of the retaining wall is 805 ft msl. The CPNPP Units 3 and 4 safety-related structures are located at elevation 822 ft msl and are unaffected by flood conditions and coincident wind wave activity.	1, 3	None	No

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 20 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
	Dam Failures	2.4.4	There are no surface water impoundments other than small farm ponds that could impact the SCR. The small farm ponds have negligible storage capacity and a breach would have no measurable effect. Failure of downstream dams, including Squaw Creek Dam, would not affect the CPNPP Units 3 and 4. The critical dam failure event is the assumed domino-type failure of the Hubbard Creek Dam, the Morris Sheppard Dam and the De Cordova Bend Dam coincident with the PMF. There are no safety-related structures that could be affected by flooding due to dam failures.	1, 3	None	No
	Surge and Seiche Flooding	2.4.5	CPNPP Units 3 and 4 are located approximately 275 mi inland from the Gulf of Mexico. CPNPP Units 3 and 4 safety-related facilities are located at elevation 822 ft msl. A surge due to a probable maximum hurricane (PMH) event would not cause flooding at the site. SCR does not connect directly with any of the water bodies considered for such meteorological events associated with surge and seiche flooding. Because of the inland location and elevation characteristics, CPNPP Units 3 and 4 safety-related facilities are not at risk from surge and seiche flooding.	3	None	No
	Tsunami	2.4.6	CPNPP Units 3 and 4 are located approximately 275 mi inland from the Gulf Coast. CPNPP Units 3 and 4 safety-related facilities are located at elevation 822 ft msl. Because of their inland location and elevation, CPNPP Units 3 and 4 safety related facilities would not be at risk from tsunami flooding.	3	None	No

RCOL2_19-2
RCOL2_19-7

Table 19.1-201 (Sheet 21 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
	Ice Effects	2.4.7	The USACE ice jam database reports that Brazos River was obstructed by rough ice at Rainbow near Glen Rose, Texas, on January 22-23 and January 25-28, 1940, with flood stage of 20 ft. CPNPP Units 3 and 4 safety-related facilities are located at elevation 822 ft msl. The SCR spillway elevation is 775 ft msl. The maximum water surface elevation during a probable maximum flood event is at 788.9 ft msl, which is more than 30 ft below the CPNPP Units 3 and 4 safety-related facilities. The possibility of inundating CPNPP Units 3 and 4 safety-related facilities due to an ice jam is remote. The climate and operation of SCR prevent any significant icing on the Squaw Creek. There are no safety related facilities that could be affected by ice induced low flow.	3	None	No
	Cooling Water Canals and Resevoirs	2.4.8	There are no current or proposed safety-related cooling water canals or reservoirs required for CPNPP Units 3 and 4. The ultimate heat sink (UHS) is part of the essential (sometimes called emergency) service water system (ESWS). The UHS does not rely on cooling water canals or reservoirs and is not dependent on a stream, river, estuary, lake, or ocean.	3	None	No

Table 19.1-201 (Sheet 22 of 22)
Comanche Peak, Units 3 and 4 External Events Screening and Site Applicability

RCOL2_19-2
RCOL2_19-7

Category	Event	FSAR Section Disposition	Description	Screening and Applicability		
				Criteria(1)	Freq. (/yr)	Site Appl.
	Channel Diversions	2.4.9	There is no evidence suggesting there have been significant historical diversions or realignments of Squaw Creek or the Brazos River. The topography does not suggest potential diversions. The streams and rivers in the region are characterized by traditional shaped valleys with no steep, unstable side slopes that could contribute to landslide cutoffs or diversions. There is no evidence of ice-induced channel diversion. The UHS is part of the ESWS. Each unit's ESWS consists of four wet mechanical draft cooling towers, each providing 50 percent cooling capacity. Therefore, channel diversion can not adversely affect CPNPP Units 3 and 4 safety-related structures or systems.	3	None	No
	Low Water	2.4.11	There are no safety-related facilities that could be affected by low-flow or drought conditions, since the UHS does not rely on the rivers and streams as a source of water.	3	None	No
	Groundwater	2.4.12	Groundwater is not used as an operational or safety-related source of water for CPNPP Units 3 and 4. CPNPP Units 3 and 4 are to be constructed on the Glen Rose Formation. According to the Design Control Document (DCD) for the US-APWR, the design maximum groundwater elevation is 1 ft below plant grade. The CPNPP plant grade elevation is 822 ft msl; therefore, the design maximum groundwater elevation is 821 ft msl relative to the current elevation of the Glen Rose Formation.	3	None	No

NOTES
(1) Screening criteria categories
"1" Lower damage potential than a design basis event
"2" Lower event frequency of occurrence than another event

"3" Cannot occur close enough to the plant to have an affect
"4" Included in the definition of another event
"5" Sufficient time to eliminate the threat or to provide an adequate response

RCOL2_19-2
RCOL2_19-7

CP COL 19.3(4)

RCOL2_19-5

Table 19.1-202
Important Basic Event related to the Site-Specific Design

Rank	Basic Event ID	Basic Event Description	Basic Event Probability	FV Importance	RAW
1	SWSCF4CTYR-FF	COOLING TOWER FAN A,B,C,D (CCF)	5.8E-09	3.2E-05	5.5E+03
2	SWSCF4CTBDBD-ALL	CTW FAN B,D START CCF	1.3E-06	9.8E-06	8.8E+00
3	SWSCF4CTBDBD-13	CTW FAN B,D START CCF	8.3E-07	6.5E-06	8.8E+00
4	SWSCF4CTBDBD-24	CTW FAN B,D START CCF	8.3E-07	6.5E-06	8.8E+00
5	SWSCF4CTBDBD-23	CTW FAN B,D START CCF	8.3E-07	6.5E-06	8.8E+00
6	SWSCF4CTBDBD-14	CTW FAN B,D START CCF	8.3E-07	6.5E-06	8.8E+00
7	SWSCF4CTBDBD-123	CTW FAN B,D START CCF	4.2E-07	3.3E-06	8.8E+00
8	SWSCF4CTBDBD-124	CTW FAN B,D START CCF	4.2E-07	3.3E-06	8.8E+00
9	SWSCF4CTBDBD-134	CTW FAN B,D START CCF	4.2E-07	3.3E-06	8.8E+00
10	SWSCF4CTBDBD-234	CTW FAN B,D START CCF	4.2E-07	3.3E-06	8.8E+00
11	SWSCF4CTYRBD-ALL	CTW FAN B,D RUN CCF	1.8E-07	1.4E-06	8.8E+00
12	SWSCF4CTYRBD-13	CTW FAN B,D RUN CCF	1.2E-07	9.4E-07	8.8E+00
13	SWSCF4CTYRBD-23	CTW FAN B,D RUN CCF	1.2E-07	9.4E-07	8.8E+00
14	SWSCF4CTYRBD-24	CTW FAN B,D RUN CCF	1.2E-07	9.4E-07	8.8E+00
15	SWSCF4CTYRBD-14	CTW FAN B,D RUN CCF	1.2E-07	9.4E-07	8.8E+00
16	SWSCF4CTYRBD-123	CTW FAN B,D RUN CCF	6.0E-08	4.7E-07	8.8E+00
17	SWSCF4CTYRBD-124	CTW FAN B,D RUN CCF	6.0E-08	4.7E-07	8.8E+00
18	SWSCF4CTYRBD-234	CTW FAN B,D RUN CCF	6.0E-08	4.7E-07	8.8E+00
19	SWSCF4CTYRBD-134	CTW FAN B,D RUN CCF	6.0E-08	4.7E-07	8.8E+00
20	SWSCTYRCB	COOLING TOWER FAN C-2 FAIL TO RUN (RUNNNG)	1.4E-05	5.7E-05	5.0E+00
21	SWSCTYRCA	COOLING TOWER FAN C-1 FAIL TO RUN (RUNNNG)	1.4E-05	5.7E-05	5.0E+00
22	SWSCTBDBA	COOLING TOWER FAN B-1 FAIL TO START (RUNNNG)	9.5E-05	1.1E-04	2.2E+00
23	SWSCTBDBB	COOLING TOWER FAN B-2 FAIL TO START (RUNNNG)	9.5E-05	1.1E-04	2.2E+00
24	SWSCTYRBB	COOLING TOWER FAN B-2 FAIL TO RUN (RUNNNG)	1.4E-05	1.6E-05	2.2E+00
25	SWSCTYRBA	COOLING TOWER FAN B-1 FAIL TO RUN (RUNNNG)	1.4E-05	1.6E-05	2.2E+00
26	SWSCF4CTBDBD-12	CTW FAN B,D START CCF	8.3E-07	9.8E-07	2.2E+00
27	SWSCF4CTYRBD-12	CTW FAN B,D RUN CCF	1.2E-07	1.4E-07	2.2E+00

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RCOL2_19-5
RCOL2_19-6

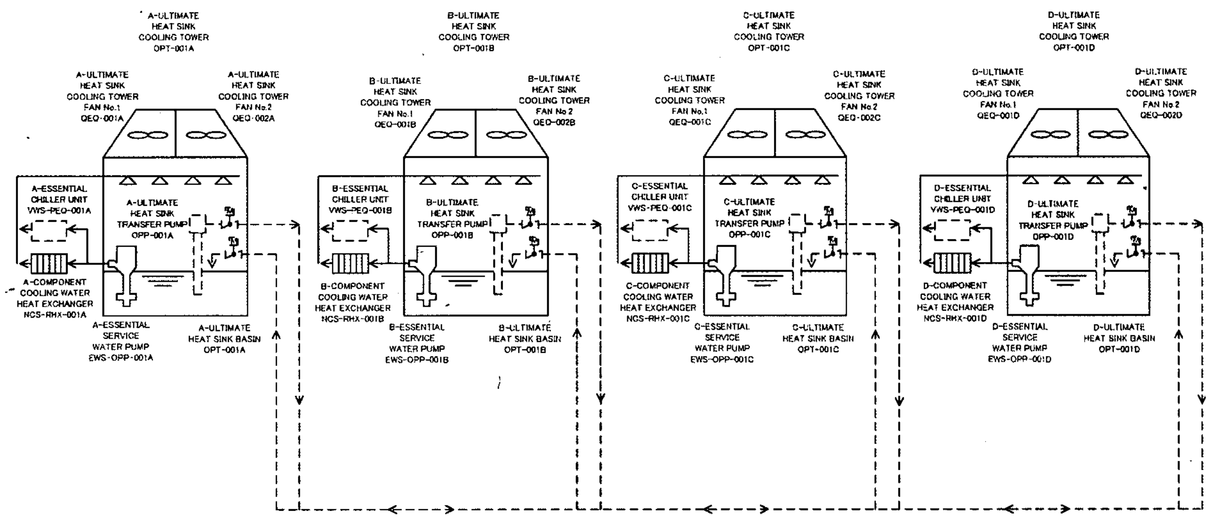
Table 19.1-206

Site-specific Key Assumptions

Key Insights and Assumptions	Disposition
Site-Specific Design Features and Assumptions Design features and assumptions that contribute to high reliability of continuous operation after the 24 hour mission time are the followings.	
- The normal makeup water to the UHS inventory is from Lake Granbury via the circulating water system.	FSAR 9.2.5.2.2
- UHS transfer pumps and the ESW pumps located in each basin are powered by the different Class 1 E buses. UHS transfer pump operates to permit the use of three of the four basin water volumes.	FSAR 9.2.5.2.2, 9.2.5.3
- The transfer line is a high integrity line, regularly tested and inspected for corrosion.	FSAR 9.2.1.2.1, 9.2.5.4
- There are adequate low-level and high-level alarms to provide rapid control room annunciation of a level problem and to allow adequate time to confirm the level and take effective action to address it.	FSAR 9.2.5.5
- Two basins contain enough water to supply water to remove decay heat for at least 24 hours after plant trip.	FSAR 9.2.5
Overfill protection will be provided to prevent overfilling the basin and failing the pump(s). This feature is important to prevent degradation of the ESWS when the basin is overfilled due to failure in the transfer pump or circulation system.	FSAR 13.5
Backup actions can avoid excessive room heat up in the event of loss of ESW room ventilation. Based on this assumption, loss of ESW room ventilation is not modeled in the PRA model. Operational procedures to avoid excessive room heat up will be prepared.	FSAR 13.5
Plant specific SSCs that potentially impact plant safety are seismically designed and thus will not impact the plant HCLPF. HCLPF values for the plant specific SSCs, such as cooling towers, will be confirmed with calculation using EPRI TR-103959 methodology after completion of seismic design and stress analysis of the SSCs.	FSAR 19.1.2.4

RCOL2_19-5

REMARK:
SYSTEM NAME (UHS) OF THE ULTIMATE HEAT SINK SYSTEM IS OMITTED FROM THE COMPONENT ID.



CP COL 19.3(4)

Figure 19.1-2R Simplified System Diagram (Sheet 18 of 36) (Essential Service Water System [2of2])