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U. S. Nuclear Regulatory Commission
Attn: 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
RESOLUTION OF DOCKETING ISSUES REGARDING FSAR SUBSECTION 2.4.13
PROJECT NO. 0754

Dear Sir:

Luminant Generation Company LLC (Luminant) submits this resolution of docketing issues for Comanche Peak Nuclear Power Plant (CPNPP), Units 3 and 4. The issues were raised by NRC reviewers conducting the acceptance review of the CPNPP Units 3 and 4 Combined License (COL) application and were discussed with the NRC in conference calls over the last few weeks. Luminant is confident that this resolution provides the NRC with adequate information to determine that the COL application is acceptable regarding these issues.

The resolution presented in the attachment to this letter is a summary that was generated from several subsections in the FSAR. Luminant will change FSAR Subsection 2.4.13 in a future COLA revision to reflect the summary information.

Please address any correspondence relating to this resolution to Don Woodlan, Manager, Nuclear Regulatory Affairs, P.O. Box 1002, 6322 North FM 56, Glen Rose, TX 76043. You may also contact Mr. Woodlan directly at 254-897-6887 or by email at Donald.Woodlan@luminant.com.

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

Executed on November 6, 2008.

Sincerely,

Luminant Generation Company LLC

M L Lucas

M. L. Lucas

Attachment - Resolution of Docketing Issues
c - See Attached

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NRO

ATTACHMENT

RESOLUTION OF DOCKETING ISSUES

FSAR Subsection 2.4.13

***Issue 1* –**

Accidental Release Evaluation

The last paragraph of Section 2.4.13 of the CPNPP FSAR contains the conclusion that the predicted impact of an accidental effluent release to potential future water users is "expected to be SMALL". However, Section 2.4.13 does not contain a quantification of what this impact would be or the technical information needed to document this conclusion and enable a review by NRC staff.

As directed by SRP 2.4.13 (NUREG-0800) and Section 2.4.13 of the US-APWR DCD the applicant should evaluate and detail "the effects of accidental releases of radioactive liquid effluents in the ground and surface waters on existing uses and known and likely future uses of ground and surface waters". Additionally, Section 11.2.3.2 of the US-APWR DCD states that the applicant should provide both the data and analysis used to demonstrate that the potential groundwater contamination from an accidental release is bounded by the analysis presented in the DCD. RG 1.206 C.I.2.4 directs that there be enough information provided of the transport evaluation to "permit an independent hydrologic engineering review".

Guidelines defining the mechanism of the potential release, assumptions for the analysis and an approach to assessing impact at receptor locations are provided in Branch Technical Position 11-6 (NUREG-0800) and Section 11.2.3.2 of the DCD.

To satisfy the acceptance requirement of completeness and technical sufficiency, Section 2.4.13 of the CPNPP FSAR should include the following information, as well as a description of how each item listed below contributes to the conservative nature of the overall analysis. This information includes:

- Quantitative documentation of all physical parameters that could potentially impact transport along the identified pathway(s) and concentrations at receptor locations. This includes a discussion of dilution (in ground and surface water), concentration, ion-exchange, dispersion and the potential for complexants in the tanks chosen for the scenario. In keeping with 10 CFR 100.20(c)(3) these parameters should be site-specific (where applicable).
- A description of the release scenario. The scenario should be similar to scenarios described in NRC guidance documents such as Branch Technical Position 11-6 of NUREG-0800.
- A description of the transport evaluation including procedures, methods, assumptions and parameters which were used in the evaluation.
- A description of the approach used in assessing the radiological impact of the release. This approach should be consistent with Branch Technical Position 11-6 which recommends that concentrations at potential receptor locations be compared to the concentration limits for water in 10 CFR 20 Appendix B (Table 2, Column 2 under the Unity Rule). Results should be provided in a format which aids review, such as a table, and exceedences, if any, should be called out.

Issue 2 **–**

Alternate Conceptual Model Development

The groundwater flow scenarios described in Section 2.4.13 of the CPNPP FSAR account for a realistic amount of variability in flow depths along flow paths to Squaw Creek Reservoir, which is identified as the likely receptor. However, they do not address the possibility of flow to other receptors (nearby pumping wells) or the mechanisms which could potentially create these alternate flow paths (i.e. changes in groundwater elevations).

Per guidance in SRP 2.4.13 (NUREG-0800), a variety of alternate conceptual models for groundwater flow paths should be envisioned based on the geological and hydrological characteristics of the site. These are then used to select the bounding set of plausible pathways that produce the most adverse contaminant concentrations to potential receptors in a conservative transport analysis.

Monitoring data indicate that water levels in about 8 wells are above the DCD based elevation of 821' msl (1 foot below the established plant grade of 822' msl) and have been rising steadily throughout the year, several rising over 20 feet. In the FSAR, these wells were described as illustrating "no indication of reliable equilibrium". Several of these are located within the shallow aquifers near the source areas. Changes to groundwater elevations near the source could potentially affect ground water flow directions and impact receptors not considered in the discussion within section 2.4.13. As a result, additional alternate conceptual models describing potential groundwater flow paths should be evaluated.

Resolution

The accidental release of the source term from the holdup tank, waste holdup tank, and boric acid tank from the new facility's radioactive waste handling system is hypothesized to occur from a tank located in the northwest corner of Unit 4 or the northeast corner of Unit 3, which is closest to Squaw Creek Reservoir (SCR), the nearest surface water body. These tanks were selected since they contain the largest amount of radioactivity. The concentration of contaminants would be reduced during migration by the processes of ion exchange, dispersion and radioactive decay. Groundwater is the primary transport mechanism for possible liquid effluent releases.

Development of the Pathways Considered in the Evaluation

Single well slug tests were performed on six monitoring wells using the Bouwer & Rice method in April of 2007 at the CPNPP Units 3 and 4 proposed sites. Of the six wells tested, three were screened in the regolith/undifferentiated fill zone (A-zone) and three were screened in the shallow bedrock (B-zone). Water levels were measured to characterize seasonal trends in groundwater levels and to identify preferential flow pathways. Hydraulic conductivity for the wells screened in the regolith/undifferentiated fill zone ranged from 2.93×10^{-5} cm/s to 5.00×10^{-4} cm/s. Hydraulic conductivity for the wells screened in the shallow bedrock zone ranged from 6.29×10^{-6} cm/s to 1.37×10^{-5} cm/s.

A step test and 72-hr pumping test were performed on aquifer pump test well RW-1 in April of 2007. To investigate groundwater communication with SCR, pump test well RW-1 was installed in an area of undifferentiated fill within a former drainage swale on the northeast portion of CPNPP Units 3 and 4. The step test was performed to determine the pumping rate for the 72-hr pumping test. Data for the step test and 72-hr pumping test were analyzed using the Cooper-Jacob Step Test and Theis Recovery

Test methods. The results of the 72-hr pump test estimated hydraulic conductivity at 1.70×10^{-3} cm/s during pumping and 3.5×10^{-3} cm/s during recovery.

Hydrographs (Figure 2.4.12-209) for these monitoring wells indicate that the water levels in the deeper Glen Rose Formation do not fluctuate and remain at a constant level near the base of the well, indicating that this water is not actual groundwater. Due to the impermeable nature of the Glen Rose Formation and the absence of a groundwater-bearing unit in the formation, the vertical transport pathway to the Twin Mountains Formation, which is where domestic wells are completed, is not evaluated. Shallow bedrock wells show a slow and steady increase of water levels over time with no fluctuations, suggesting water infiltration from overlying soils and no actual groundwater movement. Water levels in the regolith or undifferentiated region (A-zone) trended with rainfall totals at the site.

Characteristics of the Glen Rose Formation indicate that it is not a groundwater-bearing unit and a permanent dewatering system will not be required. Based upon field investigations, the bedrock formation in the area of the CPNPP site is poorly developed in that groundwater flow within bedrock is dominated by isolated layers of claystone, mudstone, limestone, and shale. The Glen Rose Formation is approximately 220 ft thick and confines the groundwater in the Twin Mountains Formation. Most domestic wells in the area are completed in the Twin Mountains Formation and are outside a 0.5 mi radius of the site (Subsection 2.4.12.3.2). The nearest water wells completed in the Glen Rose Formation are located approximately 4 mi south of the CPNPP site (Figure 2.4.12-204). No domestic or public water supply wells are considered capable of reversing groundwater flow beneath the site or from the site to these wells due to the completion of the wells within the Twin Mountains Formation and the distance to the Units 3 and 4 power blocks.

At the CPNPP site, eleven existing water wells completed in the Twin Mountains Formation, which is a confined aquifer below the impermeable Glen Rose Formation, provide potable water (seven wells in use) for Units 1 and 2 operations, and four wells are used for observation purposes. No groundwater is expected to be used for CPNPP Units 3 and 4.

SCR is a restricted access area owned and operated by Luminant. Therefore, the hypothesized release of the tank contents to SCR would not immediately affect the public.

Release Pathways Considered – NE Corner of Unit 3 and NW Corner of Unit 4

Due to variable subsurface conditions in the vicinity of CPNPP Units 3 and 4, two postulated groundwater pathway scenarios were evaluated for each reactor unit. Scenarios 1 and 2 show a conservative pathway by estimating a groundwater travel time from each reactor unit to SCR through the regolith/undifferentiated fill zone. Because the regolith/undifferentiated fill zone is expected to be removed during construction of Units 3 and 4, Scenarios 2 and 4 provide the likely characteristics of the post-construction groundwater environment. With the removal of the regolith/undifferentiated fill zone, the groundwater pathway to SCR would be in the shallow bedrock zone. The groundwater flow paths use a conservative straight-line flow path approach using the shortest distance from groundwater monitoring wells located nearest to each reactor centerline and the highest measured hydraulic conductivity from each soil or bedrock zone. A straight-line flow path would be considered conservative as the actual groundwater pathways are expected to be tortuous, resulting in longer transport times, and hydraulic conductivities (Kh) of the fractures/joints would be (or are) expected to be lower than the highest measured on-site.

No credit is taken for retardation or retention through subsurface media. There are no groundwater uses between the new units and the Squaw Creek reservoir. Both effluent release flow paths consider the shortest distance to SCR and conservatively consider the highest measured hydraulic conductivity.

Scenario 1

Scenario 1 estimates the groundwater travel time between CPNPP Unit 3 and SCR through the undifferentiated fill/regolith using groundwater levels from groundwater monitoring well MW-1217a, screened in the regolith/undifferentiated fill A-zone, and the surface water elevation of SCR. The steepest measured groundwater gradient within the undifferentiated fill material from Unit 3 to SCR was 0.104 ft/ft. Based on the average effective porosity of 0.20 and a hydraulic conductivity of 5.00×10^{-4} cm/s (Table 2.4.12-11), the estimated groundwater travel time from Unit 3 to SCR in the regolith/undifferentiated fill zone is 720.9 days (approximately 2 years).

Scenario 2

Scenario 2 estimates the groundwater travel time between CPNPP Unit 3 and SCR using groundwater levels from groundwater monitoring well MW-1217b, screened in the shallow bedrock B-zone, and the surface water elevation of SCR. The steepest measured groundwater gradient within the shallow bedrock zone from Unit 3 to SCR is 0.0974 ft/ft. Based on the average effective porosity of 0.14 and a hydraulic conductivity of 1.37×10^{-5} cm/s (Table 2.4.12-11), the estimated groundwater travel time from Unit 3 to the SCR in the shallow bedrock zone is 19,615.0 days (approximately 54 years).

Scenario 3

Scenario 3 estimates the groundwater travel time between CPNPP Unit 4 and SCR through the undifferentiated fill/regolith using groundwater levels from groundwater monitoring well MW-1215a, screened in the regolith/undifferentiated fill A-zone, and the surface water elevation of SCR. The steepest measured gradient for the regolith undifferentiated fill material from Unit 4 to SCR was 0.109 ft/ft. Based on an average effective porosity of 0.20 and a hydraulic conductivity of 5.00×10^{-4} cm/s (Table 2.4.12-11), the estimated groundwater travel time from Unit 4 to SCR in the regolith/undifferentiated fill zone is 782.6 days (approximately 2 years).

Scenario 4

Scenario 4 estimates the groundwater travel time between CPNPP Unit 4 and SCR through the shallow bedrock using groundwater levels from groundwater monitoring well MW-1215b screened in the shallow bedrock B-zone, and the surface water elevation of SCR. The steepest measured gradient for the shallow bedrock zone from Unit 4 to SCR was 0.0962 ft/ft. Based on an average effective porosity of 0.14 and a hydraulic conductivity of 1.37×10^{-5} cm/s (see Table 2.4.12-11) the estimated groundwater travel time from Unit 4 to the SCR in the shallow bedrock zone is 22,737.6 days (approximately 62 years).

Based on evacuating the soil down to a plant grade of 822 ft, the impermeable nature of the Glen Rose Formation, and the absence of production water wells from this formation, impact to present and projected groundwater users is not anticipated.

Source Term from Postulated Tank Release and Affect on the Environment

The liquid tanks considered in the hypothesized tank failure included the holdup tank (120,000 gal), waste holdup tank (30,000 gal) and boric acid tank (66,000 gal). Credit is taken for the removal effect by demineralizers or other treatment equipment for the liquid radioactive waste prior to entering the tanks. As a result, the radionuclides of interest for the source terms considered in the evaluation for these tanks are:

Holdup Tank – H-3, Cs-134 and Cs-137

Waste Holdup Tank – Cs-134 and Cs-137

Boric Acid Tank – Cs-134 and Cs-137

The source term concentrations considered for these tanks are identified in DCD Table 11.2-17 and show the radioactivity concentration closest to the nearest potable water supply. The boric acid tank contained the largest concentration of radionuclides that was closest to the effluent concentration limits for Cs-134 and Cs-137, yet well below the 10CFR 20, Appendix B limits. Isotope concentrations less than 1.0×10^{-3} in fraction of concentration limits are excluded from the evaluation. Since credit cannot be taken for liquid retention by unlined building foundations, it is assumed that the 80% of the contents of each tank is released to the environment, consistent with the guidance in BTP 11-6, March 2007. In releasing the contents of one tank, it is assumed that 80% of the tank volume is discharged and the volume of water contributing to the dilution is 4.4×10^{10} gallons for defining the dilution factor of each tank. This dilution would occur prior to reaching the nearest potable water supply, which are the Unit 1 or Unit 2 potable water supply wells in the Twin Mountains Formation.

The Kd values in Table 2.4.13-201 were conservatively not credited in the evaluation for groundwater flow velocities and travel times for isotopic movement through the subsurface soils and bedrock. Table 2.4.13-201 provides the calculated travel times based on monthly measured gradients. The locations of Units 3 and 4 and groundwater monitoring wells MW-1215a, MW-1215b, MW-1217a, and MW-1217b are shown on Figure 2.4.12-210. Hydraulic conductivities calculated during the 2006 - 2007 groundwater investigation ranged from 2.93×10^{-5} cm/sec in regolith soils to 3.5×10^{-3} cm/sec in undifferentiated fill material.

In the BTP 11-6 liquid tank failure analysis, it has been conservatively assumed that the isotopic hydrological travel time through the media occurs in 365 days. Actual measured travel times through the undifferentiated fill/regolith and the top of the Glen Rose Formation, respectively, are:

Unit 3 – 720.9 days and 19,615.0 days

Unit 4 – 782.6 days and 22,737.6 days

Therefore, the critical receptor concentrations for the analyzed tank releases that would reach the SCR in 365 days are conservative and well below 10 CFR 20, Appendix B limits and 10 CFR 100 limits.

10 CFR 20 Appendix B states "The columns in table 2 of this appendix captioned "Effluents," "Air," and "Water," are applicable to the assessment and control of dose to the public, particularly in the implementation of the provisions of §20.1302. The concentration values given in columns 1 and 2 of table 2 are equivalent to the radionuclide concentrations which, if inhaled or ingested continuously over the course of a year, would produce a total effective dose equivalent of 0.05 rem (50 millirem or 0.5 millisieverts)." The receptor concentrations of these tanks are well below the concentration limits of 10 CFR 20 Appendix B, Table 2 Column 2, and result in doses well below the 0.05 rem limit and demonstrate that the requirements of 10 CFR 20.1301 and 20.1302 are met.

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