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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Ref. # 10 CFR 52

August 13, 2010

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

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4
DOCKET NUMBERS 52-034 AND 52-035
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 4760

Dear Sir:

Luminant Generation Company LLC (Luminant) submits herein the response to Request for Additional Information (RAI) No. 4760 for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. The RAI involves the potential impact of nearby slopes on the computed SSI responses.

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

There are no commitments in this letter.

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

Executed on August 13, 2010.

Sincerely,

Luminant Generation Company LLC

Rafael Flores for

Attachment: Response to Request for Additional Information No. 4760 (CP RAI #171)

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NRO

Electronic distribution w/attachment:

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
JCaldwell@luminant.com
David.Beshear@txu.com
Ashley.Monts@luminant.com
Fred.Madden@luminant.com
Dennis.Buschbaum@luminant.com
Carolyn.Cosentino@luminant.com
NuBuild Licensing files

Luminant Records Management (.pdf files only)

shinji_kawanago@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
mutsumi_ishida@mnes-us.com
nan_sirirat@mnes-us.com
nicolas_kellenberger@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
Alicia.Williamson@nrc.gov
Elmo.Collins@nrc.gov
Loren.Plisco@nrc.com
Laura.Goldin@nrc.gov
James.Biggins@nrc.gov
Susan.Vrahoretis@nrc.gov
ComanchePeakCOL.Resource@nrc.gov
sfrantz@morganlewis.com
jrund@morganlewis.com
tmatthews@morganlewis.com
regina.borsh@dom.com
diane.aitken@dom.com

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.: 4760 (CP RAI #171)

SRP SECTION: 03.07.02 - Seismic System Analysis

QUESTIONS for Structural Engineering Branch 1 (AP1000/EPR Projects) (SEB1)

DATE OF RAI ISSUE: 7/12/2010

QUESTION NO.: 03.07.02-17

This request for additional information (RAI) is necessary for the staff to determine if the application meets the requirements of 10 CFR Part 50, Appendix A, General Design Criteria 2; 10 CFR Part 50 Appendix S; and 10 CFR Part 100; as well as the guidance in NUREG-0800, 'Standard Review Plan for the Review of Safety Analysis for Nuclear Power Plants,' Chapter 3.7.2, 'Seismic Design Parameters.'

In the response to RAI 22 (2929) question 02.05.04-9, the applicant indicated that the soil-structure interaction (SSI) calculation is bounding and is based upon the calculations using one surface foundation (no-fill) case and four embedded foundation cases. For the embedded foundation cases, it is believed that SSI analyses are based on the half-space assumption of horizontal soil layers extending to infinity in all directions. However, the applicant did not specifically discuss the validation of the half-space assumption for the power block structures setting back from the top of the Squaw Creek reservoir slopes about 150 feet.

The applicant is requested to discuss the potential impact of the nearby slopes indicated in the site profiles on the computed SSI responses to ensure that the computed seismic responses will not be under-estimated at some frequencies of interest.

Specifically, the staff would like to know how the Squaw Creek Reservoir slope may affect the SSI analysis and the stability of Unit 3 ultimate heat sink (UHS) structures, which are located near the reservoir slope, as shown in FSAR Figure 2.1-201.

Also, explain how the retaining wall (as shown in figure 2.5.5-206 of the FSAR) was considered in the UHS SSI analysis. Determine whether failure of the wall would affect the lateral stability of the UHS safety-related structure.

References:

Luminant's Final Responses to Requests for Additional Information No. 2929; Log No. TXNB-09059; dated October 28, 2009; ML093080096.

Luminant's Final Responses to Requests for Additional Information No. 2929; Log No. TXNB-09042; dated September 10, 2009; ML092580684.

ANSWER:

The site-specific SSI analyses of the UHS related structures (UHSRS) used a set of site models that considered a wide range of embedment conditions ranging from no-fill (surface foundation) to a stiff backfill material. The embedment and the subgrade are represented in the SSI models as horizontally infinite layers resting on the surface of a half-space modeling the deep rock strata. A ten-layer half-space is used below the lower boundary in the SASSI analysis consistent with SASSI manual recommendations. The half-space modeling and associated boundary conditions for the UHSRS SASSI subgrade model are described in the response to RAI No. 2879 (CP RAI #60) Question 03.07.02-16 (ML093340447). The results from the different SSI analyses of the embedment conditions were enveloped and then used for seismic design of the UHSRS. The enveloping of the results obtained from all considered backfill and no-fill soil cases provide an adequate and bounding design to cover for the sloped fill conditions adjacent to the Squaw Creek Reservoir.

The lower boundary used in the SASSI analysis is 759 ft below grade. This depth is more than twice the size of foundation plus embedment recommended by SRP 3.7.2 (i.e., 131' x 2 + 47' = 309'). The variations in the surface geometry of the backfill embedment and reservoir slope are small with respect to the overall depth of half-space considered. The shortest distance from the Unit 3 UHSRS A foundation to the top edge of the reservoir slope is approximately 90 ft in the northeast direction as shown in FSAR Figures 2.5.5-206 and 2.5.5-214. This distance is considerably larger in all other directions for all UHSRS as can be seen in FSAR Figures 2.4.2-202 and 2.5.5-201. The slope of the limestone into the reservoir is approximately 10 degrees or less, which is a relatively modest slope.

The results of the SSI analyses indicate that the SSI effects on the response of the UHSRS are not significant because the limestone layer upon which all UHSRS are founded is relatively stiff. Figure 1 below presents the in-structure response spectra (ISRS) obtained from the SSI analyses of the UHS basin foundation slab for the best estimate and lower bound no-fill cases and for the embedded cases (lower bound separated, best estimate separated, upper bound separated, and high bound separated), together with the horizontal input design response spectra. The ISRS are similar to the design input response spectra except that the results of the embedded foundation SSI analyses show reductions of the amplitudes at the backfill soil column frequencies where the backfill influences the rock in-layer response spectra, thus indicating that the SSI effects on the seismic response of the UHSRS are small. As a result, responses of the UHSRS are not considered to be sensitive to variations in the surface geometry or properties of the limestone due to the presence of the reservoir. Therefore, the presence of the reservoir slope does not impact the SSI results, and the use of a horizontally-infinite half-space and consideration of a broad range of embedment conditions ensures that the ISRS results envelope the actual site conditions.

The retaining wall shown in FSAR Figures 2.5.5-206 and 2.5.5-214 is not relied upon for lateral stability of the UHSRS. The stability check of the UHSRS accounts for imbalanced soil loads because backfill is present and creates lateral pressure on two adjacent sides of each UHSRS. The other two opposing sides are separated by isolation joints from the adjacent structures (as shown in FSAR Figure 3.8-201) such that backfill lateral pressure is not present or is minimal. SSI analysis models also consider unequal soil pressures due to the presence of isolation joints on two adjacent sides, where adjacent structures are present by separating the structure from the backfill soil. Therefore, failure or collapse of the retaining wall would not create any unbalanced load conditions or changes in lateral loading that are not already included in existing design or analysis considerations. The slope calculated from high point of backfill adjacent to the UHS to the base of the retaining wall is less than 30 degrees at the worst case location. This is less than the internal friction angle for engineered backfill, which is approximately 32 degrees (FSAR Subsection 2.5.5.2.2.4 and Table 2.5.5-202). Considering this geometry, the backfill is globally stable and failure of the retaining wall could only result in a local failure of backfill. Stability checks were completed for full unbalanced soil pressures which represent an extreme case that is not expected to be realized even in the case of a retaining wall failure.

Failure or collapse of the retaining wall would not affect the stability of the UHSRS nor create any embedment conditions that are not bounded by the SSI analyses.

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

None.

<u>Impact on DCD</u>

None.

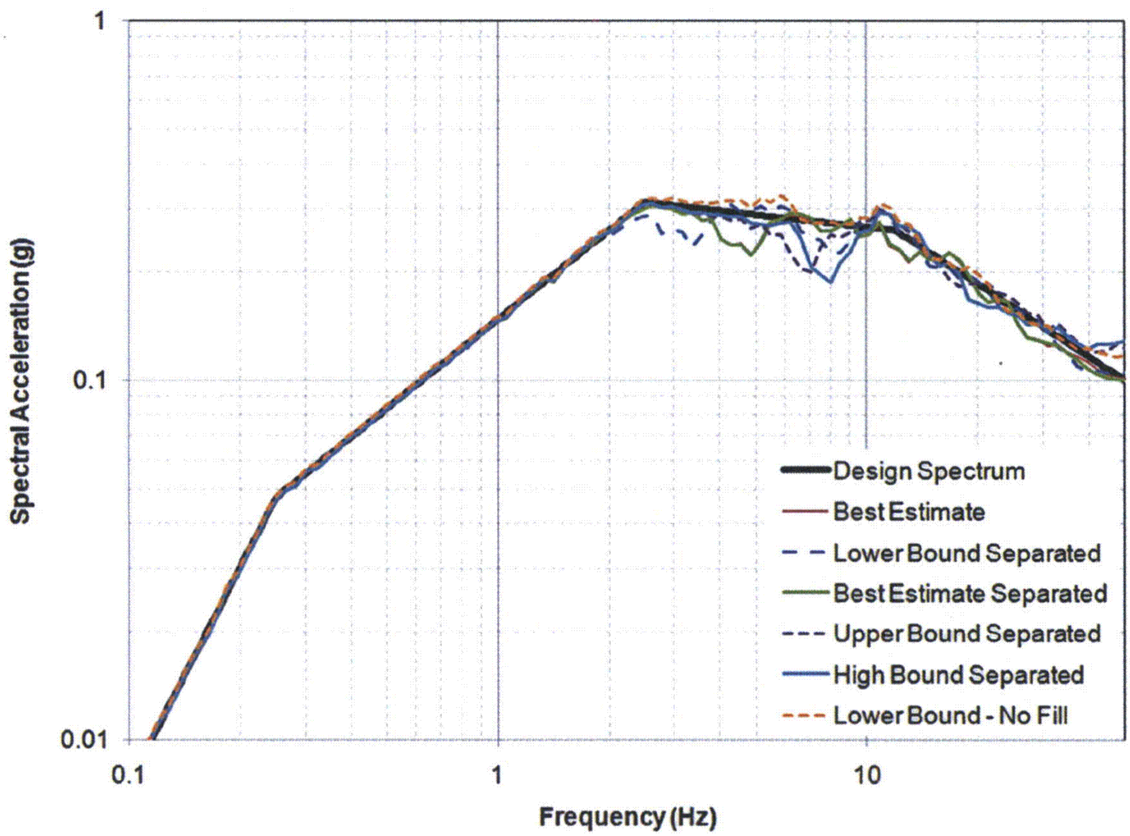

Figure 1 – Comparison of Design Response Spectra to the UHSRS In-Structure Response Spectra at Basin Slab