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Log # TXNB-10035

Ref. # 10 CFR 52

May 6, 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. 4313

Dear Sir:

Luminant Generation Company LLC (Luminant) submits herein the response to Request for Additional Information (RAI) No. 4313 for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. This RAI involves the effects of icing on safety-related structures, systems, and components.

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 May 6, 2010.

Sincerely,

Luminant Generation Company LLC

Donald R. Woodlan for

Rafael Flores

Attachment: Response to Request for Additional Information No. 4313 (CP RAI #141)

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NRO

Electronic distribution w/attachment

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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.: 4313 (CP RAI #141)

SRP SECTION: 02.04.07 - Ice Effects

QUESTIONS for Hydrologic Engineering Branch (RHEB)

DATE OF RAI ISSUE: 2/21/2010

QUESTION NO.: 02.04.07-4

NUREG-0800, Standard Review Plan (SRP), Section 2.4.7, 'Ice Effects,' establishes criteria that the NRC staff intends to use to evaluate whether an applicant meets the NRC's regulations.

By letter dated October 1, 2009, the NRC staff issued RAI ID 3669 (RAI No. 104) Question Number 14260 (02.04.07-1), in which the NRC staff asked "Provide a discussion of the processes used to determine that the analyses of ice-effects on flood elevations, ice-induced forces, and ice-related impairment of the ultimate heat sink equipment are conservatively bounding."

The applicant responded in document CP-200901564-Log No TXNB-09067-(ML093230704) executed on November 13, 2009, and, in its response, included changes to FSAR Sub-section 2.4.7 in the Updated Tracking Report (UTR) Number 4. The NRC staff has determined that the applicant did not provide a justification for the bounding conservatism of the analysis used in the FSAR. The applicant's response to RAI 3669 (RAI No. 104) Question Number 14260 describes how the plant safety is not threatened by normal occurrences of icing and sub-freezing temperatures. Neither the analysis in the COL application, Part 2 FSAR nor the applicant's response addresses the safety of the plant when icing conditions are extreme or not "characteristic of the region." The applicant's revisions in UTR No. 4 report an estimated maximum potential ice thickness of 7 inches, but does not justify the bounding conservatism of this estimate or how it does or does not affect plant safety.

In order to make its safety determination on the basis of adequate consideration of conservative terms, the NRC staff requests that the applicant justify the bounding conservatism of its icing effect analysis, giving consideration to icing under extreme conditions.

This is supplemental RAI 2.4.7-00-S.

ANSWER:

The purpose of the analysis in FSAR Subsection 2.4.7 is to ensure that safety-related facilities and water supply are not affected by ice-induced hazards. There are no CPNPP Units 3 and 4 safety-

related facilities located on Squaw Creek Reservoir (SCR). Although the CPNPP Units 3 and 4 circulating water system makeup intake structure is located on Lake Granbury, the circulating water makeup system and the makeup intake structure are not safety-related. Ice sheet formation on SCR or Lake Granbury has no effect on safety-related ultimate heat sink (UHS) or essential service water system (ESWS) operation. Freeze protection for the four wet mechanical draft UHS cooling towers and for the ESWS is described in FSAR Subsection 9.2.1.3. Freeze protection for the ESW Pump House Ventilation System is described in FSAR Subsection 9.4.5.2.6.

The estimated maximum potential ice thickness considers icing under extreme conditions by selection of conservative input parameters that are bounding for the expected range of values for the site or region. Ice thickness is calculated using U.S. Army Corps of Engineers (USACE) Publication EM 1110-2-1612. The equation for ice thickness utilizes two input parameters, the accumulated freezing degree-days (AFDDs) and the thermal expansion coefficient α. A greater value for either input parameter yields a greater potential ice thickness.

The AFDD parameter was selected using USACE Cold Regions Research and Engineering Laboratory data provided in USACE Publication TR-04-19, which provides a map of AFDDs for the U.S. The site is located in a region with AFDDs in the range of 1 to 100 °F days. The maximum of 100 °F days was selected as the input parameter. This is conservative and bounding for the expected range of AFDD values for the region.

The α coefficient was selected from Table 2-2 in Publication EM 1110-2-1612, where the value of α for an "average lake with snow" is 0.50 – 0.70. Idealizing SCR or Lake Granbury as an average lake with snow, the maximum of 0.7 was selected as the α coefficient. This is conservative and bounding for the expected range of α values for the site. Using a bounding AFDD value and a bounding α value provides a conservative assessment of freezing under extreme conditions.

References

U.S. Army Corps of Engineers, "Engineering and Design – Ice Engineering," EM 1110-2-1612, Chapter 2, Change 1, 15 Dec 2005.

U.S. Army Corps of Engineers, ERDC/CRREL TR-04-19, Severe Winter Weather in the Continental U.S. and Global Climate Cycles, Kathleen F. Jones, Julie E. Friddell, Steven F. Daly, and Carrie M. Vuyovich, October 2004.

Impact on R-COLA

See attached markup of FSAR Revision 1 page 2.4-36.

Impact on S-COLA

None.

Impact on DCD

None.

Brazos River is remote. Additionally, sustained periods of subfreezing water temperatures are not characteristic of the region. 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.

According to U.S. Army Corps of Engineers methods (Reference 2.4-~~269~~271), the maximum potential ice thickness is a function of accumulated freezing-degree days (AFDD) and the thermal expansion coefficient α. The AFDD parameter was selected using USACE Cold Regions Research and Engineering Laboratory data (Reference 2.4-272). The site is located in a region with AFDDs in the range of 1 to 100 °F days. The maximum of 100 °F days for the region was selected as the AFDD for CPNPP Units 3 and 4. The α coefficient for an "average lake with snow" is 0.50 - 0.70 (Reference 2.4-271). Idealizing SCR or Lake Granbury as an average lake with snow, the maximum of 0.7 was selected as the α coefficient. This is conservative and bounding for the expected range of AFDD and α values for the site. ~~The average maximum AFDD for CPNPP Units 3 and 4 is approximately 100 days (Reference 2.4-270).~~ The resulting maximum potential ice thickness is 7 in, which is considered icing under extreme conditions. There are no safety-related facilities located on SCR. Although the intake structure is located on Lake Granbury, that structure is not safety-related. Therefore, ice sheet formation has no effect on the ultimate heat sink (UHS) or Essential Service Water System operation. There are no safety-related facilities that could be affected by ice-induced low flow at CPNPP Units 3 and 4. The freezing protection for the essential (sometimes called emergency) service water system (ESWS) four wet mechanical cooling towers is described in Subsection 9.2.1.3. The freezing protection for the ESW Pump House Ventilation System is described in Subsection 9.4.5.2.6.

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