March 14, 2001

Mr. C. Lance Terry
Senior Vice President &
Principal Nuclear Officer
TXU Electric Company
Attn: Regulatory Affairs Department
P. O. Box 1002
Glen Rose, TX 76043

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES) UNITS 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION REGARDING SPENT FUEL STORAGE RACKS AND SPENT FUEL STORAGE CAPACITY (TAC NOS. MB0207 AND MB0208)

Dear Mr. Terry:

By letter dated October 4, 2000, you submitted proposed changes to the Technical Specifications (TSs) associated with spent fuel storage racks and spent fuel storage capacity at CPSES Units 1 and 2. The proposed TSs changes, when approved, will allow installation of additional, high density, spent fuel storage racks and an increase in spent fuel storage capacity. The proposed changes are needed by August 31, 2001, in order to support the spring 2002 CPSES Unit 2 refueling outage.

The Nuclear Regulatory Commission (NRC) staff has reviewed the information provided in the October 4, 2000, letter. In order for the NRC staff to complete its evaluation, a response to the enclosed Request for Additional Information (RAI) is required.

The contents of this RAI have been discussed with Mr. D. Woodland of your staff on February 26, 2001, and a response time frame of ninety (90) days from receipt of this letter, was agreed to. If for any reason this date becomes unreasonable, please contact me at your earliest opportunity.

Sincerely,

***/RA/***

David H. Jaffe, Senior Project Manager, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-445 and 50-446

Enclosure: Request for Additional Information

cc: See next page

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REQUEST FOR ADDITIONAL INFORMATION

REGARDING SPENT FUEL STORAGE RACKS AND SPENT FUEL STORAGE CAPACITY

TXU ELECTRIC, ET. AL.

COMANCHE PEAK STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-445 AND 50-446

Operator Licensing, Human Performance and Plant Support Branch (IOLB)

IOLB-1. Discuss how the increased number of fuel assemblies stored in the Comanche Peak Steam Electric Station (CPSES) spent fuel pools (SFPs) will affect the dose rates in any accessible areas adjacent to the sides or bottoms of the SFPs. State whether the increased storage capacity in the CPSES SFPs will necessitate any radiation zoning changes to any of the surrounding areas.

IOLB-2. Provide a description of any sources of high radiation, other than spent fuel assemblies, that may be in the CPSES SFPs during any diving operations needed to remove the old spent fuel racks and to install the new fuel racks. Discuss what precautions (such as shuffling of high radiation sources, use of diver tethers, use of physical or visual barriers, etc.) will be used to ensure that the divers will maintain a safe distance from any high radiation sources in the SFPs.

IOLB-3. Discuss the need for any additional lighting in or above the SFPs to ensure that both the diver work area is adequately illuminated and the dive tenders above the SFPs can maintain visual surveillance of the divers in the SFPs at all times.

IOLB-4. Discuss the personnel monitoring and protective clothing requirements for personnel performing the SFP reracking operation. Discuss the availability of airborne monitoring equipment for use in areas where there may be a potential for significant airborne activity during removal/installation of the fuel racks in the SFPs.

IOLB-5. Describe how you plan to monitor the doses received by the divers during the reracking operation (e.g., use of extremity or multiple thermoluminescent detectors (TLDs), alarming dosimeters, remote readout radiation detectors). Describe how you plan to maintain continuous communication with the divers while they are in the SFPs.

IOLB-6. Describe how you plan to survey the portions of the SFPs where divers may be used to ensure that you have an accurate dose rate map of these underwater areas. Verify that you will perform updated dose rate surveys in the SFPs any time that there is a change in location of the high radiation sources in the SFPs.

Enclosure

IOLB-7. Discuss how the storage of the additional spent fuel assemblies will affect the releases of radioactive liquids from the plant.

IOLB-8. Provide an estimate of the total anticipated personnel dose associated with the SFP reracking operation. Provide a dose breakdown by job to show how you arrived at this dose estimate.

Plant Systems Branch (SPLB)

SPLB-1. On Pages 14 and 15 of Attachment 2 to the October 4, 2000, amendment request (TXX-00144) (Reference 1), TXU Electric (the licensee or TXU) stated that:

> "The decay heat bounding analysis performed to support License Amendment Request 94-22 (Reference 1(a)) was based on a core thermal power of 3411 megawatt thermal power (MWt) for Unit 1 and Unit 2. The decay heat bounding analysis has been updated to consider the effect of increasing the core thermal power of 3411 MWt by 4.5% (i.e., 3565 MWt) for Unit 1 and Unit 2. Therefore the decay heat of the previous bounding analyses (License Amendment 46/32, based on an assumed total capacity of 3386 spent fuel assemblies) is increased slightly. The conclusions of the pervious bounding analyses (e.g., criticality, decay heat, thermal-hydraulic, structural [concrete temperature], total heat rejected to the environment) has been evaluated and determined to remain acceptable...."

For the most limiting design basis scenario (a planned full core offload with a single failure of one cooling train), in the previous thermal analysis for SFP cooling to support LAR 94-22, TXU calculated the peak bulk SFP temperature to be 191 °F which is below the design temperature of 200 °F as specified in the CPSES Final Safety Analysis Report (FSAR) for SFP support system components. In order to allow the Nuclear Regulatory Commission (NRC) staff to determine whether the calculated peak SFP temperature remains below the design temperature of 200 °F, please provide the calculated SFP temperature (a curve to show the temperature as a function of time for the most limiting design basis scenario) resulting from the power uprate.

SPLB-2. As a result of plant operations at the proposed uprated power level, the decay heat load for any specific fuel discharge scenario will increase. TXU stated, on Page 15 of Attachment 2 to TXX-00144, that the decay heat for the bounding analyses increased slightly; however, in Enclosure 1 to Reference 1, Holtec International (Holtec) Report HI-2002402, Revision 1 (Reference 2), Section 5.3, “Decay Heat Analysis,” Holtec stated:

> “There are no changes to the current CPSES decay heat analysis and maximum pool temperatures created by this submittal. This is because previous licensing submittals (rerack activities associated with...License Amendment 74...of SFP 2 with Region II racks utilized the ultimate

> storage capacity of 3386 fuel assemblies...and evaluated the spent fuel pool cooling and associated support systems up to the maximum calculated power rating) enveloped the decay heat values and corresponding maximum pool temperatures associated with this submital...."

The above Holtec statement contradicts what TXU stated in TXX-00144 concerning the SFPs decay heat analysis. Please provide clarification for this discrepancy.

SPLB-3. In the Holtec report, Section 5.4.4, "Impact on Spent Fuel Pool Cleanup System," Holtec stated:

> "...In order to protect the resins in the demineralizers, the maximum temperature of the water to the purification loops is 140 °F for either one or two pump operation. The increased spent fuel storage capacity does not affect the design basis or functional requirements of the cleanup system."

Please provide detailed information to show why the elevated SFP temperature resulting from the increased spent fuel storage capacity does not affect the design bases or functional requirements of the cleanup system.

Mechanical and Civil Engineering Branch (EMEB)

EMEB-1. The licensee indicated in Chapter 6 of Reference 2 that the structural analyses of the spent fuel racks were performed in compliance with the US NRC Standard Review Plan (SRP) and the former US NRC Office of Technology Position Paper related to spent fuel storage. With respect to the dynamic fluid-structure interaction analyses using the computer code, DYNARACK, in Reference 2, provide the following:

(a) Provide references to the documentation of the validation of the appropriateness of using the analytical model available in the version of the DYNARACK code for the dynamic analyses of the highly complicated, nonlinear, hydrodynamic, fluid-rack structure interactions and behavior of the fuel assemblies and the box-type rack structures. Provide the results of any existing experimental study that verifies the correctness or adequacy of simulation of the fluid coupling utilized in the numerical analyses for the fuel assemblies, racks and walls. If no such experimental study is available, provide justification that the current level of the DYNARACK code verification is adequate for engineering application and could be accepted without further experimental verification work.

(b) Provide the physical dimensions of the gaps among adjacent racks, and the gaps between the racks and the SFP walls, and compare them with the actual displacements under any simulation discussed in Section 6.9

of Reference 2 to show any potential for rack to rack, or rack to SFP wall impacts.

EMEB-2. The licensee indicated in Reference 2 that the design conditions described in SRP 3.8.4, American Concrete Institute (ACI) Code 318-71 and ACI Code 349-76 were used as guidance in the calculations of SFP capacity. With respect to the SFP capacity calculations using the ANSYS computer code presented in Chapter 8 of Reference 2:

(a) Provide the details of liner plate and the anchorages, including their material properties used in the structural analysis. Explain how the interface between the liner and concrete slab is modeled, and also, how the liner anchors are modeled; explain how such modeling accurately represents the real structural behavior.

(b) Provide the calculated governing factors of safety in a tabular form for the axial, shear, bending, and combined stress conditions in the various structural elements of the SFP.

EMEB-3. Provide a table showing the maximum bulk pool temperatures for different fuel offload scenarios to demonstrate that the temperatures do not exceed 150 °F, which is the allowable ACI Code 349 limit for concrete temperature for normal operation or any other long term period. If they do exceed the limit, justify such exceedance. Provide the assumptions used in the table.

EMEB-4. The licensee stated in Section 7.5.2, “Deep Drop Events” in Enclosure 1 of Reference 1, that the deep drop through an exterior cell does produce some deformation of the baseplate and localized severing of the baseplate/cell welds. The licensee further stated that the fuel assembly support surface is lowered by a maximum of 2.14 inches, which is less than the distance of 7.5 inches from the baseplate to the liner. Provide the design limit of the allowable deformation of the baseplate based on its material strength characteristics, and discuss the long term impact of the accumulated plastic deformation of the baseplate and the localized severing of the baseplate/cell wall welds on the integrity of the racks and the fuel assemblies.

<u>Reactor Systems Branch (SRXB)</u>

SRXB-1. Regarding the Westinghouse criticality analysis methodology used for Region II (3/4 and 4/4) storage configurations determining the reactivity bias to account for axial or three-dimensional burn-up effects, please provide the resolution to this issue consistent with Reference 1.

SRXB-2. It is not clear to the NRC staff, if the boron credit analysis was performed by Westinghouse methodology (Reference 9 of Reference 1), or by Holtec, or by both. Provide a clarification.

SRXB-3. On page 9 of Attachment 2 to Reference 1, the last sentence of the last paragraph regarding Region I states that "...150 ppm soluble boron is required to

meet the regulatory guidelines...." Provide a reference for these regulatory guidelines.

Materials and Chemical Engineering Branch (EMCB)

EMCB-1. Provide information on the materials of construction for the high density spent fuel racks to be installed in Region II of both SFPs. The information should include the types of material used for different elements of the racks including the weld material.

References

1. Letter dated October 4, 2000 from James J. Kelley, Jr., TXU Electric to U.S. NRC, "Comanche Peak Steam Electric Station (CPSES) - License Amendment Request (LAR) 00-05 - Revision to Technical Specification - Spent Fuel Assembly Storage Racks and Fuel Storage Capacity" - TXX-00144.

2. Holtec International HI-2002402, Revision 1, "Licensing Report for Spent Fuel Rack Installation at Comanche Peak Steam Electric Station."