



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

February 10, 1988

Docket Nos. 50-445  
and 50-446

APPLICANT: Texas Utilities Electric Company (TU Electric)  
FACILITY : Comanche Peak Steam Electric Station (CPSES), Units 1 and 2  
SUBJECT: SUMMARY OF AUDIT ON JANUARY 21-22, 1988 - IMPLEMENTATION  
OF PIPING DESIGN CRITERIA

On January 21-22, 1988, the NRC staff and its consultants conducted a followup audit of the TU Electric Corrective Action Program design validation for piping at the offices of Stone and Webster Engineering Corporation (SWEC) in Cherry Hill, New Jersey. The purpose of the audit was to continue staff review of the adequacy of the implementation of design criteria developed by SWEC for the resolution of generic technical issues associated with large bore piping and pipe supports at CPSES. The followup audit was a continuation of audits previously held on September 2-4, 1987, September 22-24, 1987, and October 28-30, 1987. (See NRC staff audit summaries dated September 28, 1987, October 16, 1987, and November 25, 1987, respectively). In addition, the staff discussed with SWEC the responses to open items related to the SWEC NA-1140 Report from the August 25, 1987 Meeting (see Meeting Summary dated October 2, 1987).

The following is a summary of the issues selected during the audit, the extent of their implementation reviewed by the staff, and the status of the staff's review of issues at the conclusion of the audit. A list of persons involved in the audit is provided in Enclosure 1 to this summary.

1. NA-1140 Review - The staff discussed with SWEC its response to the open items remaining in the staff review of the SWEC report, "Documentation of ASME III NA-1140 Review for Piping and Supports" (NA-1140 Report). The SWEC responses adequately resolved the staff's concerns and were documented in Revision 2 to the NA-1140 Report (Enclosure 2 to this summary).
2. SIF for Radial Weld Shrinkage - The staff discussed its review of the stress intensification factor (SIF) used to evaluate the effect of excessive girth butt weld radial shrinkage in piping. The staff discussed the adequacy of the procedure (Attachment 3-16 of CPPP-7) and the basis for the SIF values derived by SWEC. SWEC has issued Project Memorandum PM-229 (Enclosure 3 to this summary) to address the staff's concerns. Based on the methodologies and limitations provided therein, the staff finds the SIF for radial weld shrinkage to be acceptable.

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3. CPPP-7 Pipe Stress Design Criteria - The staff discussed several questions resulting from its review of the CPPP-7 (Revision 3) design criteria for piping stress analysis. The staff reviewed the differences between an October 6, 1981 letter and an October 15, 1981 letter regarding functional capability criteria and found no technical differences in the criteria therein. Additionally, the staff reviewed the use of equivalent static analysis methods for small bore piping and found it uses a 1.5 multimode multiplication factor with ASME Code Case N-42 damping values. There were no open or unresolved items identified.

4. Pipe Supports Related to Cygna Hearing - In the April 1984 hearings on the adequacy of the Cygna Independent Assessment Program (Phases 1 and 2), several issues were raised by the intervenor, Citizens Association for Sound Energy (CASE), in the pipe support design area. As a part of this audit, the staff selected three pipe support calculations completed by SWEC which were related to the CASE concerns as discussed at the Cygna hearings (SI-1-325-002-S32R, RH-1-010-004-S22K, and RH-1-064-011-S22R). The staff reviewed these supports to determine their latest status (e.g., modified, deleted, in-process).

Support SI-1-325-002-S32R, which was previously designed as a non-rigid box frame with cinched U-bolt has been revised to a stiff clamp.

Support RH-1-010-004-S22K, which was previously designed as an axial/rotational restraint with dual snubbers, has been deleted.

Support RH-1-064-011-S22R, which was previously designed using a cinched U-bolt, has been redesigned using a stiff pipe clamp.

The modifications to the three supports are in accordance with CPPP-7 design criteria and are thus acceptable.

5. Axial/Rotational Restraints - The staff selected four pipe support calculations to verify the lug/clamp orientation. The four pipe support calculations showed a lug/clamp orientation with 4 lugs at 90° to each other and the clamp ears at 45° to the lugs. The staff reviewed Project Memorandum 154, "Axial Restraints With Lugs," and SWEC generic calculations GENX-281, "Potential Binding of Lugs in Axial Supports," and GENX-242, "Parallel Snubbers." Based on our review, the staff finds that sufficient detail is provided in the SWEC approach for designing axial/rotational restraints to ensure proper implementation of CPPP-7.

6. Effect of Gaps in Dead Weight Supports - The staff reviewed the SWEC report, GENX-255 "Evaluation of Pipe Stress and Pipe Supports Due to As-Installed Gaps in Deadweight Supports," which addresses the effect of a 1/8-inch gap between the bottom of a pipe and a box frame support when the support is designed to carry the pipe dead weight. The SWEC report evaluated the potential increase in piping stress and support loads for various enveloping cases. For pipe stress, the potential increase due to the gap was found to be 12 percent. For the specific case of the containment spray header supports, where several box frame supports exist adjacent to one another, SWEC has determined that each support is capable of withstanding the additional dead weight of the piping assuming two consecutive supports are missing. The SWEC report found that all

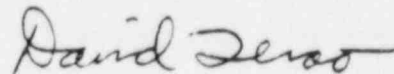
Mr. William G. Council  
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the containment spray supports have a minimum safety factor of three to their designed dead load without exceeding ASME Code requirements. Thus, the safety margin ensures that the 1/8-inch gap between the bottom of the pipe and the support will not cause an overstress of the pipe and pipe supports.

The staff review of the SWEC report finds it adequately addresses the concern identified and the item is considered closed.

A total of 36 hours was involved in this audit.



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Enclosures:

1. List of Persons Involved
2. NA-1140 Report (Revision 2)
3. PM-229

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January 21-22, 1988

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