UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

OCT 27 1994

Dockets: 50-445
50-446
Licenses: NPF-87
NPF-89
EA 94-116

TU Electric
ATTN: C. L. Terry, Group Vice President
Nuclear Production
Skyway Tower
400 North Olive Street, L.B. 81
Dallas, Texas 75201

SUBJECT: NRC INSPECTION REPORT 50-445/94-14; 50-446/94-14

Thank you for your Letter TXX-94245 of September 23, 1994, in response to our letter and Notice of Violation dated August 26, 1994. We have reviewed your reply and find it responsive to the concerns raised in our Notice of Violation. We will review the implementation of your corrective actions and your supplement to Licensee Event Report 94-005-00 during a future inspection to determine that full compliance has been achieved and will be maintained.

Sincerely,

Thomas P. Gwynn, Director
Division of Reactor Safety

cc:
TU Electric
ATTN: Roger D. Walker, Manager of
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Skyway Tower
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IE01
1/1

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Texas Department of Licensing & Regulation
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Honorable Dale McPherson
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Texas Radiation Control Program Director
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Office of the Governor
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E-Mail report to D. Sullivan (DJS)

bcc to DMB (IE01)

bcc distrib. by RIV w/enclosure:

L. J. Callan
Branch Chief (DRP/B)
MIS System
RIV File
Branch Chief (DRP/TSS)
DRS AI file
Resident Inspector (2)
Leah Tremper (OC/LFDCB, MS: TWFN 9E10)
DRSS-FIPB
Project Engineer (DRP/B)

DRS AI 94-103

RIV:RI:OB	C:PS	D:DRS	AC EO	D:DRP	D:DRS
TMcKernon	WAng	TPGwynn	GSanborn	ABBeach	TPGwynn
10/25/94	10/26/94	10/26/94	10/26/94	10/ /94	10/27/94

E-Mail report to D. Sullivan (DJS)

bcc to DMB (IE01)

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AI 103
94-14

TU ELECTRIC

Log # TXX-94245
File # 10130
10118
Ref. # EA 94-116
10CFR2.201

C. Lance Terry
Group Vice President

September 23, 1994

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NO. 50-445 AND 50-446
NRC INSPECTION REPORT NO. EA 94-116
RESPONSE TO NOTICE OF VIOLATION

Gentlemen:

TU Electric has reviewed the NRC's letter dated August 26, 1994, concerning the special inspection conducted by the NRC staff during the period of June 6 - 24, 1994. Attached to the August 26, 1994, letter was a Notice of Violation (NOV).

TU Electric hereby responds to the Notice of Violation (EA 94-116) in the attachment to this letter.

Sincerely,

C. L. Terry

GLM:bm
Attachment

cc: Mr. L. J. Callan, Region IV
Mr. D. G. Chamberlain, Region IV
Resident Inspectors, CPSES

9409270078 6PP 94-1976

NOTICE OF VIOLATION
(EA 94-116)

Criterion III of Appendix B to 10 CFR Part 50 requires, in part, that measures be established to assure that applicable regulatory requirements and the design basis, as defined in Section 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures and instructions. Further, the design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

FSAR Table 14.2-2, "Operational Vibration Testing," states, in part, that the objective of vibration testing is to verify that the vibration level of selected Class 1, 2, 3 piping is within acceptable limits. FSAR Section 3.9B.2.1.3, "Steady State Vibration Tests," states, in part, that during normal operating conditions, qualified engineers will observe the lines, where accessible, to determine the acceptability of the steady state vibrations. One of the following resolutions will be applied if observed vibrations are excessive: (1) the piping will be monitored by suitable instrumentation at or near the locations where vibrations appear to be excessive to demonstrate that the vibration level does not cause ASME Code stress and fatigue allowables to be exceeded, (2) the cause of the vibration will be eliminated, or (3) the pipe routing and/or the support system will be modified to reduce the vibrations to an acceptable level.

Contrary to the above, design control measures did not adequately verify acceptable Containment Spray system piping vibration as follows:

1. A suitable test program was not implemented for preoperational vibration testing of the Unit 2 containment spray system that was conducted between June and October of 1992. The system was not tested to encompass, to the extent practical, the actual operating and emergency conditions to which it may be subjected.

2. Design control measures failed to determine that design calculation ER 10, CT-1-C681 dated November 16, 1992, used a wrong stress intensification factor. Consequently, vibration levels for the containment spray system eductor line in Loop 4, off Pump 2-04 were erroneously determined to be acceptable. On August 5, 1993, weld FW-3A on the eductor line failed a second time due to vibration-induced fatigue.

3. Vibration testing conducted from August 1993 until October 1993 was not suitable for verifying the adequacy of the containment spray system design. Instrumentation used for collecting vibration data during this period did not provide suitable data required for evaluation of the piping vibration. As a result, incorrect data contained in Table 6 of Calculation Package CT-1-C681, dated October 22, 1993, was used for evaluation and acceptance of containment spray system vibration. The data did not account for a correction factor needed for the instrumentation that was the source of the data. Use of the correction factor results in vibration velocity values in some data points that exceeds the allowable velocity limits, thus requiring further engineering evaluations.

4. Design control measures failed to assure the adequacy of design in that analytical methods (i.e., VMG-2, OM-3 velocity method) used between preoperational testing and May 1994 did not account for off-resonant forced vibrations. As such, potential calculation nonconservatisms were not taken into consideration.

RESPONSE TO NOTICE OF VIOLATION

TU Electric accepts the violation and the requested information follows:

EXAMPLE 1

1. Reason for Violation

   The personnel who prepared the Unit 2 Containment Spray (CT) preoperational vibration test procedure included the criteria from FSAR section 3.9B.2.1.3 which states that vibration tests are run "at normal operating conditions". Normal operating conditions for the system are, at the start of an event, all four pumps starting in miniflow. At the system actuation signal, the CT system trains operate independently with both pumps in a train operating in parallel. The surveillance test typically involves operation of one pump in one train. TU Electric believes that the personnel preparing the Unit 2 preoperational vibration test procedure interpreted "normal operating conditions" to be one pump operating at a time.

   Preoperational testing with one pump operating at a time was considered appropriate since:

   1) Testing through the full flow test line allowed achievement of maximum flow rates through the pump discharge line to maximize flow induced vibrations.

2) Testing through miniflow lines allowed achievement of lower flowrates and higher discharge pressures to maximize vibration due to hydraulic instability.

3) Single pump operation represented the most frequent operating condition of surveillance testing.

2. Corrective Steps Taken and Results Achieved

The CT system was extensively modified in 1994 to reduce vibrations and correct the potential for crack propagation. Extensive confirmatory testing using instrumentation was conducted following modifications to validate and benchmark vibration levels in the system. This testing was done with different configurations of pumps operating (i.e., 4 pumps in miniflow, 1 train in full flow, 1 pump in miniflow, 1 pump in full flow).

3. Corrective Steps That Will be Taken to Preclude Recurrence

With the exception of the Spent Fuel Pool Cooling and Cleanup System, all preoperational vibration testing has been completed. The Spent Fuel Pool Cooling and Cleanup System testing was deferred in TXX-93011, dated January 8, 1993, and is scheduled to be performed during the first refueling outage for Unit 2. Engineering will specify the appropriate operating system configuration for the Spent Fuel Pool Cooling and Cleanup System deferred testing. TU Electric believes that this condition was an isolated occurrence. Vibration induced fatigue cracking has not occurred in other systems. Engineering has reviewed Unit 2 startup test packages to ensure that Emergency Core Cooling System (ECCS) and related Mechanical systems (Residual Heat Removal, Safety Injection, Auxiliary Feedwater, Chemical Volume and Control, Component Cooling Water, and Service Water) were tested for vibration under appropriate test conditions.

4. Date of Full Compliance

TU Electric is in full compliance.

EXAMPLE 2

1. Reason for Violation

   TU Electric believes that the wrong stress intensification factor was used because the personnel involved erred in the selection of the stress intensification factor.

2. Corrective Steps Taken and Results Achieved

   A new allowable velocity was calculated using the correct stress intensification factor. Additional supports were added to the eductor line to reduce the vibration to below allowable levels.

3. Corrective Steps that will be taken to Preclude Recurrence

   The personnel involved in the selection of the incorrect stress intensification factor (SIF), used i as the factor and not 2i as required. TU Electric has reviewed all vibration evaluation calculations performed by this contractor and have confirmed that the correct 2i factor was applied in all other cases. In addition to this review, TU Electric will review 30 randomly selected piping calculations which were performed by this contractor to ensure that this type of error does not exist in other similar calculations.

4. Date of Full Compliance

   TU Electric is in full compliance. The review of piping calculations will be completed by December 31, 1994.

EXAMPLE 3

1. Reason for Violation

   Vibration monitoring equipment used by TU personnel (post startup) provided a peak averaging technique which yielded a Root Mean Square (RMS) peak velocity and not the peak time history velocity required by OM-3 for the CT system. Engineering did not assure that the appropriate data was measured and utilized.

2. Corrective Steps Taken and Results Achieved

   The CT system was extensively modified in 1994 and confirmatory testing was either completed using instrumentation that provided suitable data required for evaluation of the piping system or a correction factor was applied to provide suitable data.

3. Corrective Steps That Will be Taken to Preclude Recurrence

During the time period in question, the only piping upon which the subject instrumentation was used to measure vibration levels was the CT system piping. Suitable instrumentation has been obtained for the performance of future piping vibration monitoring and appropriate engineering groups understand the nature of the data required by ASME OM-3. To enhance future compliance, appropriate personnel will receive training regarding the implementation and expectations of ASME OM-3.

4. Date of Full Compliance

TU Electric is in full compliance. Appropriate personnel will receive training by June 1, 1995.

EXAMPLE 4

1. Reason for Violation

TU Electric believes that the failure to account for off-resonant forced vibrations in the analytical methods resulted from the personnel involved not paying sufficient attention to the expectations of ASME OM-3.

2. Corrective Steps Taken and Results Achieved

All affected calculations were reviewed using ASME OM-3 criteria to assure that any potential unconservative results obtained by not accounting for off-resonant forced vibrations were addressed. Based on this review, previous conclusions regarding acceptability remain unchanged.

3. Corrective Steps That Will be Taken to Preclude Recurrence

Appropriate personnel will receive training regarding the implementation and expectations of ASME OM-3.

4. Date of Full Compliance

TU Electric is in full compliance. Appropriate personnel will receive training by June 1, 1995.