ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.:	50-445 50-446
License Nos.:	N.F.-87 N.F.-89
Report No.:	50-445/98-07 50-446/98-07
Licensee:	TU Electric
Facility:	Comanche Peak Steam Electric Station, Units 1 and 2
Location:	FM-56 Glen Rose, Texas
Dates:	September 13 through October 24, 1998
Inspector:	Anthony T. Gody, Senior Resident Inspector Scott C. Schwind, Resident Inspector Ian Barnes, Technical Assistant
Approved By:	Joseph I. Tapia, Chief, Branch A Division of Reactor Projects
Attachment :	Supplemental Information

EXECUTIVE SUMMARY

Comanche Peak Steam Electric Station, Units 1 and 2
NRC Inspection Report 50-445/98-07, 50-446/98-07

The resident inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 6-week period of resident inspection.

Operations

- During plant tours and engineered safety features systems walkdowns, equipment operability, material condition, and housekeeping were acceptable in all cases (Section O2.1).

- Control room operators used good self-verification techniques, were attentive to the control boards, and effectively identified adverse trends through reviews of operating logs, computer data, and strip chart traces (Sections O1.1 and O4.1).

Maintenance

- Maintenance personnel adhered to procedures, work orders, radiation work permits, and used good safety practices. (Section M1.1).

Engineering

- Engineering support for automatic rod control system problems, emergency diesel generator degradation issues, and other miscellaneous issues were both effective and pro-active. All corrective actions were found to be thorough and deliberate (Sections E2.1, E2.2, E8.1, E8.2, E8.4, and E8.5).

Plant Support

- An emergency drill was found to be an effective training exercise. Post drill self-critiques were effective in identifying several areas for improvement (Section P1.1).

- The licensee proactively conducted an ad-hoc relocation of the emergency operations facility to the alternate site following a planned drill and found that they would have significant difficulties in effectively operating the emergency operations facility from the alternate site (Section P1.1).

Report Details

Summary of Plant Status

Both units operated at approximately 100 percent power for the entire report period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. In general, the conduct of operations was professional and safety-conscious; specific events and noteworthy observations are detailed in the sections below. Through daily observations of control room activities, the inspectors concluded that both units were operated by knowledgeable operators using good self-verification techniques and communications.

O2 Operational Status of Facilities and Equipment

O2.1 Plant Tours and Engineered Safety Features Walkdowns

a. Inspection Scope (71707)

The inspectors used Inspection Procedure 71707 to walk down accessible portions of the following engineered safety features systems:

- Unit 2, Train B emergency diesel generator
- Unit 2, Train A and B motor-driven auxiliary feedwater pumps
- Unit 2 turbine-driven auxiliary feedwater pump
- Units 1 and 2, control room

b. Observations and Findings

Equipment operability, material condition, and housekeeping were acceptable in all cases. Systems were found in their proper standby conditions. Plant material condition was particularly noteworthy. Equipment preservation was effective. Little exterior corrosion was noted, even on systems exposed to severe service and outside weather conditions. Pump oilers were clean and always maintained full, motor air filters were exceptionally clean, mechanical pump seals leaked the prescribed amount, valve packing leaks were minimal, and valve packing followers were assembled with care to not impact valve stems. The inspector concluded that these observations demonstrated effective maintenance. Several minor discrepancies were brought to the licensee's attention and were all corrected satisfactorily. The inspector identified no substantive concerns as a result of these walkdowns. The system engineer accompanied the inspector on the emergency diesel generator walk down to discuss the cumulative affect of several recent degraded conditions identified by the licensee. These are discussed further in Section E2.2 of this report.

O4 Operator Knowledge and Performance

O4.1 Control Room Operator Performance

a. Inspection Scope (71707)

The inspectors conducted a number of extended tours of the control room observing routine operator performance.

b. Observations and Findings

Operators conducted detailed walkdowns of the control boards several times during each shift as expected. The inspectors noted that operators appropriately announced pending equipment operation and verified proper operation by scanning the appropriate indications available and discussing the equipment performance with the plant equipment operators in the field. Alarms were responded to properly and alarm reference manuals were consistently referenced. Communication between operators, supervision, and other organizations was formal and effective. The inspectors found that operators appropriately identified adverse trends through reviews of operating logs, computer data, and strip chart traces, and initiated effective corrective actions. For example, on one occasion, the reactor operator identified that the rate of volume control tank recovery following a dilution for temperature control had changed slightly and suspected a small reactor coolant system leak. The operator conducted a reactor coolant inventory surveillance which revealed that the reactor coolant system leakage had increased from approximately 0.15 to 0.32 gallons per minute. An investigation was initiated and plant equipment operators found that a small drain valve on one of the reactor coolant system seal injection filters had developed a leak. The seal injection was switched to an alternate filter, isolating the leak, and the reactor coolant system leakage returned to its original value.

c. Conclusions

Operators were attentive to the control boards and demonstrated a questioning approach towards routine plant operations.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Maintenance and Surveillance Observations

a. Inspection Scope (61726, 62707)

The inspectors reviewed and/or observed the conduct of both plant surveillance and maintenance during the report period. The inspectors observed all or portions of the following activities:

- Unit 2, Turbine-driven auxiliary feedwater pump containment isolation valve testing
- Unit 2, Train B emergency diesel generator (EDG) exhaust temperature selector switch replacement
- Unit 2, Train B containment spray pump quarterly surveillance
- Unit 1, Train B solid state protection system surveillance
- Unit 1, Startup transformer (XST1) bushing replacement
- Unit 1, Startup transformer (XST1) fire suppression deluge test

b. Observations and Findings

The inspector observed good prejob briefs and work practices associated with the work activities listed above. Personnel used good three-part communications, good safety practices, and proper adherence to radiation work permits and procedures. Specific observations follow:

During the Unit 2, Train B containment spray pump test, insulation was removed from the lower head of the Train B containment spray heat exchanger to inspect for leakage. No leakage was detected; however, the licensee planned an additional inspection to be conducted when the test can be repeated at a higher system pressure. The inspector observed boron residue on one of the Train B containment spray pump casings and questioned the licensee if either of these apparent leaks were being tracked in the radioactive system leakage inspection (RSLI) program. The RSLI program, if implemented properly, satisfies the Technical Specification 6.8.3 requirement to have a program in place to reduce leakage from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient to as low as practical. The RSLI program coordinator and cognizant system engineer stated that leaks identified outside the scope of RSLI surveillance procedures were documented through other processes such as work orders and were not captured in the RSLI program. The inspector found that a recent station operations committee meeting held to review changes to the RSLI program raised similar program questions. The inspector will review the licensee's RSLI program as an inspection followup item (IFI) (50-445;446/9807-01).

The Unit 1 startup transformer bushing replacement activity was well coordinated and executed. This activity required entry into a 72-hour Technical Specification shutdown action statement because of reduced power availability. The licensee established a defense-in-depth contingency plan to protect the remaining AC power sources to both units and to ensure both turbine-driven auxiliary feedwater pumps were available. The inspector observed good coordination between the offsite organization (Glen Rose transmission) that performed the work and the licensee.

c. Conclusions

Maintenance and surveillance activities were performed well during this inspection period, consistent with previously documented observations. Good coordination and planning minimized the time spent in abnormal plant configurations during online maintenance.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Automatic Rod Control System

a. Inspection Scope (37551)

The inspector reviewed the licensee's response to several invalid rod motion demand signals received on Units 1 and 2 with the rod control system in automatic.

b. Observations and Findings

In July, 1998, the rod control systems for both units were placed in automatic. Subsequently, Unit 2 experienced a number of invalid rod motion demand signals and the system was returned to manual. The Unit 1 rod control system remained in automatic until October 20, when an invalid rod motion demand signal caused control Bank D rods to move out one step. The licensee determined that the cause of the invalid signals was due to the high total gain of the lead-lag control circuit. One volt deviations in the rod control system were resulting from fluctuations as low as 10 millivolts on the average coolant temperature input into the rod control system.

The licensee surveyed the industry for similar problems and considered implementing modification made by other utilities. The licensee concluded that since these modifications were not completely successful at reducing invalid rod motion demand signals they were not cost effective. In addition, the station reactivity management team concluded that the undemanded rod movements to date had not been a reactivity concern because of their small magnitude. However, they did establish performance criteria and required actions to be taken upon receipt of an invalid rod control signal. The inspector reviewed the performance criteria and found them to be clear, objective, and conservative.

c. Conclusions

The licensee was thorough and deliberate in their approach to establishing performance criteria and action levels for undemanded rod movement with the rod control system in automatic. The decision to return rod control to automatic took into account reactivity management and impact on the control room. The licensee's use of industry experience was good.

E2.2 EDG Degradation Issues

a. Inspection Scope (92903)

The inspector reviewed several operations notification and evaluation (ONE) forms written to resolve degraded conditions generic to all four EDGs. These items and the modifications or administrative controls to resolve them were also discussed with the system engineer.

b. Observations and Findings

The licensee identified a number of scenarios where the EDG would not load onto the safeguards busses when required. The following summarizes the issues and resolutions.

- The alternate power supply breaker for a given Class 1E bus would not close on the loss of the preferred power source if the corresponding EDG was running at normal voltage and speed with the output breaker open. The auxiliary contact functions in the alternate supply breakers were modified to allow closure of the breaker in this situation.

- The EDG governors would not reposition the engine speed back to 60 hertz if a full load rejection were to occur during the monthly EDG surveillance test immediately followed by a loss of offsite power. A modification to the governor circuit is planned for the next refueling outage for each unit. As a compensatory measure, an EDG will be considered inoperable while paralleled to the grid during monthly testing.

- When an EDG is in the normal mode for restart, there is a 2-minute time delay following engine shutdown before the engine can be restarted. A modification is planned for the next refueling outage for each unit which would change the loss of offsite power start signal to each EDG from normal to emergency. This would eliminate the 2-minute time delay. As a compensatory measure, an EDG will be considered inoperable while paralleled to the grid during monthly testing.

c. Conclusion

The licensee was proactive in initiating modifications to correct operability concerns generic to all four EDGs. Satisfactory compensatory measures were initiated whenever implementation of corrective actions was delayed until the next refueling outage.

E8 Miscellaneous Engineering Issues (92700, 92903)

E8.1 (Closed) Licensee Event Report (LER) 50-445/98003-00: Greater than 1 percent steam generator tubes defective. In accordance with Technical Specification 4.0.6.2(c), the licensee reported that greater than 1 percent of the tubes inspected in Steam

Generator 1-2 during Unit 1 Refueling Outage (1RF06) had been identified to be defective.

The inspectors ascertained from review of the steam generator tube examination history for the last Unit 1 Refueling Outage (1RF06) that the number of tubes in Steam Generators 1-1, 1-2, 1-3, and 1-4 found by eddy current examination to contain defects were, respectively, 0, 67, 8, and 27. All of the defective tubes were removed from service by plugging. The plugging total for Steam Generator 1-2 represented 1.46 percent of the 4578 tube population and was thus reportable in accordance with Technical Specification 4.0.6.2(c). The eddy current examination results indicated that outside diameter stress corrosion cracking (ODSCC) was the only active tube corrosion degradation mechanism. Sixty-three tubes in Steam Generator 1-2, 3 tubes in Steam Generator 1-3, and 22 tubes in Steam Generator 1-4 were plugged because of the detection of circumferential ODSCC in the tube expansion transition region at the top-of-tube sheet, with an additional 2 tubes plugged in Steam Generator 1-2 because of the detection of axial ODSCC at this location. Four tubes were removed from service in Steam Generator 1-4, as a result of the detection of axial ODSCC at tube support plates. Three tubes were also plugged in 1RF06 because of the detection of volumetric indications, two in Steam Generator 1-2 and one in Steam Generator 1-4.

The actions taken by the licensee to increase Unit 1 tubing stress corrosion resistance and minimize steam generator tube degradation were reviewed during a 1994 steam generator tube integrity inspection (NRC Inspection Report 50-445;446/94-01). Overall secondary water chemistry performance was noted to be excellent, with Electric Power Research Institute secondary water chemistry guideline criteria adhered to throughout commercial service. Specific initiatives implemented by the licensee included the following:

- Thermal stress relief of Rows 1 and 2 low radius U-bends in the Unit 1 steam generators prior to commercial service, to minimize susceptibility to primary water stress corrosion cracking;

- Shot peening of the inside diameter surface of the tubes in the top-of-tube sheet region prior to commercial service, to induce residual compressive stresses, and thereby, reduce the susceptibility to primary water stress corrosion cracking;

- Replacement prior to commercial service of copper alloy tubing in the condenser with titanium tubing and in secondary heat exchangers with stainless steel tubing, in order to eliminate copper transport to the steam generators and minimize its contribution to development of ODSCC and pitting in the steam generator tubes;

- Adoption of Electric Power Research Institute secondary water chemistry molar ratio control recommendations for maintaining neutral to slightly acidic crevice conditions, rather than the alkaline conditions which promote ODSCC initiation;

- Use since 1993 of mixed amine strategies to minimize transport of corrosion products; and

- Performance of chemical cleaning of the Unit 1 steam generators in 1996 during Refueling Outage 1RF05, to eliminate deposit conditions and local environments that promote ODSCC initiation.

The inspectors concluded that the licensee has been proactive in its approach to minimizing degradation of Unit 1 steam generator tubing.

E8.2 (Closed) Violation 50-445/9709-01: Essential variable changes made in plus point probe acquisition technique specification without requalification being performed. The inspectors verified that the proposed corrective actions for the violation were accomplished, as committed, during preparation for and while in Unit 2 Refueling Outage 2RF03 in 1997. These actions consisted of: (1) conduct of a prejob briefing to emphasize expectations for procedural and work order compliance; (2) administration of a written test to eddy current acquisition personnel; (3) emphases to Westinghouse quality assurance personnel of expectations regarding field compliance with the acquisition technique specification essential variables and the conduct of field walkdowns to assure use of correct cabling, probes, and probe extensions; (4) development of a checklist for use in the field walkdowns; (5) establishment of an eddy current testing facility; (6) conduct of eddy current acquisition training for licensee personnel tasked with contractor control; and (7) attendance of licensee personnel at eddy current Level IIA analyst training.

E8.3 (Closed) NRC Generic Letter 88-17: Loss of Decay Heat Removal (MPA-L817). The inspector reviewed an open item regarding the licensees implementation of commitments for NRC Generic Letter 88-17, "Loss of Decay Heat Removal." The licensee's corrective actions for Unit 1 had been reviewed by the inspectors in 1993 but remained open for Unit 2. The inspector reviewed the licensee's response to the generic letter and verified completion of modifications to instrumentation on the residual heat removal system for Unit 2. These modifications were identical to those implemented in Unit 1 and satisfied the commitment made to address NRC Generic Letter 88-17. This item is closed.

E8.4 (Closed) Violation 50-445/9802-05, LERs 50-446/97004-00 and -01: Inadequate corrective actions associated with emergency core cooling system sump screen gaps found outside the design bases. In NRC Inspection Report 50-445;446/98-02, the inspector documented a licensee-identified problem associated with previous corrective actions implemented for containment sump screen gaps outside the design bases of the emergency core cooling system. The licensee had found 16 gaps in the Unit 2 containment sumps beyond the design bases during the Fall 1997 Unit 2 outage. Eight had been previously identified and eight additional were found. The licensee implemented effective corrective actions on Unit 2, performed an operability review on the Unit 1 containment sumps assuming similar gaps would be found, and committed to repair the Unit 1 containment sumps during the Spring 1998 outage. The licensee inspected the Unit 1 sump screens and found 20 gaps in excess of the 0.115 inch requirement specified in Final Safety Analysis Report, Section 6.2.2.2.1. All 20 of the

gaps on Unit 1 in excess of the design requirement were repaired prior to Unit 1 restart. The inspector conducted a thorough walkdown of the Unit 1 containment sumps following the Unit 1 outage and verified that the containment sump screens were repaired.

E8.5 (Closed) Licensee Event Report 50-446/96006-00: Dual unit trip caused by a lightning strike. The inspector reviewed the implemented corrective actions by the licensee and found them to be sufficient to minimize the potential for lightning-related trips of the plant. Engineering support was timely and effective. Corrective actions included several lightning deterrent modifications, improved instrument grounding, instrument cable and shield rework, design modifications to install a time delay on N-16 circuits, and severe weather procedure modifications. These were effective in preventing trips during the 1998 lightning storms, some of which were severe.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 General Comments (71750)

Radiological protection personnel maintained appropriate controls over high radiation areas and plant areas toured were properly posted. Maintenance and surveillance activities observed within radiologically controlled areas were found to be conducted in accordance with the appropriate radiation worker practices. The inspectors verified that effluent and environmental radiation monitors and meteorological tower indications remained operable and that appropriate compensatory actions were taken for those which were out of service. The inspectors routinely reviewed secondary water activity analyses and primary plant chemistry analyses and verified that these parameters remained within Technical Specifications and procedural limits, and that appropriate actions were being taken for those which did not.

P1 Conduct of Emergency Planning Activities

P1.1 1998 Blue Team Fall Training Drill

a. Inspection Scope (71750)

The inspector reviewed the drill scenario, observed licensee performance during the drill, and attended the exercise critique. The inspector also observed the licensee conduct an ad-hoc walk-through of the procedure for relocating the emergency operations facility (EOF) to an alternate site.

b. Observations and Findings

The drill was intended to demonstrate the blue emergency response team's ability to respond to events at the site leading to a general emergency. The technical support

center (TSC), operations support center (OSC), EOF, and news center were staffed during the exercise. All control room responses were performed in the plant simulator. Inspector observations were made in the TSC and EOF.

TSC

The TSC was fully staffed and declared operational within 17 minutes of the alert emergency declaration. The blue emergency response team as well as the green team responded to the facility and green team members were used to staff position until relieved by blue team members. The TSC manager conducted regular briefings on plant status and the staff continually evaluated plant status against emergency classification escalation criteria. Initial emergency notifications were made from the TSC within the required time limits. After activation of the EOF, the emergency coordinator function was transferred from the TSC manager to the EOF manager. This was announced in the TSC and over the public address system; however, neither announcement was audible and several members of the TSC staff were unsure who was performing this function.

EOF

The inspector observed good command and control by the emergency coordinator in the EOF. Noise levels in the facility were minimal and the staff was frequently updated on plant status. The offsite radiological assessment team was proactive in monitoring a simulated plume and making protective action recommendation. The licensee also used this exercise to evaluate the use of micro-cassette recorders by the EOF staff to augment record keeping. This initiative is still undergoing evaluation.

After completion of the drill, the licensee performed a walk through of the procedure for relocation of the EOF to the Hood County Law Enforcement Center in Granbury, TX. The purpose of this was to familiarize the EOF staff with the alternate location and solicit input for improving the procedure. During this scenario, the licensee found it impractical to relocate the logistical support coordinator since the alternate site does not have access to the site computer network. When the EOF staff arrived at the alternate site, an attempt was made to contact each TSC counterpart via telephone; however, the number of telephones available at the alternate site was limited and EOF personnel did not know the offsite telephone numbers for the TSC. The licensee planned to conduct an additional walk through of this procedure during the green team drill in November after which comments will be used to revise the procedure.

c. Conclusions

The licensee performed well during the recent emergency preparedness drill. Emergency response facilities where fully staffed and emergency notifications were made in a timely manner. The licensee also demonstrated good self-critiquing by identifying an exercise weakness and a number of areas for improvement. However,

the inspector concluded that the licensee would not be capable of effectively operating the emergency operations center from an alternate site. An IFI item is being opened to track the licensee's revisions to this portion of their emergency plan (50-445;446/9807-02).

S1 Conduct of Security and Safeguards Activities

S1.1 General Comments (71750)

Inspection of the licensee's security program during the inspection period included a verification of the integrity of selected protected area barriers, maintenance of isolation zones, and protected area personnel access measures. The inspectors found the security personnel to be knowledgeable of their assigned stations. Security officers touring the plant were attentive and often identified issues to plant management. Material condition of security equipment continued to be excellent.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the results of the inspection to members of licensee management on November 3, 1998. The licensee acknowledged the findings presented. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. L. Terry, Senior Vice President and Principal Nuclear Officer
M. R. Blevins, Vice President, Nuclear Operations
J.J. Kelly, Vice President, Nuclear Engineering and Support
R. Flores, System Engineering Manager
D.L. Walling, Plant Modification Manager
S. Sawa, Outage Manager
D.L. Davis, Nuclear Overview Manager
M. L. Lucas, Maintenance Manager
G.L. Merka, Senior Nuclear Specialist

INSPECTION PROCEDURES USED

IP 37551	Onsite Engineering
IP 61726	Surveillance Observations
IP 62707	Maintenance Observations
IP 71707	Plant Operations
IP 71750	Plant Support Activities
IP 92700	Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92903	Followup - Engineering

ITEMS OPENED AND CLOSED

Opened

50-445(446)/9807-01	IFI	Potential radioactive system leakage inspection program weaknesses (Section M1.1).
50-445(446)/9807-02	IFI	Weaknesses in the relocation of the emergency operations facility to the alternate location (Section P1.1).

Closed

50-445/98003-00	LER	Greater than one percent of steam generator tubes defective (Section E8.1)

50-445/9709-01	VIO	Eddy current essential variable changes in acquisition technique specification without requalification being performed (Section E8.2).
50-446/MPA L-817		NRC Generic Letter 88-17, "Loss of Decay Heat Removal" (Section E8.3).
50-445/9802-05	VIO	Inadequate corrective actions associated with emergency core cooling system sump screen gaps outside the design bases (Section E8.4).
50-446/97004-00 and -01	LER	Inadequate corrective actions associated with emergency core cooling system sump screen gaps outside the design bases (Section E8.4).
50-446/96006-00	LER	Dual unit trip caused by lightning strike (Section E8.5).