ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

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License Nos.:	NPF-87 NPF-89
Report No.:	50-445/97-14 50-446/97-14
Licensee:	TU Electric
Facility:	Comanche Peak Steam Electric Station, Units 1 and 2
Location:	FM-56 Glen Rose, Texas
Dates:	April 27 through June 7, 1997
Inspectors:	H. A. Freeman, Acting Senior Resident Inspector D. P. Loveless, Senior Resident Inspector, South Texas Project
Approved By:	J. I. Tapia, Chief, Projects Branch A Division of Reactor Projects
ATTACHMENT:	Supplemental Information

EXECUTIVE SUMMARY

Comanche Peak Steam Electric Station, Units 1 and 2
NRC Inspection Report 50-445/97-14; 50-446/97-14

Operations

- Reactor power changes for main feedwater pump maintenance were safely controlled in accordance with procedural and regulatory requirements. Licensed operators were attentive to their indications, communications were excellent, and management involvement was appropriate (Section O1.2).

- An error in allowed outage time was identified in the licensee's tracking of a containment spray valve failure. The licensee did not add the outage time already accrued during system testing to the tracking of the valve failure (Section O4.1).

- Operations surveillance tests were performed professionally and in accordance with procedures. Unit supervisors provided appropriate oversite (Sections O4.3).

Maintenance

- Overall, main feedwater pump troubleshooting and repair activities were well controlled. Engineers were actively involved in the activities. Maintenance technicians were knowledgeable and professional (Section M1.2).

- Two examples of a violation were identified wherein the work group supervisor failed to visually verify housekeeping in affected areas of containment, contrary to procedure (Section M3.1).

Plant Support

- Chemistry's use of an uncalibrated regulator pump with an attached, incomplete work-in-progress tag was indicative of poor work practices and a lack of attention-to-detail (Section R4.1).

- Two examples of a violation of minor significance were identified for failing to follow transient combustible control procedures (Section F3.1).

Report Details

Summary of Plant Status

Unit 1 operated at approximately 100 percent power throughout the inspection period.

Unit 2 began the inspection period at 100 percent power. On May 5, a steam leak developed on a main feedwater pump casing vent valve weld which forced the licensee to reduce power to 50 percent to conduct repairs. The unit was returned to 100 percent power on May 8. On May 23, vibration levels increased significantly on the outboard bearing of the same main feedwater pump. The licensee reduced power to 50 percent to conduct repairs on the pump. Repairs were completed on May 28 and the pump was returned to service. The licensee stopped the power increase at 86 percent because vibrations were again approaching operating limits. The licensee again reduced power to 50 percent on May 30 to conduct repairs. The licensee identified and replaced a cracked seal water sleeve and returned the pump to service on June 2. The licensee returned Unit 2 to 100 percent power on June 4.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

Using Inspection Procedure 71707, the inspector conducted frequent reviews of ongoing plant operations. The conduct of operations was professional and characterized by conservative decisions. Specific events and noteworthy observations are detailed in the sections below.

O1.2 Power Changes for Main Feedwater Pump Maintenance

a. Inspection Scope (71707)

The inspector observed control room operations as operators lowered and raised power on Unit 2 including: communications, attentiveness, management interaction, and compliance with operating procedures and regulatory requirements.

b. Observations and Findings

The inspector found that licensed operators closely monitored and controlled plant parameters. Communications between operators were clear and unambiguous and were conducted utilizing the three-legged method (information/repeat back/acknowledgment). Annunciator alarms were announced to the unit supervisor and appropriately dispositioned.

The inspector found that there was a high degree of management involvement in the evolutions. Operations management was frequently in the control room observing the power changes and discussing the progress with the licensed operators.

The inspector observed that, during the downpower evolutions, the reactor was operated with the axial flux difference outside of the Core Operating Limits Report target band. The inspector verified that the licensee had taken the actions required by Technical Specification (TS) 3.2.1, when the axial flux difference was outside of the target band for greater than 60 minutes.

Prior to raising power on May 27, reactor engineering concluded that, based on the time in the operating cycle and the current characteristics, it would be difficult to maintain the axial flux difference within the target band. Based on analysis, reactor engineering expanded the target band. The change appropriately included a safety evaluation as required by 10 CFR 50.59.

c. Conclusions

The licensee safely controlled Unit 2 power changes in accordance with procedural and regulatory requirements. Licensed operators were attentive to their indications and communications were excellent. Management oversight and involvement were evident during the evolution.

O2 Operational Status of Facilities and Equipment

O2.1 Engineering Safety Features System Walkdowns (71707)

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

- Emergency Diesel Generator 1-01
- Unit 2 Station Service Water System

Equipment material condition and housekeeping were generally very good. The inspector did not identify any substantive concerns as a result of these walkdowns.

O4 Operator Knowledge and Performance

O4.1 Limiting Condition for Operation Action Statement Entry Time

a. Inspection Scope (71707)

While conducting testing on the Train B containment spray system, one of the valves failed the acceptance criteria and was declared inoperable. The inspector

reviewed the licensee's compliance with TS 3.6.2.1, "Containment Spray System." The inspector reviewed log entry times to verify that the licensee had properly entered the limiting condition for operation action requirement (LCOAR).

b. Observations and Findings

The inspector found that the licensee had appropriately entered an in-progress LCOAR at 9:23 p.m. on May 28 at the start of the test. The licensee used an in-progress LCOAR for TS action requirement entries which were planned to take less than one shift to complete. Active LCOARs were used for entries which were planned to take longer than one shift. The action requirement for TS 3.6.2.1 requires that an inoperable containment spray system be restored to operable status within 72 hours.

On May 28 at 9:43 p.m., the licensee declared the Train B containment spray containment isolation valve inoperable because the valve failed to meet its stroke time acceptance criteria. The licensee closed the in-progress LCOAR and opened an active LCOAR. On May 29, the inspector reviewed the active LCOAR and noted that the entry time was listed as 2143 (9:43 p.m.) on May 28 and that the required termination time was listed as 72 hours later. The inspector informed the licensee that this termination time would allow the licensee to have containment spray system Train B inoperable for 72 hours and 20 minutes, which was not allowed by the TS Action Statement. The licensee corrected the active LCOAR entry time and required termination time to 2123 and initiated an Operations Notification and Evaluation (ONE) form. The shift operations manager sent an e-mail message to the shift managers alerting them to the error.

The inspector concluded that the error in entry time was caused by a misunderstanding of the outage time allowed by the TS. Crew supervision informed the inspector that the in-progress LCOAR had been entered because one or more valves would be out of position for automatic system actuation during the test. They further explained that, since no component had actually failed, the system was operable until the valve failure was identified. The TS does not differentiate between inoperability due to lineup changes and inoperability due to component failures. Therefore, the correct time for the active LCOAR should have included the 20 minutes from the in-progress LCOAR. This error was identified by the inspector before nearing the end of the TS allowed outage time. The inspector concluded that the licensee's corrective actions were appropriate.

O4.2 Reactor Makeup Water Storage Tank (RMUWST) Drain Event

a. Inspection Scope (71707)

While draining the Unit 1 RMUWST on May 12, an incorrect valve lineup caused the water to drain to the waste holdup tank, which then overflowed. The inspector

reviewed the alarm response procedure for high RMUWST level, the system operating procedure for the RMUWST, the licensee's immediate corrective actions, and planned long-term actions.

b. Observations and Findings

The RMUWST contains demineralized pure water and provides a makeup source for the reactor coolant system and for the component cooling water system surge tank. Because a suspected leaking fill valve had caused the tank to reach the Hi-Hi level alarm setpoint, the licensee initiated actions to drain the tank. Since no procedure existed for draining the tank, the reactor operator developed a process to lower tank level by directing the water to a nonradioactive floor drain. The reactor operator discussed the plan with the unit supervisor and proceeded to implement the plan with the help of an auxiliary operator. However, the reactor operator failed to identify that a normally open valve in the system lineup provided a direct path from the RMUWST to the waste holdup tank (a contaminated system). The draining process quickly overfilled the waste holdup tank and spilled approximately 1,000 gallons of contaminated water onto the surrounding floor.

The inspector found that neither the alarm response procedure nor the system operating procedure provided any guidance on how to lower RMUWST level. The immediate guidance in the alarm response procedure was to secure filling the tank. As described in the Final Safety Analysis Report, Hi-Hi level alarms were provided on tanks which could contain contaminated liquids, and the RMUWST was designed to hold recycled water from the reactor coolant system which could contain elevated levels of tritium. However, since the licensee did not fill the RMUWST with recycled water, the water only contained naturally occurring levels of radioactive material, and the Hi-Hi level alarm would not be required except for operational convenience.

The licensee concluded that this incident represented a significant operator error and documented the issue on ONE Form 97-482. The licensee planned to conduct the highest level of review, a Plant Incident Report, which will include a root cause analysis. The inspector will review the licensee's findings and corrective actions in a future report as an inspection followup item (IFI) (50-445/9714-01).

O4.3 Operations Surveillance Observations (71707, 61726)

The inspector used Inspection Procedures 71707 and 61726 to observe:

- Emergency Diesel Generator 2-02 Operability Test
- Unit 2 Solid State Protection System Slave Relay K601 Actuation Test

Operators performed the surveillance tests professionally and in accordance with procedures. Unit supervisors provided an appropriate level of management oversite. The safety systems performed as expected and no concerns were identified by the inspector during the performance of the surveillance tests.

O4.4 Surveillance Test Failure Due to Missing Procedural Step (71707)

While performing a solid state protection system slave relay surveillance test on May 7, a licensed operator failed to perform the step in the procedure which verified that the refueling water storage tank suction valve to the residual heat removal pump was shut. Consequently, the slave relay did not perform as required. The licensee declared the relay inoperable and commenced troubleshooting. Shortly thereafter, the licensee identified that a step in the procedure had not been performed and successfully reperformed the surveillance.

The licensee documented the incident on a ONE form and intended to conduct a human performance evaluation study. The inspector will review the results of the study as an IFI in a future report (50-446/9714-02).

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Maintenance Observations

a. Inspection Scope (62707)

Using Inspection Procedure 62707, the inspector observed all or portions of the following maintenance activities.

- Planned maintenance on steam generator blowdown demineralizer
- Planned maintenance on a station service water system strainer
- Emergent maintenance on Main Feedwater Pump 2-02 for vibration
- Emergent maintenance on Component Cooling Water Pump 1-01 motor breaker

b. Observations and Findings

The inspector found that the maintenance activities were performed professionally and in accordance with the work order. Technicians were knowledgeable of the required task and were following the procedures. Specific observations are discussed below.

M1.2 Main Feedwater Pump Maintenance

Several maintenance activities were performed on Main Feedwater Pump 2-02. On May 5, a steam leak developed on a pump casing vent valve weld. The licensee concluded that, due to the configuration of the original components, the weld failed due to fatigue. The licensee reduced power to 50 percent and replaced the vent valve with a lower mass design. The licensee has scheduled a similar change on the other pumps.

On May 23, Main Feedwater Pump 2-02 outboard bearing vibrations rose significantly. The bearing had previously exhibited elevated vibration levels following the May 5 steam leak. On May 28, the licensee reduced power to 50 percent to troubleshoot and repair the pump. Based on vibration analysis, the licensee suspected a damaged coupling and/or a damaged outboard bearing and both were replaced. As the licensee was raising power, vibration levels again rose. The licensee again reduced power to 50 percent. During troubleshooting, the licensee identified and replaced a cracked seal water sleeve. The main feedwater pump was returned to service and power was returned to 100 percent on June 2.

a. Inspection Scope (62707)

The inspector followed the licensee's planned activities for troubleshooting and repairing the main feedwater pump. The inspector attended planning meetings and observed maintenance activities associated with the pump.

b. Observations and Findings

The inspector found that the main feedwater pump maintenance activities were well controlled. The troubleshooting and repairs were based on sound analytical techniques and advice from industry experts. During the downpower evolutions on May 28 and 30, the licensee conducted vibration analyses and consulted industry vibration experts. Licensee management was well informed of the troubleshooting and took an active role in directing the repair.

The inspector found that the system engineer and the vibration analysis engineers were appropriately involved in the maintenance activities. The engineers were often observed monitoring the repairs to the pump and closely monitored the elevated vibration levels.

The inspector found that the technicians performing the maintenance activities were knowledgeable and performed the activities professionally. Maintenance procedures were appropriately being used to conduct the repair activities.

M3 Maintenance Procedures and Documentation

M3.1 Visual Inspection of Containment for Debris

a. Inspection Scope (61726)

The inspector reviewed the documentation associated with a May 6, 1997, containment entry conducted by several licensee work groups. Associated procedures were reviewed and discussions were held with maintenance craftsmen, control room operators, work group supervisors, and management personnel.

b. Observations and Findings

Technical Specification Surveillance Requirement 4.5.2.c.2 is implemented via Station Administration Manual (STA) Procedure STA-620, "Containment Entry," Revision 10. Procedural Step 6.2.10 required that "After work is complete or at least once per shift, the Work Group Supervisor shall perform a visual inspection of the affected area (Refer to Attachment 8.1.1). All trash, clothing or other loose materials shall be secured or removed to prevent transport to the Containment Sump."

Attachment 8.1.1 of this procedure provided guidelines for containment visual inspections. A procedural note stated that Form STA-620-1, "Containment Entry Authorization and Visual Inspection Verification," shall be completed. However, the inspector determined through a review of records that, on two occasions, the work group supervisor signing for the inspection on Form STA-620-1 had not entered the containment to perform a visual inspection. During interviews, one supervisor stated that he had signed the form based on a review of completed material/tool accountability logs. These inventories had indicated that all equipment taken into containment had been brought out.

Technical Specification 6.8.1 requires that written procedures be established, implemented, and maintained covering activities recommended in Regulatory Guide 1.33, Revision 2, Appendix A. Regulatory Guide 1.33, Appendix A, Section 8.b(i)(i), recommends that procedures be written covering Technical Specification surveillance tests for the emergency core cooling system. Procedure STA-620 implements the requirements of TS 4.5.2.c.2. The failure of these two work group supervisors to conduct a visual inspection of the affected areas in containment is a violation of TS 6.8.1 (50-445/9714-03).

Followup conversations with licensee personnel indicated that maintenance technicians cleaned up the work area and ensured no loose debris remained; therefore, TS Surveillance Requirement 4.5.2.c.2 was satisfied. The inspectors agreed that the TS surveillance was completed; however, the supervisor failed to follow procedural requirements.

On May 9, the inspector entered the Unit 2 containment with licensee personnel to observe a reinspection of the containment. Although a number of items were found in the building, including a partial roll of absorbent towels, rubber gloves, trash, and improperly attached signs and labels, the containment was relatively clean and free of excessive debris. The volume of material removed was not considered sufficient to reduce the capacity of the emergency core cooling system.

The inspector discussed containment inspection problems with the shift operations manager and a licensing organization representative. ONE Form 97-466 was written to document and review this issue. The shift operations manager stated that an inventory of items taken into containment and verified after exiting containment implied that a visual inspection of the work area had been completed and ensured that the containment was free of debris. The inspector noted that this approach to completing the surveillance activity did not meet the letter of TS 4.5.2.c.2. The inspector also noted that an inventory would not properly account for portions of bulk packages (i.e., cleaning cloths, loose parts, etc.) left in containment, nor would removed insulation or other items previously secured be identified as debris following their removal.

c. Conclusions

Two work group supervisors failed to conduct a visual inspection of the containment following the completion of work activities as required by procedure. The Unit 2 containment was clean and free of debris that could degrade the operability of the emergency core cooling systems.

III. Engineering

E3 Engineering Procedures and Documentation (92903)

E3.1 (Closed) Unresolved Item 50-445(446)/9708-03: refueling water storage tank and safety injection accumulator alarm setpoint basis review. This item documented the inspector's identification that the annunciator setpoint for the refueling water storage tank low level alarm was below the value listed for the minimum water level listed in TS 3.5.4. The inspector reviewed engineering calculations for minimum refueling water storage tank level, instrument uncertainties, and the basis for the TS.

The basis for TS 3.5.4 states that the required indicated level includes a 4-percent measurement uncertainty, an unusable volume of 45,494 gallons, and a required water volume of 428,237 gallons. Thus, the required minimum volume is 473,731 gallons or 90.3 percent level (actual). The annunciator low level alarm, set at 92.83 percent, accounted for instrument uncertainties which totalled less than 2.5 percent. The annunciator would alarm prior to reaching the minimum value required by the TS bases. A review of instrument uncertainties showed that a

visual indication of 93.3 percent would ensure that the minimum value of water (90.3 percent) would remain in the tank. However, a value of 95 percent had been chosen for the minimum TS value by visual indication. This value was chosen based on operator preference for visual indication, since the control board indication displays in percent.

Following the inspector's identification, the licensee documented the issue on ONE Form 97-419. The licensee provided an initial assessment in the ONE form that showed that operability was not affected. Nevertheless, the licensee concluded that the TS should be revised so that the low level alarm could be used to help ensure compliance and that the Final Safety Analysis Report should be revised to clarify that the alarms are to ensure minimum contained volume and not indicated level. The licensee's due date for resolution of the ONE form was August 15.

The inspector concluded that the annunciator alarms had been set properly.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 Plant Chemistry (71750)

Using Inspection Procedure 71750, the inspector periodically reviewed plant chemistry. The inspector found that the licensee closely controlled the chemistry of both the reactor coolant system and the steam plant. Plant chemistry was within TS and procedural limits.

R1.2 Effluent and Environment Radiation and Meteorological Monitoring (71750)

Using Procedure 71750, the inspector reviewed plant radiation monitor traces on the plant computer system. The inspector found that the radiation monitors were operable and did not identify any concern which would warrant further inspection.

R4 Staff Knowledge and Performance in Radiological Protection and Chemistry

R4.1 General Observations (71707)

On May 16 the inspector identified a regulator pump being used for liquid nitrogen sparging of the Unit 1 condensate storage tank, which had an expired calibration sticker on the regulator. The inspector also identified that a binder being used to record the sparging start and stop times was not being stored in an approved storage location and that the work-in-progress tag attached to the pump was not filled in. The chemistry manager informed the inspector that the regulator was not essential for the sparging activity and that the uncalibrated pump was acceptable for use. In addition, the chemistry manager stated that the work-in-progress tag

was subsequently corrected. The inspector determined that these deficiencies were indicative of poor work practices and represented a lack of attention-to-detail.

S2 Status of Security Facilities and Equipment

S2.1 Physical Security

a. Inspection Scope (71750)

Using Inspection Procedure 71750 during routine tours in the protected and vital areas, the inspector observed various aspects of physical security.

b. Observations and Findings

The inspector found that the facility physical security was being maintained in accordance with licensee procedures. Specifically, the inspector observed attentive and knowledgeable security personnel, isolation zones free of objects, and well maintained protected area boundaries. During a backshift inspection, the inspector verified that all locations in the protected area were well lit by installed lighting systems or had temporary lighting necessary to meet minimum lighting requirements.

F3 Fire Protection Procedures and Documentation

F3.1 Transient Combustible Permit Errors

a. Inspection Scope (71707, 71750)

On a sampling basis, the inspector reviewed the licensee's control of ignition sources and flammable material. The inspector reviewed transient combustible permits for adherence to licensee procedures and the inspector independently verified that the material did not exceed allowable limits.

b. Observations and Findings

The inspector found two examples where transient combustible permits were either in error or were not being followed. The inspector found that these errors did not threaten the operability of the equipment because the combustibles did not exceed the maximum permissible fire loading, as defined in the fire hazards analysis report; however, the inspector found that the errors represented an attention-to-detail problem concerning the control of transient combustibles.

In the first example, the inspector observed eight boxes of charcoal being stored in Room 245, mechanical equipment room. The inspector reviewed the transient combustible permit and identified that it incorrectly estimated the fire load at 14,944 BTUs (British thermal units) per box rather than 15,000 BTUs per pound as

required by Procedure STA-729, "Control of Transient Combustibles, Ignition Sources and Fire Watches." Since each box weighed approximately 160 pounds, the permit underestimated the fire load by a factor of 160. The inspector noted that the prior permit, issued for 45 boxes of charcoal, had also incorrectly estimated the fire loading. STA-729 required that the fire protection supervisor calculate the transient fire load to determine if the material would exceed the maximum loading. The inspector found that the supervisor failed to correctly calculate the fire load as required by procedure.

The licensee reissued the permit using the correct numbers for weight and found that 45 boxes would contain less than 15 percent of the transient combustible fire load that could be added to Room 245. Licensee management then reiterated their expectations on accurately calculating the fire loading for transient combustible permits. Additionally, the licensee immediately reviewed and verified all other active transient combustible permits. No similar problems were identified.

In the second example, the inspector compared the items being stored in Room 210A, the piping area, with the transient combustible permit inventory. The inspector noted that 16 radiological vacuums were being stored in the room while the inventory only listed 14. The licensee performed a complete inventory of the room and identified additional items being stored in Room 210A which were in excess of the inventory. The inspector found that the additional items increased the total combustible loading of Room 210A by less than 1 percent of the maximum permissible fire loading. Procedure STA-729 required that a permit be submitted and approved prior to transient combustibles being introduced to plant areas. The inspector found that, contrary to procedure, the licensee had introduced items into Room 210A prior to revising the transient combustible permit.

The two examples where transient combustible permits were either in error or were not being followed are considered to be two examples of a violation of minor significance and are being treated as a noncited violation, consistent with Section IV of the NRC Enforcement Policy (NCV 50-445(446)/9714-04). These examples represent weakness in the licensee's implementation of the transient combustibles control program.

Finally, the inspector noted that the licensee did not initiate a ONE form on the first issue but did on the second. Procedure STA-421, "Operations Notification and Evaluation (ONE) Form," Appendix 8.A, states that a violation of procedural requirements "should" be reported on a ONE form. The inspector concluded that the licensee should have documented both issues.

c. Conclusion

The inspector found two examples of failure to follow procedures for transient combustible permits, indicating a weakness in program implementation. However, the inspector found that the licensee generally minimized the amount of transient combustibles in plant areas well below fire protection system limits.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the results of the inspection to members of licensee management at the conclusion of the inspection on June 10, 1997. The licensee acknowledged the findings presented. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

Davis, D. L., Nuclear Overview Manager
Kelley, J. J., Vice President, Nuclear Engineering and Support
Lancaster, B. T., Plant Support Manager
Lucas, M. L., Maintenance Manager
Moore, D. R., Operations Manager
Terry, C. L. Group Vice President, Nuclear Production

INSPECTION PROCEDURES USED

37551	Onsite Engineering
61726	Surveillance Observations
62707	Maintenance Observations
71707	Plant Operations
71750	Plant Support Activities
92903	Followup - Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-445/9714-01	IFI	RMUWST tank draining evolution valve lineup error (Section O4.2)
50-446/9714-02	IFI	Review of human performance enhancement system on missed surveillance step (Section O4.4)
50-445/9714-03	VIO	Failure to follow procedures for performing a visual inspection of containment (Section M3.1)
50-445(446)/9714-04	NCV	Failure to follow procedure for control of transient combustibles (Section F3.1)

Closed

50-445(446)/9708-03	URI	RWST/SI accumulator alarm setpoint basis review (Section E3.1)
50-445(446)/9714-04	NCV	Failure to follow procedure for control of transient combustibles (Section F3.1)

LIST OF ACRONYMS USED

BTU	British thermal unit
CFR	Code of Federal Regulations
IFI	inspection followup item
LCOAR	limiting condition for operation action requirement
NCV	noncited violation
ONE	Operations Notification and Evaluation
PDR	Public Document Room
RMUWST	reactor makeup water storage tank
RWST	refueling water storage tank
STA	Station Administration Manual
TS	Technical Specification
URI	unresolved item
VIO	violation