U. S. NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

NRC Inspection Report: 50-445/89-09
50-446/89-09

Permits: CPPR-126
CPPR-127

Dockets: 50-445
50-446

Category: A2

Construction Permit
Expiration Date:
Unit 1: August 1, 1991
Unit 2: August 1, 1992

Applicant: TU Electric
Skyway Tower
400 North Olive Street
Lock Box 81
Dallas, Texas 75201

Facility Name: Comanche Peak Steam Electric Station (CPSES),
Units 1 and 2

Inspection At: Comanche Peak Site, Glen Rose, Texas

Inspection Conducted: February 8 through March 7, 1989

Inspector: S. D. Bitter
S. D. Bitter, Resident Inspector,
Operations

3/20/89
Date

Inspector: S. D. Bitter FOR S. P. BURRIS
S. P. Burris, Senior Resident Inspector,
Operations

3/20/89
Date

Reviewed by: Joel S Wiebe
J. S. Wiebe, Lead Project Inspector

3/20/89
Date

Inspection Summary

Inspection Conducted: February 8 through March 7, 1989 (Report 50-445/89-09; 50-446/89-09)

Areas Inspected: Unannounced resident safety inspection of preoperational retest program activities, TMI action items (Safety Issue Management System items I.C.6, open; II.B.1.2, open; II.B.1.3, closed; II.B.2.2, closed; II.B.2.3, closed; II.B.3.1, closed; II.B.3.2, open; II.D.3.1, open; II.E.1.1.1, open; II.E.1.1.2, open), plant tours, and follow-up of 10 CFR 50.55(e) reports.

Results: Within the areas inspected, no significant strengths or weaknesses were noted. During the inspection, no significant safety matters, violations, or deviations were identified. One open item, involving a drawing discrepancy, was identified in paragraph 4.d.

DETAILS

1. Persons Contacted

*R. W. Ackley, Jr., Director, CECO
*M. Alexander, Manager of Materials Management, TU Electric
*R. P. Baker, Licensing Support Manager, TU Electric
*D. P. Barry, Sr., Manager, Engineering, SWEC
*H. D. Bruner, Senior Vice President, TU Electric
*R. C. Byrd, Manager, Quality Control (QC), TU Electric
*W. J. Cahill, Executive Vice President, Nuclear, TU Electric
*J. T. Conly, APE-Licensing, SWEC
*W. G. Counsil, Vice Chairman, Nuclear, TU Electric
*J. C. Crnich, Project General Manager, Ebasco
*G. G. Davis, Nuclear Operations Inspection Report Item Coordinator, TU Electric
*D. E. Deviney, Deputy Director, Quality Assurance (QA), TU Electric
*J. C. Finneran, Jr., Acting Manager, Civil Engineering, TU Electric
*C. A. Fonseca, Deputy Director, CECO
*J. L. French, Senior Review Team
*T. L. Heatherly, Licensing Compliance Engineer, TU Electric
*J. C. Hicks, Licensing Compliance Manager, TU Electric
*C. B. Hogg, Engineering Manager, TU Electric
*S. D. Karpyak, Nuclear Engineering, TU Electric
*J. E. Krechting, Director of Technical Interface, TU Electric
*O. W. Lowe, Director of Engineering, TU Electric
*J. W. Muffett, Manager of Engineering, TU Electric
*E. F. Ottney, Program Manager, CASE
*A. Pereira, Staff, QA, Ebasco
*D. M. Reynerson, Director of Construction, TU Electric
*C. E. Scott, Manager, Startup, TU Electric
*J. C. Smith, Plant Operations Staff, TU Electric
*C. L. Terry, Unit 1 Project Manager, TU Electric
*R. D. Walker, Manager of Nuclear Licensing, TU Electric
*R. G. Withrow, EA Systems Manager, TU Electric
*J. E. Wren, Assistant Director QA for Administration, TU Electric

The NRC inspector also interviewed other applicant employees during this inspection period.

*Denotes personnel present at the March 7, 1989, exit interview.

2. Preoperational Retest Program Activities (70300, 70301, 70302, 70311, 70312)

NCR inspections of the applicant's preoperational retest and operational preparedness phase activities were performed

through direct observation, personnel interviews, and review of preoperational test activities by verifying that:

- Systems and components important to the safety of the plant were being fully tested to demonstrate their operability and design requirements.

- All management and administrative controls and procedures, including QA requirements, which were required for the necessary operation, had been implemented, followed and documented.

The NRC inspectors accomplished these goals by reviewing available test procedures, witnessing selected ongoing test activities and reviewing completed test procedure results. The inspectors used the following criteria to perform the pretest review to ensure that:

- Administrative content, format, and requirements were incorporated in the final approved procedure.

- Test objectives met the referenced Regulatory Guide and FSAR Section 14 commitments.

- Acceptance criteria were identified and clearly defined.

- Prerequisite conditions were established, adequately defined, and easily understood.

- Test equipment used specified the appropriate custody control and required calibration data.

- Procedure format was clearly written and appeared to be able to be easily followed.

Test witnessing of the identified systems was performed to ensure that all testing was performed in accordance with approved procedures and to verify the adequacy of test program records including preliminary evaluation of test results. The NRC inspectors accomplished these purposes by ensuring that:

- The latest revision of the test procedure was in use by test personnel.

- All crew manning requirements were met.

- All test prerequisites were met.

- Proper plant systems were in service.

- Test equipment required by the procedure was calibrated and in service, if applicable.

- Testing was performed in accordance with an approved procedure.

- Criteria for interruption of testing and continuation of testing was adhered to during all witnessed portions of the test.

- All deficiencies were documented in accordance with program requirements.

- All temporary modifications, such as jumpers, strainers, spool pieces, or blank flanges, were installed and tracked per established administrative controls.

The inspectors reviewed and witnessed the following tests as discussed below:

- Test Procedure 1CP-PT-10-02 SFT, Revision 0, "Reactor Makeup Water." The purpose of this test was to demonstrate the performance of the Reactor Makeup Water Pumps. It also demonstrated the proper operation of the controls and interlocks associated with those pumps as well as the demineralized water to reactor makeup water storage tank isolation valve. In addition, the test objectives stated in this section describe the Unit 1 Prestart Test Program activities necessary to validate the operability of the Reactor Makeup Water System.

  The inspectors did not identify any adverse conditions during the review and witnessing activities.

- 1CP-PT-34-01 SFT, "Main Steam Isolation Valves." Test objectives describe those activities necessary to validate operability of the main steam isolation valves (MSIVs). This was done by performing circuit operability checks of the MSIVs, manual operation of the MSIV bypass valves, verification that the MSIVs close upon a main steam isolation signal and verification of all associated remote indications.

  During conduct of this test, the shift test engineer (STE) found that one of the MSIVs failed to operate as required by design. The applicant is currently investigating the root cause of the valve failure and is concurrently considering using a Unit 2 valve as a replacement valve. The inspectors will follow-up and document this item during the subsequent preoperational test witnessing.

The inspectors did not identify any adverse conditions during the review and witnessing activities.

- 1CP-PT-28-02 SFT, "Feedwater Isolation Valve Testing." This test was performed to test the operability of the feedwater system valves listed in Matrix I of the test procedure, including demonstrating that the valves close within the time limit specified in the FSAR and that the valves function correctly with the reception of a feedwater isolation signal, steam generator low pressure or low level, safety injection (automatic lockout) signal, and water hammer signals (flow rate, temperature permissive and time delay).

  The inspectors noted that the STE wrote a test deficiency report on the failure of valve 1-HV-2185 to open in accordance with the test procedure. The applicant's actic to resolve this item will be reviewed by the inspectors during a future inspection period.

  The inspectors did not identify any adverse conditions during the review and witnessing activities.

- 1CP-PT-57-02 SFT, "Centrifugal Charging Pump Test." The test objectives in this section describe the Unit 1 Prestart Test Program activities necessary to validate the operability of the Chemical and Volume Control Systems and components during cold leg injection phase.

  This test demonstrated the proper operation and response of the components required for high pressure safety injection. Pump hydraulic, mechanical and electrical performance under cold leg injection conditions was demonstrated. Flow balancing of each cold leg injection line was performed and the associated throttle valves were locked in place. Valve operations were demonstrated under maximum expected differential pressure conditions by operating the system in the injection mode with the reactor coolant system (RCS) at atmospheric pressure.

  The inspectors reviewed an applicant generated test procedure change to determine the adequacy of the test personnel to implement the appropriate administrative procedures. No significant problems were identified during this inspection.

- 1CP-SPT-30, Revision 0, "Unit 1 Security Yard Lighting Special Test." This test was performed to survey the Unit 1 modified security system yard lighting for baseline engineering evaluation.

The inspectors witnessed the initial prerequisites and test run; however, due to inclement weather conditions, the applicant was forced to suspend testing until a later date. The inspectors notified the applicant that they would like to be informed of future test plans. No deficiencies were identified in the portions of the test witnessed.

Based on the inspectors' observations during both the procedure review and test witnessing phases, the preoperational test group is conscientiously tackling its predetermined test schedules.

3. TMI Action Items (SIMS)* (25565, 92719)

a. (Open) TMI Action Item* I.C.6: Verify Correct Performance of Operating Activities. This item required that procedures include an effective system of verifying the correct performance of operating activities. NUREG-0797, "CPSES SER," Chapter 22, Section I.C.6, provides clarification of specific portions of this requirement. Supplement 1 to NUREG-0797, Chapter 22 Section I.C.6, documents review of Procedure STA-605, Revision 2, "Clearance and Safety Tagging." The NRC staff concluded that this procedure contained the appropriate independent check for tagging equipment.

In NRC Inspection Report 50-445/89-02, an inspector documented that he noted that provisions for an independent check were not provided in preoperational test procedures when installing jumpers or lifting leads. Although this deficiency was subsequently corrected, it is apparent that this is an example where the TMI action item was not properly implemented.

This item remains open pending NRC review (pursuant to Temporary Instruction 2515/65) of procedures to ensure adequate implementation of this item. This review will include those aspects identified in NUREG-0797 as follows:

(1) Surveillance procedures contain or will contain the appropriate independent checks.

(2) Provisions are made to keep the shift supervisor fully informed of system status.

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* The Safety Issue Management System (SIMS) track number is the same as the TMI Action Item number.

(3) Except in cases of significant radiation exposure, a second qualified person will verify correct implementation of equipment control measures.

(4) Equipment control procedures should include assurance that control room operators are informed of changes in equipment status and the effects of such changes.

(5) For the return-to-service of equipment important to safety, a second qualified operator will verify proper system alignment, unless adequate functional testing can be performed.

(6) A licensed operator possessing knowledge of the systems involved and the relationship of the systems to plant safety will perform the second independent check unless the NRC approves otherwise.

b. (Open) TMI Action Item II.B.1.2, "Installation of Reactor Coolant System Vents." This item required each applicant to install reactor coolant system and reactor vessel head high point vents that can be remotely operated from the control room.

The clarification of this item in NUREG-0737, "Clarification of TMI Action Item Requirements" indicates that where practical, the reactor coolant vents should be kept smaller than the size corresponding to the definition of a LOCA (a leak in excess of the capability of the makeup system). The FSAR in Section 5.1 commits to sizing the vents to allow the Chemical Volume and Control System (CVCS) to provide the required makeup flow. The FSAR in Section 3.9N.1.4.5 indicates that a 3/8-inch orifice is required to limit required makeup flow to normal charging flow. Design basis document (DBD)-ME-250, "Reactor Coolant System," Revision 0, Section 2.0, indicates that by providing a 3/8-inch diameter flow restrictor, a branch line can be downgraded from Safety Class 1 to Safety Class 2.

The inspectors note that NUREG-0797, "CPSES SER" identifies the reactor vessel head vent as containing a 3/4-inch orifice in a one-inch line and drawing M1-0251, Revision CP-10, identifies the pressurizer vent as having a 3/4-inch line which opens to a one-inch line containing the isolation valves. Drawing M1-0251 identifies the pressurizer vent line as Safety Class 2 and identifies the reactor vessel head vent as Safety Class 2 downstream of the orifice.

The inspectors have two concerns and need additional information to determine if:

(1) The sizing of the vents at 3/4-inch is a deviation from the applicant's commitment in FSAR, Section 5.1, to size the vents to limit required makeup flow to the capability of the CVCS.

(2) The unisolated Safety Class 2 lines without 3/8-inch orifices (which limit required makeup flow during faults to the capability of the normal makeup system) is an apparent violation of 10 CFR 50.55a(d) which requires that reactor coolant pressure boundary components meet Safety Class 1 requirements unless makeup during faults can be provided by the reactor coolant makeup system.

The inspectors verified the following items to ensure the installation of the vents meets the requirements of NUREG-0737 and applicant's commitments.

- A positive indication of valve position is provided in the control room by valve limit switches.

- The vents are operated from the control room using key lock switches. This prevents inadvertent operation.

- Each vent line contains two valves in series. This ensures a single failure will not prevent isolation of the vent path.

- The vent valves and piping are identified as Safety Class 2 on drawing M1-0251, Revision CP-10. This provides reasonable assurance that this equipment meets the seismic requirements of NUREG-0737.

The inspectors need additional information to complete this review in accordance with Temporary Instruction 2515/65 as follows:

- The inspectors need to review plant drawings to verify that the head vent valves are powered by Train A 1E power and the pressurizer vent valves are powered by Train B 1E power. This will allow the inspector to determine conformance to the NUREG-0737 requirement that a degree of redundancy be provided by powering different vents from different emergency busses.

- The inspectors noted that the pressurizer vent pipe ends with an open flange that is taped shut. The area is open and would provide good mixing with

containment air, but the piping is apparently not finished. The inspector needs to review the final design for both vent paths to determine whether they will vent to an area that provides good mixing with containment air as required by NUREG-0737.

- The inspectors need to review documentation that shows that the vent system (that is, vent valves, position indication devices, and cable terminations) are environmentally qualified as required by NUREG-0737.

- The inspectors need to review documentation that shows that the vent valves have been tested in accordance with subsection IWV of Section XI of the ASME Code for Category B valves.

This item remains open pending resolution of the items identified above and review of the required information that is identified above.

c. (Closed) TMI Action Item II.B.1.3, "Procedures for Use of Reactor Coolant Vents." NUREG-0737, "Clarification of TMI Action Plant Requirements," states in Section II.B.1 that these procedures are to define the conditions for use of the vents as well as the conditions under which the vents should not be used. The use of vents for accidents within the normal design basis must not result in a violation of the requirements of 10 CFR 50.44 or 10 CFR 50.46.

Supplement 6 to NUREG-0797, "CPSES SER" in Section 22.II.B.1 states that the applicant has committed to use emergency procedures consistent with the Emergency Response Guidelines (ERGs) developed by the Westinghouse Owners Group and approved by the staff. The staff evaluation of the ERGs concluded that high-point venting guidelines are adequately addressed. The NRC intends to conduct a review of the Emergency Operating Procedures during a future inspection to verify conformance to the ERGs, to verify applicability to the plant, and to verify that the plant staff can perform the procedure.

The inspectors determined that the above reviews will provide reasonable assurance that the procedures for use of reactor coolant vents will meet NRC requirements and applicant's commitments. This item is considered closed and the action specified by Temporary Instruction 2515/65 is considered complete.

d. (Closed) TMI Action Item II.B.2.2, "Modification of Plant Shielding." This item required the applicant to review

the shielding design to evaluate the ability to access the areas necessary to operate essential systems that are required after a LOCA with significant core damage. Supplement 2 to NUREG-0797, "CPSES SER," Chapter 22, Section II.B.2, documents the staff's review of the applicant's radiation and shielding design review. On the basis of the applicant's commitment to incorporate additional shielding and/or remote operation capability for the post accident sampling system (PASS) the NRC staff concluded that the applicant's review was adequate. The inspector verified that the PASS can be operated from a remote station in a low radiation area. This item is considered closed.

e. (Closed) TMI Action Item II.B.2.3, "Radiation Qualification of Safety-Related Equipment." This item required applicant review of safety-related equipment to determine if it would be unduly degraded by radiation during post-accident operation. The NRC intends to conduct a comprehensive review of the applicant's equipment qualification program. This review will fulfill the requirements of Temporary Instruction 2515/65. This item is considered closed.

f. (Closed) TMI Action Item II.B.3.1, "Interim System for Post-Accident Sampling." Since the PASS will be operable prior to when it is required, this item is not applicable and is considered closed.

g. (Open) TMI Action Item II.B.3.2, "Post-Accident Sample System Modification." This item required the provision of a capability to obtain important samples of water and air following core damage. The inspector reviewed this item pursuant to Temporary Instruction 2515/65 as follows:

- The inspector verified that the applicant's PASS does not require an isolated auxiliary system to be placed in operation.

- Supplement 2 to NUREG-0797, "CPSES SER," Chapter 22, Section II.B.3 documented the staff's acceptance of the types of samples and measurement ranges. Supplement 6 to NUREG-0797, documented the staff's acceptance of the accuracy, range, and sensitivity of the PASS instruments and analytical procedures.

- The inspector verified that there are provisions for purging sample lines and for reducing plateout in sample lines. The residues of the sample lines are returned to containment.

- The inspector verified that the ventilation exhaust from the PASS enters a ventilation system that is filtered with charcoal adsorbers and high efficiency particulate air filters.

The inspector requires more information to complete the review of this item, as follows:

- NUREG-0737 requires the capability to conduct sampling and analysis in three hours or less from the time a decision is made to sample. Supplement 6 to NUREG-0797, Chapter 22, Section II.B.3, indicates that one of the bases for determining the acceptability of the PASS was that retraining of operators was scheduled at a frequency of once every six months. The inspectors require information that demonstrates that the retraining is being conducted, including demonstration that the sample and analysis can be conducted within the three hour time frame without advance notice that a sample and analysis is required.

h. (Open) TMI Action Item II.D.3.1, "Direct Indication of Relief and Safety Valve Position." This item required that reactor system relief and safety valves be provided with a positive indication in the control room derived from a reliable valve position detection device or a reliable indication of flow in the discharge pipe. The inspectors reviewed this item pursuant to Temporary Instruction 2515/65 as follows:

- The inspectors verified that indication of valve position for the power operated relief valves (PORVs) and the safety valves is provided by indication lights in the control room which are actuated by direct indication of valve stem position.

- The inspectors verified that an alarm is actuated if any PORV or safety valve is not indicating closed.

- The inspectors verified that the FSAR in Table 032.110-1 identifies the indicating systems as safety grade, environmentally qualified, and seismically qualified.

The inspectors require additional information to complete the review of this item as follows:

- The inspectors need to review preoperational test documentation to determine if the indicating systems have been properly tested and calibrated.

i. (Open) TMI Action Item II.E.1.1.1, "Short Term Actions Concerning Auxiliary Feedwater System (AFWS) Evaluation." Operating license applicants were required to respond to the NRC staff letter of March 10, 1980. NUREG-0797, "CPSES Safety Evaluation Report (SER) documents the staff's evaluation of the applicant's response. The inspectors reviewed the applicant's commitments to the short term recommendations in the March 10, 1980, letter pursuant to Temporary Instruction 2515/65 as follows:

- Recommendation GS-1: "The licensee should propose modifications to the Technical Specification to limit the time that one AFWS pump and its associated flow train and essential instrumentation can be inoperable. The outage time limit and subsequent action time should be as required in current Technical Specifications; i.e., 72 hours and 12 hours, respectively."

  The applicant committed CPSES to have the time limit recommended in the Westinghouse Standard Technical Specifications. The inspectors verified that Technical Specification 3.7.1.2, in the CPSES Proof and Review Version, meets the above recommendation. The inspector had no further questions regarding this recommendation.

- Recommendation GS-2: ""The licensee should lock open single valves or multiple valves in series in the AFWS pump suction piping and lock open other single valves or multiple valves in series that could interrupt all AFWS flow. Monthly inspections should be performed to verify that these valves are locked and in the open position. These inspections should be proposed for incorporation into the surveillance requirements of the plant Technical Specifications."

  In NUREG-0797, the staff acknowledged that CPSES has separate suction supply lines from the condensate storage tank to the motor-driven and turbine-driven pumps and separate discharge lines from these pumps to the steam generators so that no single valve closure can interrupt all AFWS flow. The staff concluded that since all manual valves in these parallel supply lines are locked open, the system design meets the above recommendation and the above monthly inspection and surveillance requirements in the technical specifications are not required.

  The inspectors verified that all manual valves in the flow path are listed as being locked open on

plant drawings. The inspectors noted, however, that the manual valves in the test lines are not locked closed. Opening one of these valves has the potential to direct a significant amount of flow from an AFW train. To determine if this is acceptable, the inspector needs additional information to determine if this path could direct significant flow from an AFW train and to determine how the operators will know if one of these valves is out of position.

Recommendation GS-3: "The licensee should reexamine the practice of throttling AFWS flow to avoid water hammer. The licensee should verify that the AFWS will supply on demand sufficient initial flow to the necessary steam generators to assure adequate decay heat removal following loss of main feedwater flow and reactor trip from 100% power.

In cases where this reevaluation results in an increase in initial AFWS flow, the licensee should provide sufficient information to demonstrate that the required initial AFWS flow will not result in plant damage due to water hammer."

In NUREG-0797, the staff acknowledged that CPSES maintains the AFWS flow control valves in the full-open position.

The staff, therefore, concluded that Recommendation GS-3 is not applicable to CPSES. The inspector had no further questions regarding this recommendation.

Recommendation GS-4: "Emergency procedures for transferring to alternate sources of AFW supply should be available to the plant operators. These procedures should include criteria to inform the operator when, and in what order, the transfer to alternate water sources should take place. The following cases should be covered by the procedures:

"(1) The case in which the primary water supply is not initially available. The procedures for this case should include any operator actions required to protect the AFWS pumps against self-damage before water flow is initiated.

"(2) The case in which the primary water supply is being depleted. The procedures for this case should provide for transfer to the alternate water sources prior to draining of the primary water supply."

In NUREG-0797, the staff concluded that the applicant's commitment in the FSAR to provide these procedures was acceptable pending inspector review of the procedures. The procedures will be reviewed during a future inspection.

Recommendation GS-5: "The as-built plant should be capable of providing the required AFWS flow for at least two hours from one AFWS pump train, independent of any ac power source. If manual AFWS initiation or flow control is required following a complete loss of ac power, emergency procedures should be established for manually initiating and controlling the system under these conditions. Since the water for cooling of the lube oil for the turbine-driven pump bearings may be dependent on ac power, design or procedural changes shall be made to eliminate this dependency as soon as practicable. Until this is done, the emergency procedures should provide for an individual to be stationed at the turbine-driven pump in the event of the loss of all ac power to monitor pump bearing and/or lube oil temperatures. If necessary, this operator would operate the turbine-driven pump in a manual on-off mode until ac power is restored. Adequate lighting powered by dc power sources and communications at local stations should also be provided if manual initiation and control of the AFWS is needed."

In NUREG-0797, Chapter 22, Section II.E.1.1, the staff noted that the applicant indicated in the FSAR that the turbine-driven pump is capable of being automatically initiated and operated independent of any ac power source for at least two hours. The staff concluded that the provisions available in the CPSES AFWS meet those outlined in the above recommendation and, therefore, are acceptable. The inspectors note that this issue is further discussed in long term Recommendation GL-3 and is further addressed in subsection j of this paragraph.

Recommendation GS-6: "The licensee should confirm flow path availability of an AFWS flow train that has been out of service to perform periodic testing or maintenance as follows:

"(1) Procedures should be implemented to require an operator to determine that the AFWS valves are properly aligned and a second operator to independently verify that the valves are properly aligned.

"(2) The licensee should propose Technical Specifications to assure that prior to plant startup following an extended cold shutdown, a flow test would be performed to verify the normal flow path from the primary AFWS water source to the steam generators. The flow test should be conducted with AFWS valves in their normal alignment."

By letter dated June 18, 1981, the applicant committed to ensuring flowpath availability as recommended by GS-6. To complete the review of item (1) the inspector needs to review the applicable procedures.

In NUREG-0797, the staff acknowledged that the AFWS is used to supply feedwater to the steam generators during normal plant startup and shutdown. The staff, therefore, concluded that item (2) is satisfied. The inspector had no further questions regarding item (2) of this recommendation.

- Recommendation GS-7: "The licensee should verify that the automatic start AFWS signals and associated circuitry are safety grade."

  The FSAR in Section 7.3.1.1.4 states that the automatic start AFWS signals and associated circuitry are safety grade. This issue is further discussed in long-term Recommendation GL-5 and is addressed in subsection j of this paragraph.

- Recommendation GS-8: "The licensee should provide automatic initiation of the AFWS."

  In NUREG-0797, the staff concluded that, since the CPSES present design provides for automatic initiation of AFWS flow, this recommendation is not applicable to CPSES. The inspectors had no further questions regarding this recommendation.

NUREG-0797, Chapter 22, Section II.E.1.1, also addressed additional short-term recommendations that did not have numbers. The inspectors reviewed the applicant's response to these short-term recommendations as follows:

- Recommendation: "The licensee should provide redundant level indication and low level alarms in the control room for the AFWS primary water supply, to allow the operator to anticipate the need to make up water or transfer to an alternate water supply and prevent a low pump suction pressure condition

from occurring. The low level alarm setpoint should allow at least 20 minutes for operator action, assuming that the largest capacity AFW pump is operating."

NUREG-0797, in Section II.E.1.1 documents the staff's determination that redundant level transmitters powered from redundant Class 1E power sources are provided. In addition, it was determined that low-level alarms are provided in the control room. The inspectors verified that at least 20 minutes are available for operator action after a low-level alarm occurs. The inspectors had no further questions regarding this recommendation.

Recommendation: "The licensee should perform a 48-hour endurance test on all EFS system pumps, if such a test or continuous period of operation has not been accomplished to date. Following the 48-hour pump run, the pumps should be shut down and cooled down, and then restarted and run for one hour. Test acceptance criteria should include demonstrating that the pumps remain within design limits and that pump room ambient conditions (temperature, humidity) do not exceed environmental qualification limits for safety-related equipment in the room."

By letter dated June 16, 1981, the applicant committed to perform a 48-hour endurance test on all AFWS pumps during prestartup testing. By letter dated June 24, 1981, the applicant also committed to make available test results including: (1) a brief description of the test method and instrumentation used, (2) a plot of bearing and bearing oil temperature versus time for each pump demonstrating that the temperature design limits were not exceeded, (3) a plot of pump room ambient temperature and humidity versus time to demonstrate that the pump room ambient conditions do not exceed environmental qualification limits for safety-related equipment in the room, and (4) a statement confirming that the pump vibration limits were not exceeded.

In order to complete the review of this recommendation, the inspectors need to review the above test results.

Recommendation: "The licensee should implement the following requirements as specified by Item 2.1.7.b on page A-32 of NUREG-0578:

"Safety-grade indication of auxiliary feedwater flow to each steam generator shall be provided in the control room. The auxiliary feedwater flow instrument channels shall be powered from the emergency buses consistent with satisfying the emergency power diversity [diversity] requirements for the auxiliary feedwater system set forth in Auxiliary Systems Branch Technical Position 10-1 of the Standard Review Plan, Section 10.4.9."

This recommendation will be reviewed in conjunction with TMI Action Item II.E.1.2.2.C, "Safety-grade Flow Indication for AFWS," during a future inspection.

. Recommendation: "Licensees with plants which require local manual realignment of valves to conduct periodic tests on one AFWS train, and there is only one remaining AFWS train available for operation should propose Technical Specifications to provide that a dedicated individual who is in communication with the control room be stationed at the manual valves. Upon instruction from the control room, this operator would realign the valves in the AFWS train from the test mode to their operational alignment."

The Comanche Peak AFWS design includes three pumps, each of which discharges to a separate header. Each motor-driven pump supplies a different pair of the four steam generators and the turbine driven pump supplies all four steam generators. Thus, two AFWS flow paths are always available to at least two of the four steam generators. The staff, therefore, concluded in NUREG-0797, that this recommendation is not applicable to Comanche Peak. The inspectors had no further questions concerning this recommendation.

This TMI Item (II.E.1.1.1) remains open pending inspectors review of additional information regarding various short-term recommendations as described above.

j. (Open) TMI Action Item II.E.1.1.2: "Long Term Actions Concerning Auxiliary Feedwater System (AFWS) Evaluation."

Operating license applicants were required to respond to the NRC staff letter of March 10, 1980. NUREG-0797, "CPSES Safety Evaluation Report" (SER) documents the staff's evaluation of the applicant's response. The inspector reviewed the applicant's commitments to the long-term recommendations in the March 10, 1980, letter pursuant to Temporary Instruction 2515/65 as follows:

Recommendation GL-1: "For plants with a manual starting AFWS, the licensee should install a system to automatically initiate the AFWS flow. This system and associated automatic initiation signals should be designed and installed to meet safety-grade requirements. Manual AFWS start and control capability should be designed and installed to meet safety-grade requirements. Manual AFWS start and control capability should be retained with manual start serving as backup to automatic AFWS initiation."

In NUREG-0797, the staff concluded that since the AFWS already includes a safety-grade automatic start, this recommendation is not applicable to CPSES. The inspectors had no further questions regarding this recommendation.

Recommendation GL-2: "Licensees with plant designs in which all (primary and alternate) water supplies to the AFWS pass through valves in a single flow path should install redundant parallel flow paths (piping and valves).

"Licensees with plants in which the primary AFWS water supply passes through valves in a single flow path, but the alternate AFWS water supplies connect to the AFWS pump suction piping downstream of the above valve(s), should install redundant valves parallel to the above valve(s) or provide automatic opening of the valve(s) from the alternate water supply upon low pump suction pressure.

"The licensee should propose Technical Specifications to incorporate appropriate periodic inspections to verify the valve positions."

In NUREG-0797, the staff documented that the Comanche Peak AFWS design provides two separate suction supply lines from the primary water source (condensate storage tank), one to the turbine-driven pump and one to both motor-driven pumps so that there is no single valve which, if left closed, could interrupt all flow. The staff, therefore, concluded that this recommendation does not apply to CPSES. The inspectors had no further questions regarding this recommendation.

Recommendation GL-3: "At least one AFWS system pump and its associated flow path and essential instrumentation should automatically initiate AFWS flow and be capable of being operated independently

of any ac power source for at least two hours. Conversion of dc power to ac power is acceptable."

By letter dated June 22, 1981, the applicant committed to verify by preoperational testing that the turbine-driven pump can operate for over two hours without additional ambient air cooling.

The inspectors need to review the results of this test to complete the review of this recommendation.

- Recommendation GL-4: "Licensees having plants with unprotected normal AFWS water supplies should evaluate the design of their AFWS to determine if automatic protection of the pumps is necessary following a seismic event or a tornado. The time available before pump damage, the alarms and indications available to the control room operator and the time necessary for assessing the problem and taking action should be considered in determining whether operator action can be relied on to prevent pump damage. Considerations should be given to providing pump protection by means such as automatic switchover of the pump suctions to the alternate safety-grade source of water, automatic pump trips on low suction pressure, or upgrading the normal source of water to meet seismic Category I and tornado protection requirements."

  In NUREG-0797, the staff documented that the primary AFWS water source (the condensate storage tank) is a seismic Category I component and is located in a concrete structure which provides protection against the effects of tornado missiles. The staff, therefore, concluded that this recommendation does not apply to Comanche Peak. The inspectors had no further questions regarding this recommendation.

- Recommendation GL-5: "The licensee should upgrade the AFWS automatic initiation signals and circuits to meet safety-grade requirements."

  This recommendation will be reviewed in conjunction with TMI Action Item II.E.1.2.1.E, "Safety-grade Initiation for AFWS," during a future inspection.

This TMI item (II.E.1.1.2) remains open pending inspector review of additional information regarding Recommendation GL-3 as described above.

4. Plant Tours (71302, 37051, 37301, 62700)

The NRC inspectors conducted numerous plant tours during this inspection period. These tours provided coverage during normal, off-normal, and backshift working hours. NRC inspection activities included reviewing work documentation, witnessing ongoing work activities, observing and interviewing shift operations personnel, reviewing the status of control room construction work, reviewing the status of system and component completion, determining the status of Units 1 and 2 equipment lay up, observing housekeeping activities, and inspecting for general safety compliance.

To support these activities, NRC inspectors attended plan-of-the-day meetings, discussed plant status with operations personnel, reviewed maintenance activities, and walked down portions of the reactor coolant system (RCS), the residual heat removal (RHR) system, and the safety injection (SI) system.

a. As part of the maintenance review, the inspectors examined the maintenance records dealing with the Unit 1 motor-driven auxiliary feedwater pump motors. The records were examined as part of the NRC's follow-up on violations 445/8727-V-01; 446/8720-V-01 (failure to install unidirectional fans in proper direction). Several concerns involving these records have been documented in NRC Inspection Report 50-445/89-08; 50-446/89-08. In addition to the records review, the inspectors reviewed Station Administration Procedure (STA)-606 to ensure that work performed on the auxiliary feedwater pump motors was requested, planned, ordered, performed, and documented properly. No violations or deviations were identified in the maintenance review.

b. The Unit 1 RHR system walkdown involved comparing the Train B as-built piping configuration to the design shown on drawing 2323-M1-0260, Amendment 67 of the FSAR. During the RHR walkdown, the inspectors observed portions of RHR system preoperational testing. The inspectors verified that prerequisites for testing were completed prior to initiating the test, observed communications between the control room and test personnel, and discussed test adequacy with QA/QC personnel. No discrepancies were noted in the RHR walkdown.

c. The Unit 1 RCS walkdown was performed on loops 1, 2, 3, and 4. Loops 2 and 3 were completely walked down, loops 1 and 4 were walked down with the exception of the following piping runs:

6-RC-1-070-2501R-1
6-RC-1-008-2501R-1
12-RC-1-007-2501R
3/4-RC-1-013-2501R-2
2-RC-1-015-2501R (WPS RCDT portion)

No discrepancies were noted in the RCS walkdown.

d. During the Unit 1 SI system walkdown, the inspectors noted that drawing 2323-M1-0261, Amendment 67 of the FSAR depicted two isolation valves, both labeled 1-SI-048, in the 12-inch piping run (12-1-031-151R) between the refueling water storage tank and the chemical and volume control system boundary. However, the control room version of the same drawing (Revision CP-7, May 31, 1988) depicted only one valve in the line. This discrepancy will be tracked as an open item (445/8909-O-01) pending the applicant's resolution of this discrepancy.

In the overall area of plant tours/system walkdowns, no violations or deviations were noted. As described in paragraph d above, one open item dealing with an FSAR/drawing discrepancy was identified.

5. Follow-up of 10 CFR 50.55(e) Reports (SDARs) (92700)

a. (Closed) Construction Deficiency (SDAR CP-86-06): "Pump and Driver Doweling." The original concern dealt with doweling requirements for pumps and their prime movers. Pump and motor dowel combination were supplied by the vendor and would subsequently be checked as part of the applicant's program prior to turnover for operational use. However, review by quality assurance found an apparent inconsistency in the doweling requirements used by site personnel.

The applicant's review found that proper implementation of doweling provisions is accomplished through the initial startup and test (ISU) program which addresses doweling requirements after initial pump operation. Although this may result in a different dowel configuration for a specific unit, it will be consistent with approved manufacturing, engineering or project requirements as established and documented. The inspectors consider this item closed.

b. (Closed) Construction Deficiency (SDAR CP-86-43): "ITT Barton Model 580 Switches." The applicant was alerted to the deficiency involving these switches by a 10 CFR 21 notice received from the vendor, ITT Barton. In the notice, the vendor explained that malfunctions of the

Barton Model 580 series switches had occurred during the LOCA portion of requalification testing.

The applicant has evaluated this situation and has determined that all Model 580 series switch installations at CPSES are installed outside of containment. Therefore, these installed switches are not required to be qualified under LOCA conditions. Furthermore, the applicant has also determined that the test failures involving the Model 580 series switches do not apply to the high energy line break (HELB) qualification.

In summary, this deficiency is not reportable under the provisions of 10 CFR 50.55(e) because the failure mode is not applicable to CPSES. The inspector has reviewed the manner in which the applicant addressed this issue and finds it satisfactory. This item is closed.

c. (Closed) Construction Deficiency (SDAR CP-87-28:) "Condensate Storage Tank Overpressurization." During the Design Basis Consolidation Program, a design deficiency involving the condensate storage tank (CST) capacity was identified. The deficiency exists because the design established a maximum permissible normal operating level for the CST that may not leave sufficient tank volume to accommodate excess water during plant transients. During these transients, CST insurges could exceed the tank's overflow capacity and thus, lead to tank rupture.

The applicant has reported this deficiency under the provisions of 10 CFR 50.55(e). As corrective action, the applicant has decided to install a safety-related control feature for the CST level transmitters. This feature would isolate CST make-up using redundant safety-grade valves when the CST high level setpoint is reached.

The inspector has reviewed the applicant's resolution of this deficiency and finds it satisfactory. This item is closed.

d. (Closed) Construction Deficiency (SDAR CP-87-117): "Service Water System Electrical Design Verification." During the design verification of control circuitry for the service water system (SSW), a deficiency involving the 118 volt control circuitry for the recirculation line isolation valve was identified. The current circuit design conflicts with the design outlined in the FSAR. Specifically, the FSAR maintains that the SSW recirculation isolation valves (1-PV-4252 and 1-PV-4253) are designed to close upon receipt of a safety injection (S) signal. However, the current design is such that if a loss-of-control-power situation were to exist

coincident with an S signal, the recirculation line isolation valves would either shut and then reopen, or remain open.

The applicant evaluated this deficiency and determined that if the recirculation line valves fail to close or remain open after the receipt of an S signal, the decrease in SSW flow available for heat removal would be insignificant. Therefore, the applicant has concluded that this deficiency is not reportable under the provisions of 10 CFR 50.55(e). The applicant should either revise the FSAR to reflect this or correct the deficiency.

The inspector has reviewed the applicant's actions in addressing this deficiency and finds them acceptable. This item is closed.

e. (Closed) Construction Deficiency (SDAR CP-88-01): "CCW Surge Tank Capacity." During the design validation of the component cooling water (CCW) system, a deficiency involving improper low and empty level setpoints for the CCW surge tank was identified. Essentially, the applicant has completed calculations which indicate that during the worst-case nonseismic pipe break, the empty level setpoints on the CCW surge tank are not set high enough to provide adequate water inventory for the CCW pumps. As designed, there would then be too little water remaining in the tank to ensure adequate net positive suction head (NPSH) to the CCW pumps.

The applicant has determined that this deficiency is reportable under the provisions of 10 CFR 50.55(e). As corrective action, the applicant has revised the surge tank level setpoints to ensure that sufficient water is available for adequate NPSH.

The inspector has reviewed these actions and finds them acceptable. This item is closed.

6. Open Items

Open items are matters which have been discussed with the applicant, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. One open item disclosed during the inspection is discussed in paragraph 4.d.

7. Exit Meeting (30703)

An exit meeting was conducted on March 7, 1989, with the applicant's representatives identified in paragraph 1 of this report. No written material was provided to the applicant by the inspectors during this reporting period. The applicant did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. During this meeting, the NRC inspectors summarized the scope and findings of the inspection.