APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report Nos. 50-445/92-27
50-446/92-27

Operating License No. NPF-87

Construction Permit No. CPPR-127

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

Facility Name: Comanche Peak Steam Electric Station (CPSES)

Inspection At: CPSES, Glen Rose, Texas

Inspection Conducted: July 9 through September 3, 1992

Inspectors: Howard F. Bundy, Reactor Inspector, Test Programs Section, Division of Reactor Safety

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Approved: Dwight D. Chamberlain 9-25-92
Dwight D. Chamberlain, Deputy Director Date
Division of Reactor Safety

Inspection Summary

Areas Inspected (Unit 1): No inspection of Unit 1 activities was performed.

Results:

- Not applicable.

Areas Inspected (Unit 2): Routine, announced inspection of preoperational test program requirements, procedures, and implementation; Thermo-Lag installations; and followup on open items. In particular, emphasis was given to witnessing various activities associated with hot functional testing.

Results:

- Effective management oversight was readily apparent in the scheduling of the preoperational test program activities (paragraph 2.1).

- The timely approval of preoperational test procedures did not meet the commitments made by the licensee, but had generally improved from that experienced in the past (paragraph 2.1).

- Management controls over the preoperational test program conduct were strong and reflected thorough management planning with extensive coordination through numerous meetings and meeting handouts (paragraph 2.2).

- Preoperational test procedures were generally of good quality. However, the licensee's review of one procedure did not identify the presence of several minor errors that would have precluded the successful conduct of the test. The number of errors identified in this procedure, and in two other procedures reviewed indicated a weakness in the final procedure review process (paragraph 4.2).

- Although numerous, the changes to the hot functional test procedure were reasonable and had received the necessary approvals (paragraph 7.1).

- The field support supervisor position for the Unit 2 control room facilitated the implementation of the preoperational test program needs. This important position was beneficial in reducing the work load of the Unit 2 supervisor (paragraph 7.1.1).

- There was poor coordination of one preoperational local leak rate test wherein a startup test engineer did not communicate with the field support supervisor. In addition, the field support supervisor who was aware of control room discussions on the desired testing made no overt effort to become involved in assessing the test. Coordination of test activities with the control room staff is a matter of concern, and inspectors will continue to monitor this area as the preoperational test program continues (paragraph 7.1.1).

- The personnel who gathered temperature and clearance measurements demonstrated commendable experience and knowledge of their job

requirements. Measuring equipment that was utilized had current calibrations (paragraph 7.1.2).

- Prior to conducting the remote reactor shutdown test, the licensee appropriately held training and a thorough pre-job briefing. Operators and observing test personnel displayed good training and knowledge of their responsibilities. The professionalism and care given to transferring control of the reactor to the remote shutdown panel, and maintaining a controlled cooldown was noteworthy (paragraph 7.1.4).

- The overview assessment team effort was notable. The team functioned as planned and made a positive contribution to the quality of not functional test activities. Combining oversight and inspection activities in one organization appeared to contribute to efficiency in problem resolution. The round-the-clock coverage of operations by outside consultants was a positive program attribute (paragraph 7.1.5).

- Thermo-Lag installation activities were very professionally performed and the finished appearance of the installations was very good (paragraph 8).

- Several types of Thermo-Lag installations did not appear to have been covered by the licensee's testing program (paragraph 8).

- Quality Control inspections of the Thermo-Lag installation process and the completed installations were good and had been well documented.

Summary of Inspection Findings:

- Inspection Followup Item 446/9221-01 was reviewed but not closed (paragraph 9).

- Inspection Followup Item 446/9229-01 was opened (paragraph 8.1).

Attachments:

- Attachment 1 - Persons Contacted and Exit Meeting

- Attachment 2 - Documents Reviewed

DETAILS

1 PLANT STATUS

During this inspection period, the licensee commenced the hot functional testing (HFT) portion of the preoperational test program on July 11, 1992. The HFT program resulted in establishing a series of reactor coolant system (RCS) pressure and temperature plateaus that ultimately included normal operating pressure and normal operating temperature. The licensee scheduled assorted preoperational tests and associated activities at the various plateaus. Before transitioning to each new plateau, the licensee appropriately instituted a quiet time in the control room. This quiet time allowed the operations staff to assess plant conditions and activities for readiness to begin RCS pressure and temperature changes. The plant manager maintained authority to change plateaus.

The licensee extended the scheduled HFT program as a result of a bearing temperature problem with the auxiliary feedwater (Terry Turbine) pump. The licensee subsequently returned the component to the vendor for repair. (The inspector understood that the licensee had previously sent the component to the vendor for repairs. The first occasion arose during initial field assembly when the licensee found that the clearance between the rotor and the casing was insufficient.) As a result of the unavailability of the terry turbine pump for testing in the RCS normal operating pressure and temperature plateau, the licensee advanced the HFT sequence for certain tests and activities that did not involve the terry turbine pump. Subsequently, the licensee installed the repaired component and continued tests scheduled for the normal operating pressure and temperature plateau of the HFT. The licensee terminated the HFT on September 4, 1992, and began RCS cooldown.

2 OVERALL PREOPERATIONAL TEST PROGRAM REVIEW REQUIREMENTS (70301)

In this area of the inspection, the inspectors ascertained whether the licensee's administrative controls over preoperational testing were in accordance with the Final Safety Analysis Report (FSAR) commitments and regulatory requirements.

2.1 Discussion

Throughout the inspection period, the inspectors periodically reviewed the implementation of the administrative controls exercised over the preoperational test program. The inspectors observed that the licensee conducted various meetings to coordinate preoperational test activities. Effective management oversight was readily apparent in the licensee's scheduling. The routinely scheduled meetings included two daily shift turnovers, the Unit 2 plan of the day (POD) meetings, and other preoperational test program status meetings. In addition, certain Unit 2 personnel attended the Unit 1 POD meeting to keep Unit 1 personnel apprised of the Unit 2 preoperational test program. The inspectors were aware of changing

preoperational test schedules because the licensee periodically provided the inspectors with revised test dates.

On July 15, 1992, the licensee implemented the Unit 2 Nuclear Operations Transition Organization (U2NOTO). The purpose of the U2NOTO was to allow for the merging of project and operational activities from the conclusion of HFT until the issuance of the operating license. Two co-transition managers headed the organization. The organization explicitly provided for preoperational test program milestone management for the structural integrity test (SIT), integrated leak rate test (ILRT), and integrated test sequence (ITS), and for the continuation of their overview assessment effort. Initial activities of the U2NOTO included the development of hour-by-hour preoperational test program schedules. According to the licensee's representative, the Startup organization was to continue to report to the Unit 2 project manager for the duration of the preoperational test program.

On July 29, 1992, the licensee implemented the Unit 2 shift manager concept. The shift managers reported to the U2NOTO co-transition managers. The shift managers replaced the Unit 2 project duty manager and the Unit 2 operations manager positions. At the time of the inspection, the licensee had designated three Unit 2 shift managers. They and others (not yet named) were to provide continuous site coverage. Among the various shift manager responsibilities was the requirement to coordinate/expedite the work/testing activities to meet the Unit 2 integrated work/test schedule.

During the inspection, the inspectors monitored the licensee's development and approval of preoperational test procedures. The inspectors attended the licensee's weekly meetings to discuss the development of acceptance and preoperational test procedures. The inspectors gave particular attention to whether the licensee's staff had adequate time to review approved procedures prior to the commencement of the applicable testing. During this review, the inspectors did not identify any situations wherein licensee personnel did not have sufficient time to become knowledgeable of and prepare for scheduled testing. Nevertheless, the inspectors noted that the licensee was not able to approve all preoperational test procedures and have them available for NRC review 60 days prior to the scheduled performance of the testing (i.e., see FSAR commitment on page 14.2-36). The inspectors noted from a sampling of preoperational test procedures, however, that the licensee was generally improving on the timeliness of preoperational test procedure issuances.

2.2 Conclusions

Effective management oversight was readily apparent in the scheduling of the preoperational test program activities.

The licensee had not approved all preoperational test procedures as timely as it had committed to in the FSAR, but had generally improved on the timeliness of procedure issuances.

The licensee's controls over the preoperational test program conduct were generally strong and reflected thorough management planning with extensive coordination through numerous meetings and meeting handouts.

3 REACTOR PROTECTION SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW (70305)

In this area of the inspection, the inspector evaluated a preoperational test procedure for the reactor protection system test. In particular, the inspector reviewed the procedure for technical and administrative adequacy and consistency with regulatory requirements, guidance, and licensee commitments. The inspector primarily directed the review toward determining whether this test would satisfy the licensee's FSAR commitments and Technical Specifications requirements.

3.1 Discussion

The inspector reviewed Preoperational Test Procedure 2CP-PT-64-02, Revision 1, "Reactor Protection System Operational Check." The inspector determined that this procedure appeared to address all commitments and requirements referenced, with one exception where the FSAR required verification of response time of the logic channels. There was a note in this preoperational test procedure which referenced two other preoperational test procedures to satisfy this requirement. Because of the volume (over 1200 pages) and complexity of this test procedure, the inspector was unable to conclude that it was effective in satisfying each stated objective. However, it appeared that each objective was properly addressed by those portions of the preoperational test procedure that the inspector selected for detailed review. For those parts which the inspector reviewed in detail, the procedure appeared to satisfy FSAR commitments and Technical Specifications requirements. The test methods were logical and consistent with industry standards. The inspector forwarded a few minor editorial comments to the licensee for its consideration.

3.2 Conclusions

Preoperational Test Procedure 2CP-PT-64-02 appeared to be responsive to licensee commitments and regulatory requirements for reactor protection system testing. The inspector identified no technical deficiencies. The inspector forwarded minor editorial comments to the licensee for its consideration.

4 LOSS OF OFFSITE POWER TEST - PREOPERATIONAL TEST PROCEDURE REVIEW (70306)

In this area of the inspection, the inspectors evaluated the preoperational test procedures for the conduct of loss of off-site power testing. In particular, the inspectors reviewed the procedures for technical and administrative adequacy and consistency with regulatory requirements, guidance, and licensee commitments.

4.1 Discussion

During the review of Preoperational Test Procedure 2CP-PT-64-07, Revision 1, "Solid State Safeguard Sequencer Preoperational Test Procedure," the licensee was given questions on apparent inconsistencies identified in the procedure. The nature of these questions dealt mainly with typographical errors in tables, table notes, and data sheets. Uncorrected, the errors would have precluded the successful conduct of the test. In response to the questions, the licensee issued Test Procedure Change No. 1 that adequately addressed the questions and permitted the conduct of the test. Subsequently, the licensee issued Test Procedure Changes 2, 3, and 4 that corrected other errors.

4.2 Conclusions

The licensee's preoperational test procedure review process did not identify the presence of several minor errors in a procedure. The licensee needed to correct these errors to conduct the subject test successfully. This finding indicated a weakness in the final procedure review process.

5 LOCAL LEAK RATE TEST - PROCEDURE REVIEW (70307)

In this area of the inspection, the inspector evaluated the preoperational test procedure for the conduct of containment isolation valve local leak rate testing (LLRT). In particular, the inspector reviewed the procedure for technical acceptability; human factors effectiveness; and administrative adequacy and consistency with regulatory requirements, guidance, and licensee commitments.

5.1 Discussion

The inspector reviewed Preoperational Test Procedure 2CP-PT-75-01, Revision 0, "Containment Local Leak Rate Tests." At the time of the inspector's procedure review, the licensee was approximately 90 percent complete with the subject testing. The licensee had previously identified most of the editorial issues that the inspector identified, and the licensee had incorporated these issues by procedure changes. The inspector provided to the licensee's representative four editorial comments in the areas not yet changed by the licensee. The inspector understood that the licensee would incorporate these comments before testing in those areas occurred. The incorporation of the requisite changes would not, however, affect the results of the licensee's testing.

The inspector determined that the preoperational test procedure contained sufficient detail, was comprehensive, and included appropriate acceptance criteria. No procedural deficiencies were identified.

5.2 Conclusions

The licensee's preoperational test procedure for demonstrating the integrity of containment penetration isolation valves through local leak rate testing was acceptable.

6 EMERGENCY/STANDBY POWER SUPPLY SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW (70341)

In this area of the inspection, the inspectors evaluated the preoperational test procedures for the conduct of testing AC and DC lighting. In particular, the inspectors reviewed the procedures for technical and administrative adequacy and consistency with regulatory requirements, guidance, and licensee commitments.

6.1 Discussion

The inspector reviewed the following preoperational test procedures:

- 2CP-PT-71-01, Revision 0, "AC Essential Lighting Test," and
- 2CP-PT-71-04, Revision 0, "Main Control Room Emergency DC Lighting."

Together, these procedures were adequate to demonstrate that sufficient illumination would be available, as required in the FSAR, at the main control room work stations, the control board panels, the remote shutdown panels, and the shutdown transfer panel. The procedures specified appropriate acceptance criteria, and deficiencies were not identified.

6.2 Conclusions

The licensee's procedures for demonstrating the acceptability of the subject AC and DC lighting were acceptable.

7 HOT FUNCTIONAL TEST WITNESSING (70314)

In this area of the inspection, the inspectors witnessed HFT activities to establish through observations, records reviews, and independent checks that the licensee conducted its testing in accordance with approved procedures. In particular, the inspectors evaluated the performance of licensee personnel involved in the conduct of HFT.

7.1 Discussion

Preoperational Test Procedure 2CP-PT-55-02, Revision 1, "Hot Functional Test," described the prerequisites necessary for HFT. On several occasions, the inspectors audited the licensee's satisfaction of the prerequisites required by the procedure. The inspectors did not identify any discrepancies, and observed that licensee personnel signed off on all necessary procedural steps. The inspectors also reviewed the test procedure changes that the licensee had issued against Preoperational Test Procedure 2CP-PT-55-02. Although there were many changes, the changes appeared reasonable and had received the necessary approvals.

7.1.1 Field Support Supervisor (FSS)

The licensee had not established a test director position for the preoperational test program, but instead created the FSS position. Licensee management had aligned the FSS concept to be more responsive to the operational needs and less responsive to the startup aspects of the program. The inspector understood that the licensee's qualification requirements for the FSS position were operations oriented. The FSS was stationed in the Unit 2 control room. The FSS facilitated the testing efforts and reduced the work load of the Unit 2 supervisor. The inspector was informed that the position of FSS would continue until the Unit 2 fuel load. At the time of the inspection, there were six personnel assigned to the FSS program.

As described in an undated description of the FSS duties and responsibilities, the FSS had many job requirements that required coordination with various personnel. The listing gave various on-shift duties and responsibilities that included the following:

- Coordinate/direct Unit 2 operations personnel to implement the POD activities;
- Approve changes in equipment and system operational status in support of the POD;
- Review all clearances, plant modifications, engineering or maintenance activities to preclude adverse impact on the POD;
- Approve and implement changes to the POD based on equipment configuration, system availability and unanticipated work approved by the POD committee;
- Assure compliance with procedures of Unit 2 test activities;
- Assure no unplanned impact to the operation of Unit 1;
- Review and authorize work orders, startup work authorizations, and startup work packages;
- Periodically verify unit separation boundary integrity: monitor circumstances which could result in loss of unit separation boundary integrity; and
- Perform authorizations and specific duties of the Unit 2 supervisor, as directed.

In addition to the above, the inspector noted that a June 22, 1992, memorandum specified, among other duties, that the FSS was to:

- Coordinate HFT startup test activities with the operations unit supervisor,
- Direct startup test activities through the on-shift STEs, and
- Approve startup prerequisite testing on HFT related systems.

In fulfilling this role, the FSS interfaced with startup management, Unit 2 operations management, STEs who were conducting preoperational tests, and other groups providing various support services to the HFT effort.

The inspectors interviewed most of the personnel assigned to FSS duties; one of which had not received certification (at the time of the interview) to sign off on the HFT preoperational test procedure. Other qualified individuals had signed off on the procedural steps for that FSS. The inspectors noted that various plant employees frequently visited the FSSs, especially during late morning hours, when, on occasion, a line of personnel were waiting to talk to the on-shift FSS. The inspectors questioned whether the FSSs were capable of monitoring and providing the desired coordination given the number of daily contacts with personnel of various disciplines. In addition, the inspectors questioned whether many of the FSS's job functions would create the need for personnel to visit the control room when they might otherwise have no need to do so. The inspectors anticipated that the amount of dialogue involving the FSSs and STEs should increase later in the preoperational test program when the licensee was planning to have many concurrent preoperational tests. The inspectors noted, however, that the licensee was appropriately controlling the traffic admitted to the control room.

The inspectors discussed these two concerns with the licensee representative who had oversight of the FSSs. The licensee's representative stated that (a) the role of the FSS did not result in additional personnel traffic coming into the control room, (b) the licensee augmented the day-shift FSS with up to two additional people who were doing activities such as examining valve lineup deficiencies, and (c) the FSS had taken action to limit work activities on a previous occasion when the FSS became too busy to handle additional work.

On one occasion, the inspector observed poor coordination of a preoperational test. Specifically, on August 13, 1992, an STE received permission to commence the desired testing (an unscheduled LLRT) from the Unit 2 supervisor; however, the STE did not inform the FSS of the testing until questioned by the inspector when the STE was leaving the control room. The inspector noted that the on-duty FSS overheard some of the discussion between the Unit 2 supervisor and the STE, but did not make an overt effort to become personally involved in learning about and assessing the proposed testing (e.g., for an adverse impact on Unit 1 operations). The inspector questioned the STE about his instructions relative to coordinating with control room personnel on desired preoperational testing. The STE was not aware of the need to coordinate the

testing with the FSS, and stated that he merely thought that he was to contact the senior person in charge of Unit 2.

The inspector subsequently learned that training for all STEs on their role in coordinating their tests with the FSSs had been given by the startup manager. An attendance list for this training was not available. The inspector noted, however, from another training's attendance list that the subject STE had attended the June 24, 1992, training given by the Unit 1 and Unit 2 operations managers. This training discussed, to some extent, the administrative working relationship between FSSs and STEs. In addition, the startup manager and the Unit 2 operations manager held training for FSSs around June 22, 1992. During this training, the licensee managers discussed the role of the FSS in the preoperational test program.

The coordination of preoperational test program work activities with the control room was a matter of concern to the inspectors who will monitor this area as the preoperational test program continues.

7.1.2 Temperature and Clearance Measurements

At various pressure/temperature plateaus in the HFT, the inspectors observed Westinghouse and Brown & Root (B&R) inspectors who took temperature and clearance measurements on major plant components. Westinghouse personnel measurements of RCS equipment supports were taken pursuant to Preoperational Test Procedure 2CP-PT-55-09, Revision 0, "RCS Equipment Supports Thermal Expansion Test." B&R personnel measurements of the RCS components and Class 1, 2, and 3 piping were taken by following Preoperational Test Procedure 2CP-PT-90-03, Revision 0, "Hot Functional Piping Systems Thermal Expansion Test."

The inspector observed Westinghouse personnel taking data for Preoperational Test Procedure 2CP-PT-55-09, at the 350°F plateau. This involved taking clearance measurements for supports on the pressurizer, reactor coolant pumps, and steam generators. The engineers were planning to extrapolate the measurements taken at each plateau to those estimated at the design temperature of 615°F. This information would then allow the engineers to determine the shim size for each support. The Westinghouse personnel used calipers to determine the clearances at the designated points in the supports. The calipers were measured with calibrated dial micrometers to determine the numerical values of the individual clearances. The measurement techniques employed by the measurement team appeared acceptable. In addition to taking the measurements, the measurement team made visual inspections of the equipment for leaks and any apparent clearance problems. The test personnel reported one feedwater line leak to operations for further investigation and action. Also, they initiated a thermal expansion problem report for a potential clearance problem involving reactor coolant pump number 3. There was approximately a one-inch clearance between a component cooling water valve support and the pump casing. The vendor's engineer estimated that further pump movement during heatup could close the gap. He recommended verifying the clearance at 557°F.

The inspectors determined that the B&R inspectors utilized temperature detectors, which had up-to-date calibrations. The B&R inspectors used steel tapes for measuring clearances between components. The B&R inspectors were observant for signs of component binding or interference. From reviewing the field data sheets, the inspectors noted that the licensee was attempting to maintain continuity by having the same B&R inspectors perform the necessary measurements of the same components at each pressure/temperature plateau of the HFT. The inspector concluded that the B&R inspectors displayed experience and knowledge of their job requirements.

7.1.3 Local Leak Rate Testing

The inspector witnessed LLRTs pertaining to Penetration 2-MV-0006. The licensee's test personnel performed LLRTs in accordance with Preoperational Test Procedure 2CP-PT-75-01, Revision 0, "Containment Local Leak Rate Tests." The tested valves were in the discharge line for the containment component cooling water drain tank pumps. Test personnel recorded the data on data sheet 9.36. The testing included Air Operated Valves 2-HV-4725 and 2-HV-4726 and Relief Valve 2CC-1090. The leak rate for Valve 2-HV-4725 was well under the expected value. The test personnel could not pressurize the volume during the initial test for Valves 2-HV-4726 and 2CC-1090, which were tested together. The STE initiated Startup Deficiency Report 2744 to have the operator for Valve 2-HV-4726 calibrated. The leak rate was well under the acceptance criterion during the retest. The inspectors observed that the test personnel performed all test activities in accordance with the approved procedure.

7.1.4 Remote Reactor Shutdown Test

Procedure ISU-223B, "Remote Shutdown Capability Tests," described the licensee's demonstration test to remotely shutdown the reactor. (Inspection Report 50-446/92-21 provided NRC's review of the shutdown demonstration procedure.) Procedure SOI-HFT-ABN-905B, "Loss of Control Room Habitability," provided instructions for operator actions to be taken to support remote reactor shutdown.

On August 16, 1992, the licensee provided simulator training for most of the operations personnel who were to participate in the remote reactor shutdown test. On that date, the licensee deferred the scheduled test because of a licensee concern about the RCS lithium concentration. Specifically, the licensee's personnel thought that the lithium concentration, which was within specification, was high enough that it might result in a coolant that would be too acidic upon plant cooldown and that degradation of the passive corrosion barrier in the RCS might occur. Consequently, the licensee deferred the test 24 hours during which time operators lowered the lithium concentration.

During a thorough pre-job briefing in the control room, the licensee's representative discussed the reasons that would cause test termination. The test then commenced on the morning of August 17, 1992, from a normal RCS operating pressure and temperature with reactor heat simulated by operating

reactor coolant pumps. The number of licensed and non-licensed operators participating in the test did not exceed the Unit 1 Technical Specification for minimum shift coverage during Mode 1. In the test, the licensee maintained normal control room staffing; however, those control room operators did not assist the operators conducting the test.

During the test, operators maintained continuous communications via radio and sound-powered phones between the remote shutdown panel, the transfer shutdown panel, and auxiliary operators in the plant. Communications between the operating staff who conducted the test and the control room staff were proper. The test demonstration conformed to the guidance given in Regulatory Guide 1.68.2. The licensee successfully demonstrated the ability to maintain the plant at hot standby, and cooldown the plant from hot standby, all from outside the control room.

The inspectors noted that during the conduct of the test, an auxiliary operator had trouble in gaining access to an electrical box. The box, which was located on a support within a few feet of the remote shutdown panel, was fire protected by a Thermo-Lag box. To gain access to the box, the operator virtually had to destroy the box by cutting out an opening and forcing out the box sides to allow for the opening of the electrical box door. The inspector was later informed that the licensee had previously requested the replacement of the Thermo-Lag protection for the subject electrical box with a design equivalent to that used for Unit 1.

The inspectors determined that the operators and observing test personnel exhibited good training and knowledge of their responsibilities during the test. Professionalism and care were given to transferring control of the plant to the remote shutdown panel, and to maintaining a controlled and acceptable cooldown rate. The operators administratively limited the cooldown rate to a value less than that allowed by the Unit 1 Technical Specifications.

7.1.5 Overview Assessment

The licensee utilized an HFT overview assessment team for the duration of HFT. An HFT overview assessment leader and 12 team members constituted the team. The licensee documented the plans and goals for this effort. There were four crews with three individuals, including a shift HFT overview assessment leader, assigned to each crew. Scheduled crews provided continuous coverage during HFT. To provide a diversity of experience, various organizations associated with the plant provided team members. The following were team objectives:

- Evaluate the impact of HFT on Unit 1 operations,
- Evaluate the operation organization's ability to operate two units,
- Evaluate the implementation of HFT activities, and

- Evaluate the performance of HFT activities in meeting management's expectations (e.g., self-checking, procedural compliance).

To achieve these goals, the team was given a list of HFT activities to monitor. They included the following:

- Evaluate the conduct of testing,
- Perform pre-selected test surveillances,
- Review test procedures and changes,
- Evaluate the conduct of operations, and
- Evaluate the performance of support organizations.

The inspectors noted that the licensee was reporting the team activities and findings in the following:

- Overview shift log,
- Quality assurance test logs for each test, and
- Overview shift summary report.

The licensee documented and resolved deficiencies in accordance with the licensee's ONE/TUE form process. It reported observed weaknesses directly to the appropriate manager and documented them in the shift summary report. The licensee planned to issue an HFT overview assessment report at the conclusion of HFT to summarize team activities and provide the evaluation of the activities observed.

Interviews with team members and review of selected logs and reports by the inspector indicated that the team was functioning as planned and was making a positive contribution to the quality of HFT activities. Combining oversight and inspection activities into one organization for HFT appeared to contribute to efficiency and problem resolution.

Prior to beginning the evolutions shown on the project HFT schedule, the licensee required completion of an operations/startup self-assessment checklist. Also, the licensee required approvals of various operations and startup management personnel, including the plant and startup managers. In addition, the licensee required approvals by the shift HFT overview assessment leader and the HFT overview assessment leader. Completion of this checklist should assure that all parties were in agreement prior to beginning important evolutions and, thereby, should contribute to error reduction.

The inspector interviewed one of four licensee consultants from Duke Engineering & Services. A significant role the consultants performed was that

of advising the shift supervisor of the adequacy of Unit 1/2 interfaces. The inspector understood that the licensee's consultants were also relatively free to look for potential operations problems in areas such as management/operator communications and work control practices. The inspector considered this round-the-clock coverage by outside consultants a positive program attribute.

7.2 Conclusions

Although numerous, the licensee's test procedure changes for the HFT procedure were reasonable and had received the necessary approvals.

The FSS position for the Unit 2 control room was an important position that facilitated the implementation of the preoperational test program needs and was beneficial in reducing the work load of the Unit 2 supervisor.

Poor coordination occurred during one preoperational LLRT wherein an STE did not communicate with the on-shift FSS. In addition, the FSS who was aware of control room discussion on the desired testing made no overt effort to become involved in assessing the test. The test personnel subsequently performed this test satisfactorily in accordance with the approved procedure. Coordination of test activities with the control room staff is a matter of concern, and inspectors will continue to monitor this area as the preoperational test program continues.

The temperature and clearance measurement techniques employed by the licensee's measurement teams were acceptable. The inspectors determined from a sampling of measuring equipment that the licensee was maintaining such equipment calibrations current. The licensee's measurement personnel demonstrated commendable experience and knowledge of their job requirements.

The licensee held simulator training and a thorough pre-job briefing for the personnel involved in the remote reactor shutdown test. Communications between the operating staff who conducted the test and the control room staff were appropriate. Operators and observing test personnel displayed good training and knowledge of their responsibilities during the test. Noteworthy, was the professionalism and care given to transferring control of the reactor to the remote shutdown panel, and to maintaining a controlled and acceptable cooldown rate. During the test, the licensee demonstrated the ability to maintain the plant at hot standby, and cooldown the plant from hot standby, all from outside the control room. The demonstration conformed to the guidance given in Regulatory Guide 1.68.2.

The licensee's overview assessment team effort was notable. The team functioned as planned and made a positive contribution to the quality of HFT activities. Combining oversight and inspection activities into one organization for HFT appeared to contribute to efficiency and problem resolution. The round-the-clock coverage of operations by outside consultants was a positive program attribute.

8 THERMO-LAG FIRE BARRIER INSTALLATIONS (92701)

The inspector also evaluated the oversight of the Thermo-Lag installations by the quality control organization.

8.1 Discussions

The inspector found that the Thermo-Lag installations that had been completed appeared to meet the licensee's installation specifications and had been completed in a very professional manner. The technicians installing the Thermo-Lag were exercising care in fitting up the material to minimize crack size. Considering the congestion in the area with the resulting clearance problems that were being encountered, the installations were notable.

The inspector noted some types of Thermo-Lag installations that did not appear to be modeled in the fire endurance test programs that the licensee had completed.

These installations included:

- Applications which used flexi-blanket material,
- Junction box covers, and
- Fire damper support covers.

This matter was discussed with licensee representatives. This matter will be reviewed further during a future inspection and has been identified as Inspection Followup Item 446/9229-01.

The cable-trays, conduits, and junction boxes that had been covered with Thermo-Lag were very effectively labeled and presented a very professional appearance.

The inspector interviewed quality control inspection personnel, who were involved in the inspection of Unit 2 Thermo-Lag installations and reviewed the records of these inspection efforts. The inspection checklist that was used by the quality control inspectors included the following attributes:

- Surfaces were clean, dry, and free of foreign material;
- The qualifications of the applicator were satisfactory;
- The trowel grade Thermo-Lag used in installation was acceptable (shelf-life) and had been properly mixed;
- Fasteners (bands, clamps, and wire) were approved and had been installed with the specified spacing;
- The continuity of the material had been maintained (no air gaps);

- There were no visual defects in the material; and
- Protrusions had been covered out to 9 inches from the cable tray or conduit.

The inspections had been well documented, and any noted deficiencies had been promptly corrected and reinspected.

8.2 Conclusions

The Thermo-Lag installations were being installed in a very professional manner to ensure the integrity of the barrier enclosures. The finished installations had a very good appearance with no apparent defects. Several types of Thermo-Lag installations were observed that did not appear to have been included in the licensee's fire endurance test programs. Quality control activities were good, and had been well documented

9 FOLLOWUP (92701)

(Open) Inspection Followup Item (446/9221-01): Demonstration of Necessary and Adequate Communications for Remote Reactor Shutdown

The Procedure ISU-223B, "Remote Shutdown Capability Tests," discussed the licensee's communications for the personnel involved in remote reactor shutdown. The procedure referred to use of the Gai-Tronics system for the purpose of the test. The inspector questioned the licensee on the reliability and availability of communication equipment in the area of the remote shutdown panel. Also, of interest was whether operators in this area would have a means of communicating with personnel in the emergency operations facility (EOF) if the need to abandon the technical support center arose because of fire, radiological hazard, or other adverse habitability condition.

The licensee provided Design Basis Document DBD-EE-048, Revision 2, "Communication System," to explain the communications planned for the remote reactor shutdown operations. In regard to communications between the remote shutdown panel and the EOF, the licensee's document described three means of communication systems installed or awaiting installation. The primary means of communicating was the plant radio system. The Gai-Tronics system was the primary backup system. The licensee also planned to install a telephone system in the area of the remote shutdown panel. During the conduct of the above-described August 17, 1992, test, the licensee demonstrated the ability to use the two installed communication systems. Communications were, however, not established with the EOF. The inspector concluded that the licensee's installed and planned communications systems should satisfy the communication needs.

NRC will review this open item at a later time (such as during an emergency preparedness drill) when the licensee tests the ability to communicate between the remote shutdown panel area and the EOF.

ATTACHMENT 1

1 PERSONS CONTACTED

1.1 Licensee Personnel

D. Allen, Supervisor, Programs Test Group, Performance and Test
* J. Ayres, Operations Quality Assurance Manager, Nuclear Overview
* M. Blevins, Director, Nuclear Oversight
* L. Bradshaw, Stipulation Assistant
R. Burdick, Startup Test Engineer, Startup
* W. Cahill, Jr., Group Vice President
L. Chatfield, Startup Test Engineer, Startup
* J. Conly, Licensing Engineer, Unit 2 Licensing
R. Daly, Manager, Startup
* J. Greene, Licensing Engineer, Unit 2 Licensing
* T. Hope, Licensing Manager, Unit 2
J. Houchen, Transition Co-Manager, Unit 2
W. Hurley, Startup Test Engineer, Startup
* J. Kelley, Plant Manager
D. Kross, Manager, Unit 2 Operations
B. Landry, System Engineer, Programs, Startup
P. Olson, Hot Functional Test Milestone Manager, Startup
G. Ondriska, Supervisor, Programs Test Group, Startup
* D. Pendleton, Manager, Unit 2 Regulatory Services
* C. Rau, Project Manager, Unit 2 Project Management
T. Scruggs, Field Shift Supervisor
R. Smith, Staff Engineer, Systems Engineering, Operations
* C. Terry, Chief Engineer
C. Wells, Operations Staff Assistant, Unit 2
* J. Wren, Construction Quality Assurance Manager, Quality Assurance

1.2 Contractor Personnel

T. Chaney, QC Inspector, Brown & Root
J. Foland, Senior Engineer, Westinghouse
R. Funkhouser, Technician, Westinghouse
J. Gimbel, Engineer, Westinghouse
J. Himler, Senior Engineer, Westinghouse
* I. Hughes, Brown & Root
* L. Hurst, Project Manager, Bechtel
C. Pringle, Engineer, Westinghouse
M. Ravan, Nuclear Operations Consultant, Duke Engineering & Services
R. Rowe, QC Inspector, Brown & Root
* J. Snyder, Startup, Bechtel

1.3 CASE Personnel

* O. Thero, Consultant

1.4 NRC Personnel

* D. Graves, Senior Resident Inspector, Unit 2
* C. Johnson, Project Engineer, Division of Reactor Projects
R. Latta, Resident Inspector, Unit 2

In addition to the personnel listed above, the inspectors contacted other personnel during this inspection.

* Denotes personnel that attended the exit meeting.

2 EXIT MEETING

An exit meeting was conducted on September 3, 1992. The inspectors also met with the licensee's startup manager on July 13, 1992, to discuss the licensee's oversight and controls on the HFT program. The inspectors met with other licensee managers on various dates to discuss the status and conduct of their responsibilities in the preoperational test program.

During the exit meeting, the CASE representative asked the inspector if the licensee's program for local leak rate testing committed to the American Society for Nondestructive Testing Standard SNT-TC-1A, "Recommended Practice." The inspector responded that an answer to the question would be provided to CASE at a later date.

The licensee did not identify, as proprietary, any information provided to or reviewed by the inspectors.

ATTACHMENT 2

DOCUMENTS REVIEWED

Preoperational Test Procedure 2CP-PT-64-07, Revision 1, "Solid State Safeguard Sequencer Preoperational Test Procedure," June 22, 1992

Preoperational Test Procedure 2CP-PT-55-02, Revision 1, "Hot Functional Test," July 3, 1992

Preoperational Test Procedure 2CP-PT-90-03, Revision 0, "Hot Functional Piping Systems Expansion Test," June 3, 1992

Preoperational Test Procedure 2CP-PT-55-09, Revision 0, "RCS Equipment Supports Thermal Expansion Test," April 4, 1992

Office memorandum CPSES-92222331 U2PM-92150, "Implementation of the Unit 2 Nuclear Operations Transition Organization," July 14, 1992

"Duties/Responsibilities of the Field Supervisor/Operations Procedure Reviewer," undated listing

Design Basis Document DBD-EE-048, Revision 2, "Communication System," December 19, 1991

Preoperational Test Procedure 2CP-PT-71-04, Revision 0, "Main Control Room Emergency DC Lighting," July 24, 1992

Preoperational Test Procedure 2CP-PT-71-01, Revision 0, "AC Essential Lighting Test," July 27, 1992

Procedure ISU-223B, Revision 0, "Remote Shutdown Capability Tests," May 15, 1992

Procedure SOI-HFT-ABN-905B, Revision 0, "Loss of Control Room Habitability," August 15, 1992

Preoperational Test Procedure 2CP-PT-75-01, Revision 0, "Containment Local Leak Rate Tests," May 2, 1992

Office memorandum CPSES-9224379 U2PM-92153, "Implementation of the Unit 2 Shift Manager Concept," July 28, 1992

Office memorandum CPSES-9219989 U2PM-92135, "Hot Functional Test (HFT) Organization Chart," June 22, 1992

Standing Order 92-0031, "Guidelines for Operating Equipment Outside of Procedures," May 28, 1992

Preoperational Test Procedure 2CP-PT-64-02, Revision 1, "Reactor Protection System Operational Check," August 15, 1992