APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-445/92-25 Unit 1 Operating License: NPF-87
50-446/92-25 Unit 2 Construction Permit: CPPR-127
Expiration Date: August 1, 1995

Licensee: 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: Glen Rose, Texas

Inspection Conducted: June 14 through August 1, 1992

Inspector: D. N. Graves, Senior Resident Inspector
R. M. Latta, Resident Inspector
G. E. Werner, Resident Inspector

Reviewed by: L A Yandell Aug 20, '92
L. A. Yandell, Chief, Project Section B Date
Division of Reactor Projects

Inspection Summary

Inspection Conducted June 14 through August 1, 1992 (Report 50-446/92-25)

Areas Inspected: Unannounced resident safety inspection of Unit 2 activities was performed including plant status, routine plant tours, followup on previously identified inspection items, followup on corrective actions for deviations, followup on licensee actions on construction deficiencies, preoperational test program implementation verification, preoperational test procedure review, preoperational test witnessing, and hot functional testing activity observations.

Results: General observations during plant tours indicated that housekeeping, control of combustibles, segregation and temporary storage of Q-material, and implementation of access controls were effective. The preoperational test procedures continue to be of high quality, and testing activities were approached in a cautious, deliberate manner that demonstrated a conservative safety attitude. The conduct of operations in the control room was observed to be satisfactory, with good coordination between the unit supervisor and the field supervisor in controlling the status of the plant systems and work control items. Two violations were identified (paragraphs 7.2 and 10.1), one of which was noncited. One unresolved item (paragraph 7.1) and one inspection

followup item (paragraph 7.7) were identified. One unresolved item, one deviation, and six significant deficiency analysis reports (SDARs) were reviewed and closed.

Inspection Conducted June 14 through August 1, 1992 (Report 50-445/92-25)

Areas Inspected: Unit 1 inspection activities were limited to the close out of previously identified items, and the review of Thermo-Lag fire barrier testing.

Results: One unresolved item was reviewed and closed. One inspection followup item (paragraph 7.7) was identified.

## DETAILS

### 1. PERSONS CONTACTED

TU ELECTRIC

D. Bruner, Senior Vice President
W. J. Cahill, Jr., Group Vice President
E. P. Gully, Engineering Management
S. W. Harrison, Deputy, Unit 2 Project Manager
T. L. Heatherly, Licensing Engineer
T. A. Hope, Unit 2 Licensing Manager
L. W. Hurst, Project Manager
S. S. Palmer, Stipulation Manager
D. Pendleton, Unit 2 Regulatory Services Manager
C. W. Rau, Unit 2 Project Manager
D. W. Schmidt, Quality Construction Supervisor
A. B. Scott, Vice President, Nuclear Operation
C. Wells, Unit 2 Operations

CITIZENS ASSOCIATION FOR SOUND ENERGY (CASE)

O. L. Thero, Consultant

In addition to the above personnel who were present at the exit meeting, the inspectors held discussions with various operations, engineering, technical support, maintenance, and administrative members of the licensee's staff.

### 2. UNIT 2 PLANT STATUS (71302)

The reactor coolant and other systems required to support hot functional testing (HFT) were filled and vented during this inspection period. Condenser vacuum was established in the main condenser. Unit 2 began HFT on July 12, 1992, and testing was scheduled to last approximately 39 days. Various plant preoperational and acceptance testing activities were performed at testing plateaus established at 180°F, 250°F, 350°F, and 450°F. The reactor coolant system achieved normal operating pressure and temperature, 2235 psig and 557°F, on July 25; and, at the end of this inspection period, all four reactor coolant pumps were operating to maintain this condition with several preoperational and acceptance tests in progress. Thirty-four of 151 preoperational and acceptance tests have been completed. Eight systems (out of 77 total) have been accepted by operations. The Train B emergency diesel generator underwent significant disassembly and repair as a result of damage to several bearings that occurred during testing activities. Reassembly was in progress at the end of this inspection period. The Train A diesel generator was available to support HFT. Construction activities were continuing to support project milestones.

3. UNIT 2 TOURS (71302, 92701)

During the performance of routine plant tours, no violations or deviations were identified. Housekeeping, including the control of combustible materials, was acceptable and appropriate provisions for the segregation and control of Q-listed material had been implemented. The inspectors also determined that installed systems and components were being protected and that, in general, the observed work activities were well controlled.

During this inspection period, routine tours of the Unit 2 facility were conducted in order to assess equipment conditions, security, access controls, and adherence to regulatory requirements. In particular, plant areas were examined for fire hazards, installed equipment damage, and the acceptability of system cleanliness controls and general housekeeping. Additionally, the inspectors conducted evaluations of existing plant programs for the preservation and maintenance of installed systems and components as well as portable equipment.

Nineteen portable welding machines were inspected to determine if they had been serviced in accordance with the maintenance sheet attached to the machines. Eighteen of those inspected were verified to have been current with respect to routine maintenance. One machine located in the Unit 2 cable spreading room was found to be out of date but was clearly labeled as out of date and tagged with an information tag stating that it was out of date and not to be used. The machine was chained and locked to a support and none of the welders in the area knew who had custody of the key to have the machine removed and serviced. A subsequent tour of the area by the inspectors determined that the machine had been removed.

Inspection of the access control process for construction work activities was performed. The inspectors determined that the activities were controlled in accordance with Project Procedure 2PP-2.03, "Room/Area Walkdown, Access Control, and Completion." Access control forms were utilized where appropriate, and workers in the field without access control forms were queried by the inspectors as to the requirements of Procedure 2PP-2.03. The workers were knowledgeable regarding the procedure, including the types of activities that required the use of an access control form. Approximately 145 rooms out of a total population of 211 were under access control at the end of this inspection period.

Installed instrumentation was observed to be adequately protected. Segregation and control of Q-listed material and transient combustible control were determined to be satisfactory.

On the 790-foot elevation in the safeguards building, the inspectors observed a small trench approximately 2 inches deep chipped into the concrete floor, directing what appeared to be groundwater seeping from the building floor seal into a nearby floor drain. The inspectors queried civil/structural construction engineering as to the nature of the leakage and the authorization for the modification to the floor. The licensee informed the inspectors that

the leakage was from groundwater and that the small trench chipped into the floor was authorized per Design Change Authorization 101325 which authorized the installation of a small drain pipe from the building seal into the observed trench to direct the water into the floor drain. Additionally, a plate will be mounted over the building floor seal. No deficiencies were identified by the inspectors during these inspections or discussions.

4. FOLLOWUP ON PREVIOUSLY IDENTIFIED ITEMS (92701)

(Closed) Unresolved Item 445/91202-02; 446/91201-02: Potential Damage of Battery Charger Due to High Fault Current

This item involved the potential for battery charger damage under fault conditions with initial current surges in excess of 5600 amperes. Further evaluation was required to determine if adequate protection was provided for the Class 1E 125 Vdc system.

The licensee's response to this issue in Letter TXX-92143 dated March 27, 1992, concluded that the 125 Vdc system provided a reliable power supply source and was adequately protected and monitored against postulated faults. This conclusion was based on the availability of a redundant battery charger that can be connected to each safety train, if required, and vendor testing of the type of battery chargers installed at CPSES.

A review of this issue and the licensee's response by the Electrical Systems Branch of Nuclear Reactor Regulation (NRR) determined that the type of fuses used to protect solid state devices are highly likely to protect against equipment damage. Additionally, each safety train has the capability to be supplied by a redundant battery charger. These features provide adequate assurance that the Class 1E 125 Vdc system is adequately protected. Therefore, this unresolved item is closed for both units.

5. FOLLOWUP ON CORRECTIVE ACTIONS FOR VIOLATIONS AND DEVIATIONS (92702)

(Closed) Deviation 446/9121-01: Weld Mapping Process

This deviation involved the licensee's untimely notification of an alteration to a quality control (QC) inspection process which had been developed as part of the corrective actions associated with Enforcement Action (EA [illegible]. Specifically, in response to Item I.C.8 of EA 86-09, the licensee [illegible]ed Procedure QI-QAP-11.1-28 to incorporate the lessons learned from Unit 1, including the weld mapping and recording of all required weldments on component supports. However, prior to the resumption of Unit 2 construction activities in January 1991, the applicable ASME Weld Inspection Procedure AQP-11.3 was revised and the commitment to perform weld mapping of component supports was deleted.

During this reporting period, the inspectors reviewed the licensee's basis for modifying the ASME QC inspection process for Unit 2 component supports which was delineated in TU Electric's letter, TXX-91095, dated April 29, 1991. As

indicated in this letter, the need for the weld mapping process was evaluated based on the satisfactory results of the Comanche Peak Response Team Reinspection Program, which validated the overall acceptability of the original welding program, and the adoption of the American Welding Society (AWS) Visual Weld Acceptance Criteria for NF welds (Code Case N-430), which provided additional guidance for the acceptability of certain weld conditions (e.g., weld size). Therefore, the licensee concluded that the weld mapping process for Unit 2 component supports was no longer necessary. Furthermore, the licensee stated that QC will continue to verify and document the acceptability of the total weldment on the QC inspection report in accordance with established Unit 2 procedures.

Based on the review of the supporting documentation, including the evaluation of Procedure ACP-11.5, Revision 9, "Component Support Fabrication And Installation," the inspectors determined that appropriate inspection criteria had been developed to address the original concern identified in EA 86-09, relative to component support welds.

Additionally, the inspectors examined the corrective actions associated with this deviation which were documented in TU Electric's letter, TXX-91256, dated July 19, 1991. These actions included the licensee's enhancement of the program which tracks regulatory notifications involving substantive methodology or scope changes and the evaluation of existing open commitments which were assigned to various Unit 2 disciplines in order to better define when notifications to the NRC may be necessary. The inspectors also reviewed the licensee's open commitment listing provided in Project Letter CPSES-9112753 dated May 20, 1991, and the departmental actions associated with the organizational evaluation of commitments which were described in Project Letter CPSES-9114591 dated June 6, 1991.

Based on these reviews, it was determined that the licensee had developed and implemented appropriate corrective actions to address the identified deviation. Therefore, this item is closed.

6. LICENSEE ACTION ON 10 CFR PART 50.55(e) DEFICIENCIES (92700)

6.1 (Closed) Construction Deficiency SDAR CP-84-027: "Ventilation Exhaust Dampers"

This construction deficiency was originally reported by TU Electric letter, TXX-4409, dated March 6, 1985. The licensee informed the NRC of a reportable deficiency involving the design failure modes of certain primary plant ventilation system exhaust dampers and several other related issues. As previously documented in NRC Inspection Report 50-445/89-76; 50-446/89-76, this item was reviewed and closed for Unit 1.

The corrective actions for Unit 2 were the same with the exception of the downgrading of Class 1E electrical switches and solenoid valves mounted on certain safety-related dampers to non-nuclear safety (NSS). During design validation, the dampers were shown to provide no safety function and were not

required to change position as a result of any accident and were downgraded to Seismic Category II; therefore, two electrical isolation devices (fuses) will be installed between the Class 1E power supplies and each NSS damper.

With respect to Unit 2, the inspectors reviewed the historical documentation associated with this issue and performed a partial field walkdown to verify that corrective actions had been effectively implemented. The inspectors determined the licensee had implemented appropriate corrective actions; however, Procedure ABN-202 had not been changed to include securing safeguard building lighting as prescribed by Ebasco Letter EB-T-3475. The failure to include this change was brought to the attention of the licensee and the procedure was in the process of being corrected. This item is considered closed for Unit 2.

6.2 (Closed) Construction Deficiency SDAR CP-87-029: "Component Cooling Water (CCW) Isolation Following Reactor Coolant Pump (RCP) Thermal Barrier Rupture"

This issue involved a design deficiency in the instrumentation and controls utilized for the isolation of CCW to the RCP thermal barrier heat exchanger. Specifically, the isolation of CCW following a postulated RCP thermal barrier rupture was determined to be dependent upon non-Class 1E instrumentation and non-Class 1E valve actuation, which was contrary to the requirements of NRC Regulatory Guide 1.97. With respect to Unit 1, this deficiency was reviewed and closed in NRC Inspection Report 50-445/89-75; 50-446/89-75 based on the replacement of the existing non-Class 1E temperature and flow instrumentation with Class 1E components and the installation of a second check valve in the CCW inlet piping.

During this reporting period, the inspectors evaluated the licensee's corresponding corrective actions for Unit 2 which were delineated in TU Electric's letter, TXX-89128, dated April 28, 1989. As described in this letter, these actions involved the incorporation of safety-related Class 1E temperature and flow elements at the thermal barrier coolers which provide for an automatic isolation signal to the containment isolation valves and the individual thermal barrier isolation valves, as well as control room indication and alarm functions. Additionally, a second check valve was installed in the CCW inlet piping of each thermal barrier.

In order to confirm the implementation of these corrective actions, the inspectors reviewed the applicable Design Basis Document DBD-ME-229, Revision 6, "Component Cooling Water System"; as well as Design Change Authorization (DCA) 50439, Revision 2, which directed the replacement of the existing non-Class 1E components. The inspectors also reviewed the incorporating drawings which installed Check Valves 2CC-0371, -0372, -0373, and -0374; and the equipment installation documentation associated with the replacement of the associated Class 1E temperature and flow elements.

Based on the inspectors' reviews of the referenced documentation, no discrepancies were identified and it was determined that the completed

corrective actions appropriately addressed the identified deficiency. Therefore, this item is considered closed for Unit 2.

6.3 (Closed) Construction Deficiency SDAR CP-87-134: "Class 1E AC Electrical System Deficiencies"

This construction deficiency involved several design inadequacies associated with Class 1E AC electrical systems. Specifically, as documented in TU Electric's letter, TXX-88064, dated January 11, 1988, numerous deficiencies were identified during the design validation process, which included incorrect cable ampacity ratings, voltage ratings, circuit breaker sizing, and cable separation. These deficiencies, which resulted from the misapplication of cable protective device sizing and separation criteria, were reviewed and closed for Unit 1 as previously documented in NRC Inspection Report 50-445/89-84; 50-446/89-84.

During this reporting period, the inspectors reviewed the licensee's corresponding corrective actions for Unit 2, which included the establishment of design criteria for cable sizing in DBD-EE-052, "Cable Philosophy and Sizing Criteria." The inspectors also examined the revised circuit breaker design criteria contained in DBD-EE-051, "Protection Philosophy," and the electrical separation design criteria provided in DBD-EE-057, "Separation Criteria." Additionally, the inspectors reviewed the following construction work documents and DCAs in order to confirm the implementation of Class 1E circuit design criteria.

| Construction Work Documents No. | DCA | Revision No. |
|---|---|---|
| EG 255702-01 | 94788 | 2 |
| EG 255339-02 | 94787 | 1 |
| AG 204857C-01 | 94808 | 0 |
| AG 204857B-02 | 95990 | 0 |
| EO 255 701-02 | 95274 | 1 |
| EO 255 336-01 | 96246 | 0 |
| EO 223 687-02 | 94544 | 2 |
| EO 223 566-02 | 94533 | 3 |
| AO 205 030A-02 | 94786 | 2 |
| AO 205 030B-02 | 94603 | 2 |
| SP 210758-01 | - | |
| SP 210760-01 | - | |

Based on the above documentation reviews, it was determined that the licensee had implemented appropriate corrective actions to address the identified deficiencies. Therefore, this item is closed for Unit 2.

6.4 (Closed) Construction Deficiency SDAR CP-88-036: "Charging Pump Miniflow Lines"

This construction deficiency involved the identification of a potential deficiency in the piping stress analysis for the chemical and volume control

system (CVCS) charging pumps' alternate minimum recirculation piping. Specifically, during the licensee's design review and validation process, a concern was identified involving the adequacy of the supports associated with the piping downstream of CVCS discharge relief Valves 2-8510 A and B. As previously documented in NRC Inspection Report 50-445/90-03; 50-446/90-03, this item, which was determined by the licensee to be nonreportable, was reviewed and closed for Unit 1.

With respect to Unit 2, the inspectors' reviewed the supplementary documentation contained in Stress Calculation SI-2-366 which concluded that the pipe supports required to qualify the functional capability of the subject piping were adequate. Additionally, the inspectors conducted a field walkdown of portions of the associated CVCS piping in order to confirm that the installed piping supports were in agreement with the design drawings.

Based on these reviews, the inspectors concluded that the licensee had implemented appropriate actions to correct this construction deficiency for Unit 2. This item is considered closed for Unit 2.

6.5 (Closed) Construction Deficiency SDAR CP-90-008: "Volume Control Tank Isolation Valve Leakage"

This reportable deficiency involved the potential for gas binding of the centrifugal charging pumps (CCPs) as a result of excessive back-flow leakage in the solenoid operated isolation valves (SOIVs), which isolate the gas space of the volume control tank (VCT) from the CCP suction lines during the injection phase of a loss-of-coolant accident. As documented in TU Electric's letter, TXX-91104, dated March 6, 1991, this deficiency was initially discovered during the evaluation of Information Notice 90-64 and was subsequently reported to the NRC for Unit 1 in Licensee Event Report 90-035 dated November 13, 1990. As a result of this condition, the licensee initiated compensatory actions for Unit 1 on October 11, 1990, which included tagging the associated manual Isolation Valves 1CS-0112, 2CS-0113, and 1CS-0114 in the closed position; and the periodic venting of the pump suction lines for both trains of the high-head safety injection system in order to offset the potential failure of either SOIV 1-HV-8220 or -8221.

Relative to Unit 2, the licensee elected to replace the affected SOIVs (2-HV-8220 and 2-HV-8221) with new components which were capable of isolating the flow from the VCT to the CCPs in both directions. Accordingly, during this reporting period, the inspectors reviewed the implementation of these corrective actions for Unit 2 which were documented in TU Electric's letter, TXX-91275, dated July 31, 1991. Specifically, the inspectors reviewed the technical resolution of TU Evaluation (TUE) Form 90-178, which directed the replacement of Valves 2-HV-8220 and -8221, as well as the records associated with Weld Data Cards 052758, -59, -60, and -61. Additionally, the inspectors performed a field walkdown of the suction line from the VCT to the CCPs in order to confirm the replacement of the subject valves with the revised components specified on Drawing BRP-CS-2-SB-056, Sheet 2A, Revision CP-5.

Based on the review of the documentation associated with this system modification and the results of field verification walkdowns, the inspectors determined that the licensee had implemented appropriate corrective actions to address the identified construction deficiency. Therefore, this item is closed for Unit 2.

6.6 (Closed) Construction Deficiency SDAR CP-92-003: "Potential Loss of Residual Heat Removal (RHR) Due to Flooding"

This construction deficiency involved the licensee's identification of an apparent open flow path into RHR Pump Room 2-053, that was not previously identified as a potential flood pathway. The scope of this evaluation included other rooms with ventilation and duct configurations not analyzed for possible flood pathways. This item was determined by the licensee to be nonreportable.

The inspector reviewed the revised Unit 2 flooding Calculation 2-NU-0059, which concluded that the water level, resulting from the postulated flooding of the RHR room from adjacent rooms, does not result in submergence of any safe shutdown equipment. The calculation also concluded that the flooding of adjacent rooms through the heating, ventilation, and air-conditioning (HVAC) ducts does not increase the worst-case flood levels. Additionally, the inspector performed a field walkdown and verified that the open flow path into Room 2-053 was not directed at safety equipment.

Calculation 0218-HV-0048, "Structural Qualification For Duct And Duct Supports Due to Flooding In Safeguard and Auxiliary Buildings," was also reviewed. This calculation analyzed the worst case static loading conditions for various flooded duct configurations. The actual calculated stresses were all less than the allowable stresses.

Based on these reviews, it was determined that no corrective action was necessary. This item is closed for Unit 2.

7. PREOPERATIONAL TEST PROGRAM IMPLEMENTATION VERIFICATION (71302, 92701)

Relative to the preoperational test program, the inspectors evaluated implementation of the licensee's management control system to determine if jurisdictional controls were observed for system turnovers, that systems/components undergoing testing were properly tagged, that maintenance activities and preoperational tests were adequately performed, that test discrepancies were properly identified, and that test procedures and operational verifications were satisfactorily conducted.

7.1 Emergency Diesel Generator (EDG) Damage

On June 27, 1992, while troubleshooting a failure of the Train B EDG to trip on overspeed while testing, the licensee discovered a blind flange installed in an oil line which supplied oil to the overspeed trip device and several bearings. The licensee disassembled the affected portions of the engine for

inspection and determined that damage had occurred to the jacket water pump, idler gear, and camshaft gear bearings in addition to the overspeed trip device.

TUE Form 92-5655 was generated to address the event and review it for reportability. A task team was formed by the licensee to determine the root cause for the event, including reviews of work activities, flushing activities, and modifications associated with this engine. The Train A EDG had previously undergone similar testing and was considered available to support HFT as a back up power supply.

The flange was removed and the engine damage was repaired. The engine was being reassembled at the end of this inspection period. The engine had been operated at various speeds unloaded, with the flange installed for a total of approximately 82 minutes. No testing had been performed with the generator energized or loaded. This event will be identified as an unresolved item (446/9225-02) pending the inspectors' review of the licensee's completed root cause analysis and evaluation.

7.2 Unapproved Nelson Stud Modifications

During the installation of fireproofing material (Thermo-Lag) on electrical conduits, a quality control inspector observed a craftsman removing a portion of a Nelson stud on a conduit support to facilitate the Thermo-Lag installation. The removal of the stud protrusion was performed by utilizing a piece of conduit to bend the stud back and forth until it broke. This action made the condition of the weld on the previously QC accepted commodity, the conduit support, indeterminate.

The quality control inspector stopped the activity and immediately notified construction management. Construction management stopped the installation of Thermo-Lag and generated TUE Form 92-5449 to address the issue. The licensee's evaluation determined that the installers had received verbal direction from an unidentified source that it was acceptable to cut off the excess portion of Nelson studs. This direction was incorrectly interpreted as authorization to perform the observed activity. Corrective actions performed by the licensee included retraining of the Thermo-Lag installers in the specific requirements of Procedure CQP-213, including the unacceptability of verbal direction for construction work performance authorization. The installers were also trained in acceptable methods and the documentation requirements for cutting of Nelson studs. Installation of Thermo-Lag was allowed to recommence following the completion of the retraining.

With regard to the hardware, all conduit supports upon which Thermo-Lag was installed prior to the identification of the above-mentioned practice were identified. For each of the identified supports, the Thermo-Lag at each point of attachment between the conduit and its support will be removed such that the Nelson studs and the entire conduit clamp are both clearly visible. QC shall inspect each Nelson stud to determine which ones have been cut or broken. Studs which have been cut shall be acceptable provided there is full

thread engagement with the nut and there is no physical damage to the nut, clamp, or conduit. Nelson studs which have been broken shall be inspected and documented by QC. If any discontinuities are detected, the stud shall be torque tested. Any studs failing the torque test shall be replaced with the appropriate QC inspections.

The modification of the Nelson studs without proper authorization is a violation of 10 CFR Part 50, Appendix B, Criterion V, in that Procedure CQP-213, Section 6.1.1, "Construction/Quality Documentation Preparation, Use, Control, and Review," which states that a construction work document shall be generated by construction engineering for construction work on permanent plant equipment, was not followed. This violation was discovered by the licensee and the response was prompt. The approach to address the hardware concern was thorough. As a result of these actions, a Notice of Violation is not being issued because the criteria of Section VII.B.1 of the NRC's enforcement policy have been met.

7.3 Station Operations Review Committee Meeting

The inspectors attended a Station Operations Review Committee (SORC) meeting on June 24, 1992, to observe the activities associated with the review of two matters regarding Unit 2. One topic involved the proposed conversion of the Unit 2 locked valve program valves to the unit interface and isolation control program. The second topic involved a safety evaluation review for manipulating several Unit 2 locked closed valves during HFT.

Unit 2 locked valves, referred to as LC-2 valves, are currently under the control of Operations Department Administration Procedure ODA-403, "Operations Department Locked Valve Program." The valves are also identified as LC-2 valves in the Final Safety Analysis Report (FSAR) drawings for the Unit 1 systems that contain those valves. A number of the Unit 2 locked valves are also identified as interface valves in accordance with Station Administrative Procedure STA-821, "Unit Interfaces and Isolation Control Program." The proposal included a review of all LC-2 valves to determine which valves were also interface valves and to remove the LC-2 designation from the Unit 2 valves, including revision of the licensing basis drawings in the FSAR to remove the LC-2 notation. The valves which were determined to be interface valves would be controlled under the STA-821 program while the valves required to be locked which are not interface valves would be controlled under the ODA-403 program. The review of the LC-2 valves was completed and it was determined that no additional valves needed to be added to the STA-821 program.

The SORC also reviewed Safety Evaluation 92-095, which involved a 10 CFR Part 50.59 evaluation of several instrument air valves, designated as LC-2 valves, that required manipulation during the performance of HFT. The requirement to perform a safety evaluation prior to operating LC-2 valves was discussed in NRC Inspection Report 50-445/92-20; 50-446/92-20.

Both proposals were presented to the SORC in a logical and well-documented manner. The documentation clearly supported the two issues discussed. The SORC members displayed a conservative safety attitude as evidenced by the questions asked concerning both proposals. The actual SORC approval for the LC-2 to STA-821 conversion was to be sought in a subsequent meeting, and the safety evaluation was approved pending the resolution of one question regarding the impact of all requested valves being opened at the same time. No deficiencies were identified by the inspectors during the conduct of the meeting.

7.4 Startup Temporary Modification

The inspectors reviewed the installation and removal of a portion of Startup Temporary Modification 92-4499. The temporary modification was installed to isolate the field sensing devices, such as pressure transmitters, from the control room logic circuits by the installation of nonconducting washers at the terminals in Cabinet CP2-ECPRTC-39 in the Unit 2 cable spreading room. The inspectors verified that 12 points randomly selected from the temporary modification were properly installed or removed as required by the temporary modification. The modification was properly authorized and the technician was properly documenting his actions. No deficiencies were identified during the review of this activity.

7.5 Punchlist Item Correction Work Package

The inspectors reviewed the activities associated with the performance of Construction Work Package EZ-QXX085/D-00004, which was a work package containing instructions for the correction of 30 punchlist items identified during Room 85D walkdowns by construction electrical engineering. All 30 items were electrical items, such as junction box gaskets and switch covers. The work package had the appropriate level of detail in the instructions and proper QC inspection points were identified. Performance of the craft in implementing the instructions contained in the work document was satisfactory. No deficiencies were identified by the inspector.

7.6 Hydrazine Spill

While in the process of performing a valve lineup of the component cooling water system inside the Unit 2 containment building, a vent valve was inadvertently opened by an auxiliary operator (AO), and three construction workers and an electrical panel were sprayed with CCW. The vent valve was immediately shut to stop the water spill. The AO indicated to the construction personnel that the CCW system did not contain hydrazine but would check with the control room to confirm that assertion. The AO indicated that the control room response was that CCW did not contain hydrazine. A construction safety technician was requested to sample the water and the sample determined that hydrazine was present. The individuals were sent to the site safety contractor, National Fire and Medical (NFM), for showering and clothing cleanup, and NFM assisted in the cleanup of the water in the containment building. A Brown & Root incident report was generated by Brown &

Root safety, including statements from the construction personnel involved. NFM filed clinic visit forms for the cleanup of the three individuals sprayed with CCW. Subsequent discussions could not determine who in the control room indicated to the AO that the CCW did not contain hydrazine. The electrical panel, a non-1E lighting panel, was deenergized at the time of the spill. According to the construction foreman, the water was wiped out of the panel immediately. Subsequently, an Operations Notification and Evaluation (ONE) form was generated to address the operator issue and a shift order was written to ensure that all water spills on Unit 2 are tested for hydrazine content. Operators were also reminded to be aware of other personnel in the area of activity and to look for potential problem situations. Brown & Root management initially determined that a TUE Form was not required based on the fact that the lighting panel was non-1E and the water was immediately wiped up. A TUE Form was subsequently generated to evaluate the effect of the spray on the lighting panel. The licensee determined that there was no adverse impact on the panel and that it was acceptable for use as is. During the review of this event, no violations or deficiencies were identified.

7.7 Thermo-Lag Fire Barrier Testing

As a result of the licensee's review of NRC Information Notices 91-47 and 91-79, and a proposed draft generic letter regarding generic Thermo-Lag issues and concerns, independent testing of various configurations of Thermo-Lag was performed at an independent laboratory in San Antonio, Texas. Specifically, the tests consisted of a series of 1-hour fire endurance tests which evaluated the acceptability of a variety of cable tray, junction box, and conduit installation configurations.

The initial testing, which was witnessed by the Office of Nuclear Reactor Regulation and Region IV NRC personnel, was performed on 3/4-, 1-, and 5-inch conduits, a junction box, and a 12-inch cable tray. As a result of these tests, the electrical cables inside the 3/4- and 1-inch conduits experienced physical damage. A test of a 30-inch cable tray configuration was also unsatisfactory. The licensee determined that the junction box, the 12-inch cable tray, and the 5-inch conduit configurations were acceptable.

As a result of the unsatisfactory test results, TUE Form 92-5553 and ONE Forms FX 92-549 and -601 were generated to evaluate and document the condition for both units, and compensatory fire watches were implemented in Unit 1 in all areas of the plant where Thermo-Lag was installed. In Unit 2, formal Stop Work Order (SWO) 92-001 was issued in accordance with Procedure STA-417, "Stop Work," regarding Thermo-Lag installation on all conduits less than 4 inches in diameter and all cable trays greater than 12 inches wide. The installation specification for the failing configurations, CPSES-M-2032, "Procurement and Installation of Fire Barrier and Fireproofing Materials," has been revised to incorporate changes which the licensee believes will provide satisfactory results in tests which were tentatively scheduled to be performed in mid-August 1992. The SWO was lifted and Thermo-Lag installation was resumed using

the revised installation specification and procedures with the understanding that the acceptability of these new installation configurations is dependent on the results of the proposed testing.

The NRC issued Information Notice 92-46 on June 23, 1992, and Bulletin No. 92-01 on June 24, 1992, which discussed several issues regarding Thermo-Lag and the licensee's test results. This issue is identified as an inspection followup item (445/9225-03, 446/9225-03).

7.8 Borg-Warner Check Valve Issues

During this reporting period, several deficiencies associated with Borg-Warner pressure seal swing check valves were identified by the licensee. Specifically, as documented by the licensee on TUE Form 92-5560, excessive backleakage was identified during the reverse flow testing of the 3-inch check valves associated with the motor-driven auxiliary feedwater (AFW) pumps' recirculation lines (Valves 2AF-057 and -069). Subsequent radiographic examinations of the two valves determined that the disc was lodged under the seat ring on Valve 2AF-069 and that the bonnet on Valve 2AF-057 was misaligned to the body. These deficiencies, which were similar to the check valve deficiencies identified in NRC Augmented Inspection Team Report 50-445/89-30; 50-446/89-30 and were the subject of NRC Information Notice 89-62, were determined by the licensee to be the result of the misalignment of the valve bonnet to the body during valve reassembly. The licensee has determined that the 3-inch check valves on the AFW pump recirculation lines serve no safety function and has implemented a design modification which removed the valve internals from the two valves discussed above as well as Valve 2AF-045, the recirculation valve for the turbine driven AFW pump. This modification has been completed on Unit 2 and will be implemented on Unit 1 at a future date.

Additionally, excessive backflow leakage was identified on Valves 2AF-083 and 2AF-093, the motor-driven AFW pumps' supply lines to the Nos. 2 and 3 steam generators, respectively, during testing. These valves were subsequently radiographed, disassembled, and inspected by the licensee. These inspections determined that the bonnet on Valve 2AF-093 was misaligned to the body, and that the disc stud on Valve 2AF-083 had broken near the weld where the stud is threaded into the disc, resulting in the separation of the disc from the swing arm.

As a result of these deficiencies, the licensee disassembled the remaining 4-inch check valves in the steam generator supply lines from AFW, and a task team was assembled to determine the root cause of the disc stud failure on Valve 2AF-083 and to develop a corrective action plan. Additionally, the licensee initiated a Technical Evaluation (TE) 92-1445 to evaluate the potential implications of this failure on the operability of the Unit 1 AFW system which utilizes similar Borg-Warner pressure seal swing check valves. Examination of the remaining check valves did not identify any additional discrepancies and the preliminary review of TE 92-1445 by the licensee determined that the Unit 1 AFW system was operable. This determination was

based on the assessment that the high AFW flow rates experienced by the Unit 2 check valve during testing in conjunction with a modification implemented on the Unit 2 check valves, (a backstop installed on the valve bonnet to prevent the counterweight on the back of the disc from striking the bonnet) placed the Unit 2 check valve in a stress/load condition that the Unit 1 valves would not encounter.

The licensee reassembled all of the inspected valves and replaced the broken disc stud. The reassembled check valves were satisfactorily backleakage-tested and the licensee determined that the system was satisfactory for the performance of HFT. Additionally, the licensee temporarily limited the flow through the Unit 2 AFW check valve to 300 gpm, pending evaluation and implementation of corrective actions.

The inspectors also reviewed the licensee's corrective action process relative to the broken disc stud, which included a metallurgical examination of the broken stud. The metallurgical examination was performed by an independent laboratory which determined that the failure was a ductile failure caused by stress overload. The licensee's task team had not finalized its results at the close of this reporting period, but the inspectors will continue to monitor the corrective actions associated with Borg-Warner check valves. The licensee also indicated to the inspectors that future correspondence regarding SDAR CP-89-15, which was initially generated to address the check valve failures on Unit 1, would include information regarding the recent Unit 2 Borg-Warner check valve failures and the associated corrective actions. These corrective actions will be in conjuction with NRC review of SDAR CP-89-15.

7.9 Balance-of-Plant Operations

The inspectors observed the Unit 2 reactor operator performing Procedure SOI 2-92-GS-01, "Turbine Gland Steam System," to support establishing a main condenser vacuum. The reactor operator used the procedure throughout the evolution and no discrepancies were noted.

7.10 Containment Spray Suction Valve Maintenance

On July 1, 1992, the inspectors observed craft personnel performing maintenance on containment Spray Sump Suction Valve 2HV-4783. Work Order C91-4783 was the controlling document and the inspectors verified that the correct component was being worked and all sign-offs were current. The inspectors determined the work was being performed in accordance with the work document. Access to the valve, which is contained in a confined space, was adequately controlled. No discrepancies were identified.

7.11 Pressurizer Spray Valve Adjustment

While attempting to heat up the pressurizer in preparation for establishing a pressurizer bubble, the operators observed that no increase in pressurizer temperature occurred. Troubleshooting determined that the pressurizer spray valve from reactor coolant system (RCS) Loop 4, 2-PCV-455C, was leaking

significantly past its seat, effectively recirculating the RCS water through the pressurizer. Startup Work Package SWP-20223 was generated to rotate the spray valve stem external to the valve, which would rotate the flow control v-notch ball internal to the valve. A portable flow monitor was attached to the piping which confirmed the effectiveness of the rotation. The inspectors observed the performance of this activity. The inspectors observed that the work document contained the appropriate authorizations, QC oversight, and component verifications and was sufficiently detailed to limit the possibility of inappropriate activities. All observed activities were well executed with good coordination between the operators in the control room and the technicians in the pressurizer spray valve cubicle.

7.12 Burned Spots on Station Service Water Piping

During plant tours, the inspectors observed two burned spots approximately 3 inches in diameter on the station service water piping to the CCW Heat Exchanger 2-02. The licensee was asked about the burned spots and determined that the spots resulted from weld repairs performed inside the service water piping to correct deficiencies identified on Nonconformance Reports (NCRs) 89-9872, -9875, -9876, and -9877. The inspector reviewed copies of the referenced NCRs and determined that the documentation supported the licensee's position and addressed the inspector's concern.

7.13 Summary of Findings

In general, the preoperational test program has been effectively implemented. Control and execution of work activities was good. One violation, noncited, was identified regarding the unauthorized modification of Nelson studs during Thermo-Lag installation. Licensee response to the unauthorized modifications was thorough. The continuing problems and corrective actions associated with Borg-Warner check valves will continue to be closely monitored by the inspectors. It was understood by the inspectors that the licensee will address the recent check valve failures discussed in this report and the associated corrective actions in future correspondence with NRC regarding SDAR CP-89-015, "Auxiliary Feedwater System Check Valves." One unresolved item was identified regarding the failure to remove a blind flange from the EDG lubricating oil system prior to engine operation, resulting in significant damage to the engine. One inspection followup item was identified regarding Thermo-Lag installation and future testing of mockups of the revised installation techniques.

8. PREOPERATIONAL TEST PROCEDURE REVIEW (70300, 70304, 70338, 70341)

The inspectors reviewed selected preoperational test procedures to determine if they conformed to the administrative requirements for content and format and to ascertain whether the procedures incorporated the requisite test criteria. The procedures were also reviewed to determine if the stated test objectives satisfied the appropriate Regulatory Guides, FSAR, Safety Evaluation Report commitments, and licensing commitments; that the prerequisite test conditions were delineated; that human factor considerations

were incorporated; that the test methodology would produce the desired acceptance criteria; and that the appropriate qualitative and quantitative acceptance criteria were identified.

The following Unit 2 preoperational test procedures were reviewed:

- 2CP-PT-02-13, Revision 0, "6.9 KV and 480 Volt Class 1E Switchgear Undervoltage Relay Functional Test"
- 2CP-PT-30-01A, Revision 1, "Emergency Diesel Generator Train A"
- 2CP-PT-30-01B, Revision 1, "Emergency Diesel Generator Train B"
- 2CP-PT-37-01, Revision 0, "Auxiliary Feedwater System"
- 2CP-PT-37-03, Revision 0, "Auxiliary Feedwater Turbine Driven Pump"
- 2CP-PT-57-06, Revision 0, "Hot Functional ECCS Check Valve Operability"

Reviewed procedures having specific comments are addressed below.

8.1 Preoperational Test Procedure 2CP-PT-02-13

The requirements of the FSAR, the licensee's commitment data tracking system, the supplemental safety evaluation reports, the proposed Technical Specifications, NRC Regulatory Guide 1.68, "Initial Test Program for Water Cooled Nuclear Power Plants," and the design basis document, were reviewed and found to be properly addressed in the procedure. The test prerequisites were well defined, including the requirement for a pretest briefing for the test participants.

The inspectors noted that this test verifies that the undervoltage circuitry functions to trip the required breakers, but that the remaining trips of the breakers, other than undervoltage, were not included. According to the licensee, the remaining breaker trip functions will be tested in Test Procedure 2CP-PT-02-08, "345 KV Startup Transformer and 6.9 KV Class Switchgear," which had not been issued. Additionally, Sections 7.1 and 7.2 of the procedure stated the time requirements for the time delay relay actuations as approximate values and the times are not identified as acceptance criteria. The proposed technical requirements manual specifies maximum allowable times for the functions performed in the test. Startup department personnel were questioned on the matter and agreed to review the procedure to determine if the values should have been identified as acceptance criteria.

The procedure was properly developed and provided a logical sequence for the proposed testing activities. No deficiencies were identified during this procedure review and the procedure was judged to be superior in quality.

8.2 Preoperational Test Procedures 2CP-PT-30-01A and -01B

The inspectors noted, during the walkdown of Procedures 2CP-PT-30-01A and -B to verify labeling of components, that the EDG local control panels and motor control centers did not have hand switches labeled with number identifications; however, the preoperational test procedures referenced the switches by their numbers. The inspector brought this to the attention of the startup organization and the inspector was informed that all hand switches would be labeled prior to the preoperational tests.

The EDG preoperational test procedures did not incorporate all of the FSAR requirements necessary to demonstrate operability of the diesel generators and associated auxiliaries. FSAR Table 14.2-2 listed the EDG test summary, and the following tests from this table will not be performed during the reviewed diesel generator preoperational tests:

- Demonstrate the capability of the unit to start automatically as designed and attain the required voltage and frequency within the acceptable time limit.

- Verify the capability of the EDG to accept the sequenced equipment by utilizing the actual plant loads appropriate for existing conditions. The loads will be added at the proper sequence and time duration, while maintaining an acceptable voltage and frequency.

- Perform load rejection test (rejection of largest single load).

- Demonstrate the ability to synchronize the EDG with offsite power while the EDG is connected to the emergency load, transfer this load to the offsite power, isolate the EDG, and restore it to standby status.

- Demonstrate that the EDG capability to supply emergency load is not impaired during periodic testing.

- Demonstrate that no common failure mode exists by starting the redundant EDGs simultaneously.

However, in a followup conversation with Unit 2 startup engineers, the above EDG tests will be accomplished during Preoperational Test Procedure 2CP-PT-57-05, "Integrated Safeguards Actuation Test," tentatively scheduled for October 1992.

The additional EDG testing to be performed in accordance with Procedure 2CP-PT-57-05 should satisfy the requirements of the FSAR; however, this procedure has not been issued and will be reviewed to ensure that all EDG operability tests have been incorporated.

The procedures were consistent in format and contained the elements required by the startup administrative procedures.

8.3 Preoperational Test Procedures 2CP-PT-37-01 and 2CP-PT-37-03

Preoperational Test Procedures 2CP-PT-37-01, "Auxiliary Feedwater System," and 2CP-PT-37-03, "Auxiliary Feedwater Turbine Driven Pump," were reviewed. The inspectors determined that the procedures encompassed the requirements of the FSAR, SERs, Design Basis Documents, and additional licensing commitments. The procedures were well written and followed a logical testing sequence. Acceptance criteria were explicit and satisfied the requirements of the above mentioned documents. The procedures were also reviewed for human factors consideration, including wording of procedural steps and labeling of components and were determined to be satisfactory. No deficiencies were identified during these procedure reviews.

8.4 Preoperational Test Procedure 2CP-PT-57-06

During the review of this procedure, the inspector noted that there was no reference to Startup Administration Procedure SAP-24, "System Cleanliness Requirements and Control," regarding system cleanliness requirements during the installation and removal of test equipment from system entry points. This observation was discussed with startup personnel and a note regarding system cleanliness would be considered as an addition to the procedure.

The inspector also noted that the valve emissions acoustic monitoring should provide valuable data, and that the posttest quality verification was a good practice.

8.5 Summary of Findings

Overall, the inspectors found the procedures to be technically accurate, established prerequisite test conditions, and clearly stated the acceptance criteria. The procedures contained adequate detail and the sequence of testing was such that the tests would produce the desired level of confidence regarding the ability of the equipment to meet its functional requirements.

9. PRECPERATIONAL TEST WITNESSING (70312, 70313, 70438, 71302)

9.1 Containment System Local Leak Rate Test

The inspector observed the performance of a local leak rate test, Procedure 2CP-PT-75-01, Revision 0, Data Sheet 9.29, on postaccident containment air sampling Penetration 2-MIV-0010(a). The performance of the procedure was observed from the initial steps that required administrative verification of system status, outstanding work, temporary modifications, and other prerequisites until the test equipment was removed from the system. The procedure section tested the leakage through solenoid operated Valves 2-HV-5560 and 2-HV-5561. The measured leakage on both valves was less than 2 standard cubic centimeters per minute (SCCM), while the specification listed an expected value of less than 345 SCCM. Both valves successfully

passed the local leak rate test and no discrepancies were noted. The startup test engineer and technicians used good work practices and communication techniques throughout the leak rate test.

9.2 Auxiliary Feedwater System Test

The inspectors observed the performance of portions of Preoperational Test Procedure 2CP-PT-37-01, "Auxiliary Feedwater System," and 2CP-PT-37-03, "Auxiliary Feedwater Turbine Driven Pump." The inspectors attended the procedure briefing and found the brief to be thorough. Initial conditions and prerequisites were verified to be completed. The inspectors observed the testing of the flow restricting orifices in the lines for motor-driven AFW Pump 1. Individual indicated flow, for Steam Generators 1 and 2, was less than 700 gallons per minute as specified by the procedure. Other test sections that were observed included part of the 48-hour endurance run on both motor-driven AFW pumps and the overspeed testing of the turbine for the turbine-driven AFW pump. The inspectors observed close coordination of the test engineers, field supervisors, operators, and test technicians. All procedures were closely monitored and documented as required. Communications were established where required. When test procedure deficiencies were encountered, the systems were placed in a stable configuration and the procedures were properly revised. Failure to meet acceptance criteria or expected values was properly documented and addressed. No regulatory deficiencies were identified, although the inspector noted that several of the test procedures proceeded slowly due to the lack of dedicated operations personnel available to manipulate plant equipment.

9.4 Main Steam Isolation Valve Test

The inspectors observed the control circuit and hydraulic operability portion of Test Procedure 2CP-PT-34-01, "Main Steam Isolation Valve," on Valve 2HV-2333A. Coordination between the test engineers, test technicians, and operations personnel was good. All steps were performed and documented in accordance with the procedure, and no deficiencies were noted during the performance of this test procedure.

9.5 Pressurizer Spray and Heater Control

The inspectors reviewed the installation of jumpers and test switches associated with the performance of Test Procedure 2CP-PT-55-06, "Pressurizer Spray and Heater Control." The test switches and jumpers were properly installed and labeled in accordance with the test procedure. The test procedure was specific in the installation instructions and each switch and jumper was individually documented in the procedure. No deficiencies were identified in the inspector's review of this activity.

9.6 Summary of Findings

The inspectors determined that the observed testing activities were being performed in accordance with the test procedures, good coordination and

communications was evident, testing deficiencies and procedural changes were being properly documented and implemented, and that a conservative and deliberate approach toward testing was being displayed. Several observed tests were delayed in that dedicated operations personnel were not available to perform system manipulations when required. No violations or deviations were identified.

10. HFT ACTIVITIES (71302, 70314)

HFT officially began for the licensee on July 12, 1992, when RCS temperature exceeded 120°F. The plant was heated up in steps, with pauses at plateaus for testing at 180°F, 250°F, 350°F, 450°F, and 557°F. The plant's normal operating pressure and temperature plateau, at 557°F, was attained on July 24, 1992, and the plant remained at this plateau for the remainder of this inspection period. The inspectors observed various activities associated with the administration, performance, and control of HFT.

10.1 HFT Procedures

The RCS and associated systems required to support HFT were filled and vented utilizing startup operating instructions (SOI) generated in accordance with Startup Administrative Procedure SAP-26, "Startup Operating Instructions." In general, the SOI's were generated from Unit 2 system operating procedures and integrated plant operating (IPO) procedures that had been modified to meet the specific plant conditions and testing requirements for supporting HFT. The primary integrated plant operating procedure generated and utilized for plant heatup was SOI-HFT-IPO-001B, "Plant Heatup," which was generated using a modified IPO-001B. This procedure established prerequisites and initial conditions for heatup, including which systems required valve lineups, and administratively controlled the plant heatup to the normal operating temperature plateau at 557°F. Preoperational Test Procedure 2CP-PT-55-02, "Hot Functional Testing," directed the testing activities that were to be performed at each plateau during the heatup. The review of Procedure 2CP-PT-55-02 was documented in NRC Inspection Report 50-445/9221; 50-446/9221. The SOI's appeared to be generally well written and effective for controlling the operation of plant systems and integrated plant operations.

The inspector noted that several valve lineups, when performed in the field in accordance with the SOI valve lineup, identified valves in addition to those listed on the valve lineup, that were not listed on the systems operating procedure (SOP), which had been used to generate the SOI. These additional valves, while noted on the working copy of the SOI valve lineups and placed in the position that the operators determined appropriate, were not always incorporated into the master copy of the SOI. Operations Department Administrative Procedure ODA-407, "Guideline on use of Procedures," indicates that for procedure improvements not requiring immediate changes, such as if the procedure is not expected to be reused within 2 weeks, a procedure feedback form should be utilized to process the improvement. The implementation of this guidance was inconsistent in that some of the

additional valves identified were noted on submitted procedure feedback forms and some were not. The inspector noted that SOIs automatically expire after 60 days unless specifically reissued. The inspectors noted to the licensee that the potential exists for discrepancies to exist between the base document for the SOI, which is the SOP, and the actual system configuration if the master SOIs are not kept current and the identified discrepancies are not eventually incorporated into SOP improvements.

On July 14, 1992, the inspector identified several instances where steps in the instrument air (IA) valve lineup were not completed, yet the procedure was signed as having been reviewed by a supervisor and the system was signed off in the SOI-HFT-IPO-001B, indicating that it was lined up for operation. A system lineup for the IA System SOP-509 had been performed and was reviewed and signed on July 7, 1992. The referenced SOI-IPO was also signed, indicating that the system was lined up for operation. Step 8.18 of Attachment 1 and Steps 1.1 and 1.2 of Attachment 2 were not signed as having been verified in any position, nor were they identified on the attached discrepancy sheet for resolution. The lineup was reviewed by a supervisor and signed as being complete, and Step 2.3 of SOI-HFT-IPO-001B was signed indicating that the system was lined up for operation. A verification lineup on IA (Attachment 1 only) was performed and reviewed by a supervisor on July 13, 1992, and the step in the SOI-IPO was resigned on July 13. Step 12.44 of the verification lineup was not signed as having been verified in any position, nor was the step identified on the attached discrepancy sheet for resolution by the supervisor. The unit supervisor, field supervisor, and Unit 2 operations manager were notified. The unverified components were immediately verified in the correct position by operations personnel. Operations Department Administrative (ODA) Procedure ODA-410, "System Status Control," Step 6.1.8, requires that lineups which are incomplete or have unresolved discrepancies should not be placed in the system status file until completed. The IA lineup was filed as complete. Step 6.1.9 of ODA-410 provides the methods of discrepancy resolution. The failure to properly identify the unverified components' positions during the supervisor's review, and resolve them, is a violation of 10 CFR Part 50, Appendix B, Criterion V (446/9225-01).

In addition to immediately verifying the positions of the unverified components positions, the licensee performed reviews of the 29 valve lineups that were determined to be required to support plant heatup. No valves were identified by the licensee as being out of position. Two instrument lineups were reperformed to confirm exact configuration, but no valves were found out of position. Two valves were reverified in their proper position based on confusing entries in the discrepancy log, but again no valves were found out of position. Twenty-nine additional systems required to support HFT were identified by the licensee that will have their lineups reviewed prior to achieving the applicable milestone. Standing Order 92-0035 was issued to provide additional guidance to the ODAs regarding lineup and procedure discrepancy resolution. Reviews of the administrative controls delineated in ODA-407 and ODA-410 were initiated for process improvements, and the need for zero defects in the field and with paperwork was emphasized.

The inspectors subsequently reviewed the valve lineups for safety injection, CCW, containment ventilation, and the pressure relief tank and no discrepancies were identified.

10.2 Reactor Coolant Pump Concerns

During initial RCP balancing, licensee personnel observed that the RCP 2 required significantly more weight to achieve acceptable vibration levels than did the other three RCPs. The proper balance is obtained by adding weights in the form of washers to the upper and lower motor-to-pump coupling flanges. As the RCS temperature increased to 450°F, the shaft vibration on RCP 2 increased to approximately 20 mils, which is the maximum allowable steady state vibration level allowed by Procedure SOI-HFT-SOP-108B, "Reactor Coolant Pump." The licensee, following consultation with Westinghouse, revised the SOI and abnormal Operating Procedure ABN-101, "Reactor Coolant Pump Trip/Malfunction," to establish a higher vibration limit during balancing runs of the pump. The inspector witnessed the rebalancing of the RCP 2.

As RCS pressure approached normal operating pressure, 2235 psig, during the plant heatup, the No. 1 seal leakoff on the RCP 3 was observed gradually increasing to approximately 11.5 gallons per minute (gpm). The seal leakoff on the remaining three RCPs was approximately 3 gpm each. Increased seal leakoff could be indicative of a seal not fully seated or seal degradation. Procedurally, the maximum allowable seal injection was 13 gpm and seal injection should be maintained at a rate greater than the observed seal leakoff. Following licensee consultations with Westinghouse RCP seal experts, several attempts were made to determine the cause for the excessive seal leakage. Temperature measurements of seal injection and leakoff indicated approximately 100 horsepower of losses in the seal package, while losses less than 10 horsepower were typical. Measurements were made on the No. 2 seal leakage to verify the integrity of the No. 2 seal should the No. 1 seal fail. All RCPs were shut down and static breakaway torques were measured for comparison purposes. The measured torques ranged from a low on RCP 1 of 340 foot-pounds to a maximum of 520 foot-pounds on RCP 2. The maximum acceptable value was 750 foot-pounds. The inspectors witnessed the torque measurement on RCP 3. No conclusion was reached as to the cause of the excessive leakoff, but the licensee, with Westinghouse's concurrence, concluded that the pump's condition was satisfactory to proceed with HFT. RCP 3 was restarted, with no observable change in seal leakoff, and the SOI was revised to allow seal injection to be increased to a maximum of 20 gpm. The RCP 3 seal leakoff has remained unchanged at approximately 11.3-11.5 gpm throughout this portion of the HFT. It had been the licensee's plan to replace the currently installed RCP seals with new seal assemblies following HFT.

The inspector observed that Westinghouse provided recommendations and guidance to the licensee via speed memorandums which, in the case of the seal injection flow, was incorporated into a technical evaluation. It was not clear to the inspector that the governing procedures would have been revised to incorporate

the new values prior to commencing the evolution. The procedures were revised following queries from the inspectors regarding how this new information was to be implemented.

10.3 Conduct of Operations

The inspectors observed the general conduct of operations during the performance of HFT activities. The unit supervisor and field supervisor coordinated activities well with the unit supervisor appearing to control the plant conditions regarding system manipulations from the control boards, and the field supervisor directing the work control activities. The field supervisor was also responsible for maintaining the HFT preoperational test procedure and test log. Test activities were well controlled with significant operator oversight, and briefings were held in the control room prior to the initiation of any test or test section that affected plant conditions. Control room personnel limited the number of individuals allowed into the control room in order to minimize noise and distractions to the operators.

Prior to beginning HFT and prior to heating up to each higher temperature plateau, a self-assessment was performed by the operations and startup departments, with each department having its own self-assessment checklist to complete prior to receiving management approval to proceed to the next plateau. A periodic review of these checklists by the inspectors determined that they were being completed and utilized in accordance with licensee management expectations.

10.4 Summary of Findings

In general, HFT performance was good. The licensee maintained close control of testing and work control activities. The control room organization was functioning well. With the exception of the violation identified regarding the IA valve lineup, adherence to procedures and operator performance was good.

11. UNRESOLVED ITEMS

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. One unresolved item disclosed during the inspection is discussed in paragraph 7.1.

12. INSPECTION FOLLOWUP ITEMS

Inspection followup items are matters which have been discussed with the licensee which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. An inspection followup item disclosed during the inspection is discussed in paragraph 7.7.

13. SUMMARY OF TRACKING ITEMS

The following items were opened in this inspection report:

- Violation 446/9225-01
- Unresolved Item 446/9225-02
- Inspection Followup Item 445/9225-03; 446/9225-03

The following items were closed in this inspection report:

- Deviation 446/9121-01
- Unresolved Item 445/91202-02; 446/91201-02
- SDARs CP-84-027
  CP-87-029
  CP-87-134
  CP-88-036
  CP-90-008
  CP-92-003

14. EXIT MEETING

An exit meeting was conducted on August 3, 1992, with the persons identified in paragraph 1 of this report. The licensee did not identify as proprietary any of the materials provided to, or reviewed by, the inspectors during this inspection. During this meeting, the inspectors summarized the scope and findings of the inspection.