

APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 50-445/92-24      Unit 1 Operating License: NPF-87  
50-445/92-24      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, Units 1 and 2

Inspection At: Glen Rose, Texas

Inspection Conductor: June 7 through July 18, 1992

Inspectors: W. B. Jones, Senior Resident Inspector  
G. E. Werner, Resident Inspector  
C. E. Johnson, Project Engineer

Reviewed by: L. A. Yandell      August 5 '92  
L. A. Yandell, Chief, Project Section B      Date  
Division of Reactor Projects

Inspection Summary

Inspection Conducted June 7 through July 18, 1992 (Report 50-445/92-24)

Areas Inspected: Unannounced resident safety inspection of plant status, followup on corrective actions for violations, licensee event report followup, onsite event followup, operational safety verification, maintenance observation, and surveillance observation.

Results: Improvement was noted in the daily communication between licensed and nonlicensed operators. One instance was identified where the status of an annunciator on a local panel was not identified to the reactor operators (paragraph 7.2). This indicated that additional management attention was warranted to assure that communications occur at the level and detail expected. Management oversight of daily and complex evolutions was evident. The Conservation Managers, established following the loss of spent fuel pool cooling event, were effective in assessing personnel performance (paragraph 6.4). Operator response to the loss of both main feedwater pumps and the blackout sequencer actuation (paragraphs 5.1 and 5.2) was excellent. The licensee identified that auxiliary operator performance was not always consistent with managements' expectations (paragraph 6.6).

9208190102 920812  
PDR ADDCK 05000445  
Q PDR

Maintenance activities were performed in accordance with the work instructions. One violation was identified for the failure to initiate an Operations Notification and Evaluation (ONE) Form for an adverse condition on one of the motor driver auxiliary feedwater (MDAFW) pumps (paragraph 7.1). An observation was made concerning the completeness of work instructions for previous work on the MDAFW pump and a radiation monitor (paragraphs 7.1 and 7.2) in that the work instructions and assessment of work performed may not have accurately depicted the scope of work performed.

The licensee performed observed surveillance activities in accordance with the work instructions and within the Technical Specification time requirements (paragraphs 8.1 through 8.5).

Radiation protection personnel demonstrated cognizance of work activities within the radiation controlled area (paragraph 6.1). They were aware of changing plant conditions and these changes were appropriately discussed during shift turnover.

Security personnel maintained control of personnel, packages, and vehicles entering the protected area (paragraph 6.2). Security officers responded appropriately to a security drill to engage a postulated adversary force.

Inspection Conducted June 7 through July 18, 1992 (Report 50-446/92-24)

Areas Inspected: No inspection activities were conducted on Unit 2.

Results: Not applicable.

## DETAILS

### 1. PERSONS CONTACTED

#### TU ELECTRIC

O. Bhatti, Site Licensing  
R. C. Byrd, Manager, Quality Control  
W. J. Cahill, Group Vice President, Nuclear Engineering and Operations  
R. Flores, Shift Operations Manager  
J. J. Kelley, Plant Manager  
D. M. McAfee, Manager, Quality Assurance  
S. S. Palmer, Stipulation Manager  
A. B. Scott, Vice President, Nuclear Operations  
C. L. Terry, Chief Engineer  
B. W. Wieland, Maintenance Manager

#### CITIZENS ASSOCIATION FOR SOUND ENERGY (CASE)

O. L. Thero, Consultant

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

### 2. PLANT STATUS (71707)

The unit operated at essentially 100 percent power until June 11 when a manual reactor trip was initiated. Both main feedwater pumps had tripped simultaneously resulting in a loss of feedwater flow. The reactor operator initiated a manual reactor trip prior to any steam generator low level setpoint being reached. The plant was maintained in Mode 3 while the cause for the main feedwater pumps tripping was assessed and troubleshooting activities completed. The reactor was then taken critical on June 13 and full power operation attained on June 16. On June 23 an engineered safety features actuation occurred when the unit safeguards buses transferred from the preferred offsite power source (Transformer XST1) to the alternate offsite power source (Transformer XST2). The transfer occurred because of a lightning strike to Transformer ST1, which is supplied by the same offsite line as Transformer XST2. The unit remained at essentially 100 percent power through the end of the inspection period.

### 3. FOLLOWUP ON CORRECTIVE ACTIONS FOR VIOLATIONS (92702)

3.1 (Closed) Violation 445/9033-01: Failure to close personnel airlock inner door equalizing valve

This violation involved a failure to satisfy the Unit 1 Technical Specification requirement for maintaining the personnel airlock operable. In TU Electric's letter, TXX-91005, dated January 3, 1991, the licensee concluded that they failed to maintain positive control of containment integrity during

manual operation of the personnel airlock inner door. This failure resulted from insufficient administrative controls applied to the airlock equalizing valves. Specifically, the licensee identified that the equalizing valves were not locked. In addition, the operating procedure for manual operation of the airlock doors required postoperation valve alignment checks to be performed on the equalizing valves; however, the procedure only applied if the equalizing valves were manipulated by operations. At the time the equalizing valves were left open, the operator was not aware that the valves had been repositioned and, therefore, he did not verify the equalizing valves were closed when exiting the airlock.

The licensee has placed the inner and outer door equalizing valves and two other similar valves under the locked valve administrative control program. The inspector verified these valves were included in Operation Procedure ODA-403, Revision 2, "Operations Department Locked Valve Control." The inspector concluded that the licensee's corrective actions were appropriate. This violation is closed.

3.2 (Closed) Violation 445/9162-01: Failure to Properly Align the Residual Heat Removal (RHR) System for Standby Readiness

On December 6, 1991, the licensee identified that the residual heat removal crosstie valves were closed with the plant in Mode 3. This condition was prohibited by Integrated Plant Operating Procedure IPO-001A, Revision 10, "Plant Heatup From Cold Shutdown to Hot Standby," and Operating Procedure SOP-102, Revision 6, "Residual Heat Removal System." The crosstie valves were determined to have been closed for approximately 53 hours. Licensee Event Report (LER) 91-30 documents this event and the licensee's corrective actions. The inspector reviewed this LER in assessing the licensee's corrective actions.

The licensee completed the corrective actions specified in its response to the Notice of Violation and Imposition of Civil Penalty (EA 91-189) and the LER. On May 12, 1992, a similar event was identified by the inspector involving a loss of spent fuel pool cooling. This later event is documented in NRC Inspection Report 50-445/92-20; 50-446/92-20 (EA 92-107). The licensee's corrective actions for the RHR crosstie valves were considered in the letter and Notice of Violation to EA 92-107. The corrective actions will be reviewed in the followup to EA 92-107. This violation is closed.

3.3 (Closed) Violation 445/9162-02: Turbine Driven Auxiliary Feedwater (TDAFW) Pump Inoperable With the Unit in Mode 3

On December 4, 1991, the licensee identified that the TDAFW pump steam admission valves were in pull-to-lock at the time the unit entered Mode 3. This is a condition prohibited by the Technical Specifications. The operators incorrectly assumed that, because the surveillance test for the TDAFW pump could not be performed until sufficient steam pressure was available, the proper system lineup was not required. This event is also documented in

LER 91-029, "Technical Specification Violation Due To Steam Supply Valves To The Turbine Driven Auxiliary Feedwater Pump Being Isolated In Mode 3."

The inspector reviewed the licensee's response to the Notice of Violation and the corrective actions described in the LER. The inspector verified that the licensee has developed and provided lessons learned on this event to the operators on the requirements of Technical Specifications 3.0.4 and 4.0.4 which address surveillance testing and mode changes. The licensee also revised plant procedures for integrated plant startup, AFW system operability test, and operator log sheets to provide procedural requirements and checklists for equipment lineups prior to making mode changes. This violation is closed.

3.4 (Closed) Violation 445/9162-03: Failure to Initiate an Active Limiting Condition for Operation for the TDAFW Pump Being Inoperable

This violation resulted from the failure to upgrade a tracking limiting condition for operation for the TDAFW pump to an active limiting condition for operation when the unit entered Mode 3. The TDAFW pump is required for Mode 3 operation. The licensee provided training on the use of active and tracking limiting conditions for operation to both the onshift operators and the other operating crews. These corrective actions were deemed to be appropriate. This violation is closed.

4. ONSITE FOLLOWUP OF WRITTEN REPORTS OF NONROUTINE EVENTS (92700)

The inspectors reviewed the below listed LERs to determine whether corrective actions were adequate and whether the responses to the events were adequate and met regulatory requirements, license conditions, and commitments.

4.1 (Closed) LER 90-032: "Failure to Identify Proper Design Bases Resulted In Operation And Testing Of The Containment Personnel Air Lock (PAL) Hydraulic System Inconsistent With Existing Design"

On September 19, 1992, the licensee identified that the personnel airlock qualification was not properly addressed in the design basis, Final Safety Analysis Report (FSAR), master equipment list, or operating procedures. Specifically, the personnel airlock design requirement that the hydraulic system function as a containment isolation barrier was not identified.

The licensee determined that the root cause for the event was that the personnel airlock hydraulic system was treated as a subcomponent. Because of insufficient identification of subcomponent specifications, the design requirements for the personnel airlock hydraulic system to function as a containment isolation barrier were not adequately identified and addressed in engineering and operating documentation.

The licensee's corrective actions were to replace the existing three-way diverter valves (1BS-0041, -0042, -0050, and -0058) with new valves and added isolation valves between the existing valves and the quick disconnect. The

design basis documents and the FSAR were updated to indicate the correct qualification classification and the modification. Appropriate administrative controls were added, including revisions to operating procedures. This LER is closed.

4.2 (Closed) LER 91-030: Personnel Error Leading to Mispositioned Residual Heat Removal System Crosstie Valves

This LER and Violation 445/9162-01 both addressed personnel errors which resulted in the residual heat removal system crosstie valves being left closed with the unit in Mode 3. The inspector reviewed this LER and the violation response together in assessing the licensee's corrective actions. A discussion of this review is provided in paragraph 3.2. This LER is closed.

4.3 (Closed) LER 91-029: Technical Specification Violation Due to Steam Supply Valves to the TDAFW Pump Isolated in Mode 3

This LER and Violation 445/9162-02 addressed personnel cognitive errors regarding the requirements of Technical Specifications 3.0.4 and 4.0.4 and the TDAFW pump operability. The inspector reviewed this LER and the violation response together in assessing the licensee's corrective actions. A discussion of this review is provided in paragraph 3.3. This LER is closed.

4.4 (Closed) LER 90-33: Personnel Error Leading to Momentary Loss of Containment Integrity

This LER and Violation 445/9033-01 addressed the auxiliary operator error and the procedure deficiency which resulted in this event. The inspector reviewed this LER and the violation together in assessing the licensee's corrective actions. A discussion of this review is provided in paragraph 3.1. This LER is closed.

4.5 (Closed) LER 91-13: Loss of Offsite Power Caused by Grounded Transmission Line

On March 28, 1990, with the plant in Mode 5, a fault occurred on the Unit 1 preferred offsite power line which supplied the safety-related buses through Transformer XST2. This line also supplied nonsafety-related buses through Transformer 1ST. The fault caused a slow transfer to the alternate offsite power line. The safety-related buses were then supplied through Transformer XST1. The nonsafety-related buses remained deenergized because their alternate power supply was not available. The Train A emergency diesel generator started when the preferred offsite power line was lost, but did not load. The Train A blackout sequencer also actuated as expected. The Train B emergency diesel generator and blackout sequencer did not actuate because they had been previously removed from service. Later, a second fault occurred on the preferred transmission line causing the Train A emergency diesel generator to start. The safety-related buses remained energized on the alternate

offsite power supply. This event was initially reviewed by the inspectors and is documented in NRC Inspection Report 50-445/91-14; 50-446/91-14, paragraph 4.6.

The licensee initiated Design Modification DM 89-159, "345Kv Switchyard Breaker Modification," to move the Unit 1 preferred offsite power supply from the existing source (Parker Line) to a point supplied by both the East and West busses through Breakers 7970 and 7980, respectively. Design Modification DM 90-105, "Diesel Start Logic," was initiated to modify the emergency diesel generators' start logic. This modification would allow for the slow transfer from the preferred offsite power source to the alternate power source without starting the emergency diesel generators. These modifications were implemented in October and November 1991, during the first refueling outage. The inspector concluded that these modifications effectively addressed the unnecessary emergency diesel generator starts and provided an increased level of offsite power reliability. The licensee received an amendment to Technical Specification, Section 3/4.8, and revised FSAR, Chapter 8, to address the design modifications. This LER is closed.

On June 10, 1992, the licensee identified a concern with the implementation of DM 90-105. The inspector's review of this concern is documented in paragraph 5.2. A lightning strike occurred on June 23, 1992, which caused a slow transfer from the preferred offsite source to the alternate offsite power source. The plant response was consistent with the design modifications. This event is documented in paragraph 5.3..

## 5. ONSITE EVENT FOLLOWUP (93702)

### 5.1 Manual Reactor Trip Following Loss of Both Feedwater Pumps

On June 11, 1992, the reactor was manually tripped from 100 percent power. At approximately 5:28 a.m., both main feedwater (MFW) pumps tripped. Approximately 32 seconds later the reactor operator manually tripped the reactor prior to any low steam generator level being reached. Review of the post-trip data showed that all protective systems functioned as designed. One steam dump valve indicated that it had partially stuck open but was isolated before any appreciable reactor coolant system cooldown occurred. The motor driven AFW pumps started on loss of MFW pumps and the turbine driven AFW pump initiated on lo-lo steam generator water level.

The inspector observed the licensee securing the secondary plant and other equipment alignments necessary to maintain the plant in Mode 3. No discrepancies were observed and the inspector found communication and procedural compliance to be excellent. Management involvement was good and personnel provided the support necessary to recover from the reactor trip.

The reactor was stabilized in Mode 3 while troubleshooting activities were ongoing to determine the cause for the MFW pump trips. Troubleshooting by instrumentation and control (I&C) personnel identified that the No. 4 low-steam generator (SG) pressure relay in Train A solid state protection

system (SSPS) cabinet had actuated. This relay could have caused a trip of both MFW pumps. Refer to paragraph 7.3 (Maintenance Observations) of this report for details on the troubleshooting and corrective maintenance. Subsequent testing could not duplicate the actuated relay; therefore, through reviews of electrical system prints and consultation with a Westinghouse expert, the licensee replaced three cards that could have interacted with each other to cause the relay to actuate. All other common feedwater pump trips were discounted.

ONE Form 92-514 was generated in response to the simultaneous loss of both MFW pumps and the subsequent reactor trip. Event Notification Worksheet 23634 was completed. The event was classified as a 4-hour nonemergency event (10 CFR Part 50.72[b][2]), and the NRC notification was completed on June 12 at 7:55 a.m. (CDT).

## 5.2 Potentially Inoperable Blackout Sequencer

On June 10, 1992, during a review of Units 1 and 2 system differences, the licensee identified that a design modification, to permit the offsite power sources to slow transfer from the preferred to the alternate, without causing an emergency diesel generator actuation, had not been properly implemented. Design Modification 90-105, Diesel Start Logic, was implemented in October and November 1991, during the first refueling outage. This modification revised the Class 1E undervoltage relay scheme to provide a 90-cycle delay in the receipt of a diesel generator start signal. The modification also provided for reducing the time delay from the undervoltage relays to the blackout solid state safeguards sequencers. This time delay was found not to have been implemented.

The inspector reviewed the design modification, including the design change notice (DCN), DCN-1146, which addressed revising the undervoltage relay scheme and the decrease in the blackout sequencer time delay. The design change was also discussed with the cognizant design engineering personnel. The reason for decreasing the blackout sequencer time delay was to assure that the blackout sequencer would actuate prior to the other undervoltage relays completing their timed cycle. Otherwise, a "relay race" would occur which could result in the blackout sequencer timing out after the undervoltage relays had completed their timed cycles. This condition could result in the failure of the blackout sequencer to actuate following the slow transfer to the alternate offsite power source. The Trains A and B blackout sequencer serve to sequence the 6.9kv and 480v loads back onto their respective safety-related busses. In the event of a loss of both the preferred and alternate offsite power sources, the emergency diesel generators would start and the blackout sequencer would have operated as expected.

The licensee initiated ONE Form 1-FX-92-508 to document the above concern. An engineering evaluation was performed which identified that the blackout sequencer would operate under all postulated conditions provided each Class 1E 6.9kv safety-related bus was loaded with at least one motor. The evaluation showed that the voltage decay on each Class 1E bus was sufficiently delayed by



the 6.9kv motor and that the blackout sequencer would time out prior to a third set of undervoltage/time delay relays which would cause the bus transfer. On this basis, the licensee established a requirement that both Class 1E busses be loaded with at least one 6.9kv motor and that the switchgear be checked twice a shift to ensure the motors were running. On June 11 a manual reactor trip was initiated as documented in paragraph 5.1. Prior to returning to power operation, the time delays on both blackout sequencers were reset. The licensee conducted a review of all loads on each Class 1E 6.9kv bus from when the modification was implemented. The licensee did identify periods when the Class 1E 6.9kv busses were not loaded. The licensee subsequently issued LER 92-15, "Personnel Error Leading To Potential Inoperability of the Blackout Sequencer," to document the condition prohibited by the plant's Technical Specifications.

The LER identifies the root cause for the event as the failure of the electrical maintenance organization to identify the sequencer timer setpoint change to the I&C organization. Four other contributing causes were also noted. The inspector performed a preliminary review of each of the causal factors. The licensee implemented Station Administrative Procedure STA-716, Revision 7, "Site Modification Process," of March 16, 1992, which addresses two of the causal factors for release of an unapproved DCN and designation of a lead organization for each DM. The specific root cause and the actions to prevent recurrence will be reviewed in detail during the LER followup.

### 5.3 Automatic Initiation of Blackout Sequencer

On June 23, with the unit at 100 percent power, a lightning strike on Transformer ST1 caused a slow transfer from the preferred offsite power source to the alternate offsite power source. This resulted in the actuation of the blackout sequencers as expected. The event demonstrated that DM 90-105 was effective in precluding the emergency diesel generators from starting when the Class 1E busses were reenergized from the alternate source.

At approximately 7:40 p.m. security personnel notified the control room of a severe thunderstorm approaching the site. The operators appropriately entered abnormal Procedure ABN-907, Revision 4, "Acts of Nature," Section 5. At 7:48 p.m. a lightning strike occurred on Transformer 1ST which caused the supply line Breakers 7970 and 7980 from the East and West busses to open. This line also feeds the preferred Transformer XST2. When Transformer XST2 deenergized, a slow transfer of the Class 1E busses to the alternate source occurred and the blackout sequencers actuated. Transformer XST2 reenergized after the air switch to Transformer 1ST opened. The nonsafety-related busses were not affected during the transient. The operators later returned the Class 1E offsite power supply to the preferred source.

The inspectors reviewed abnormal Procedure ABN-601, Revision 5, "Response To A 138/345 KV System Malfunction," Section 3.0, "Plant Recovery From A Blackout Sequencer Initiation," and verified that the operators response was in accordance with the procedure. The blackout sequencer actuated the AFW

system. Prompt action was taken to clear the SG feedwater nozzle high flow alarm. This included shutting down the TDAFW pump and reducing reactor power.

#### 5.4 Thermo-Lag Insulation

During the inspection period, the licensee conducted confirmatory testing of the protective fire barrier system (Thermo-Lag) at Omega Point Labs in San Antonio, Texas. Based on the results of the Thermo-Lag fire tests, certain Thermo-Lag installations appeared to be inoperable. The licensee initiated ONE Form 92-549 on June 18 to evaluate the test results for system operability.

The inspectors verified that the licensee had established proper compensatory fire watches for the areas where Thermo-Lag is relied upon. The fire watches were initiated in accordance with the licensee's Fire Protection Manual and were documented as Fire Impairment 92-X-453.

The NRC issued Information Notice 92-46, "Thermo-Lag Fire Barrier Material Special Review Team Final Report Findings, Current Fire Endurance Tests, And Ampacity Calculation Errors," and Bulletin 92-01, "Failure Of Thermo-Lag 330 Fire Barrier System To Maintain Cabling In Wide Cable Trays and Small Conduits Free From Fire Damage," based in part on the licensee's 1-hour fire endurance tests. The inspectors will followup on the licensee's corrective actions to ensure compliance with the requirements of 10 CFR Part 50, Appendix R.

#### 5.5 Summary of Findings

The operators responded very well to the loss of both MFW pumps and the blackout sequencer actuation. The potentially inoperable blackout sequencer resulted from a poor practice involving distribution of preliminary design changes, an inadequate review by the design modification review group, and the failure to assure that the work instructions completely implemented the design modification. It was noted that the engineering review of unit differences was comprehensive as demonstrated by this finding. Managements' review and prompt implementation of corrective actions for the Thermo-Lag and blackout sequencer issues demonstrated the appropriate level of safety awareness.

### 6. OPERATIONAL SAFETY VERIFICATION (71707)

The objectives of this inspection were to ensure that this facility was being operated safely and in conformance with regulatory requirements, to ensure that the licensee's management controls were effectively discharging the licensee's responsibilities for continued safe operation, to assure that selected activities of the licensee's radiological protection programs were implemented in conformance with plant policies and procedures and in compliance with regulatory requirements, and to inspect the licensee's compliance with the approved physical security plan.

The inspectors conducted control room observations and plant inspection tours and reviewed logs and licensee documentation of equipment problems. Through

in-plant observations and attendance of the licensee's plan-of-the-day meetings, the inspectors maintained cognizance over plant status and Technical Specifications action statements in effect.

The following paragraphs provide details of certain areas reviewed during this inspection period.

#### 6.1 Radiation Protection Observation

The inspectors reviewed the activities associated with the implementation of the radiological protection program. The review consisted of observing activities requiring radiation work permits, tours of the radiologically controlled area, and activities documented in the radiation protection shift log. Following the reactor trip on June 11, the inspector verified that radiation protection personnel had been informed of the event and were cognizant of changes in the radiologically controlled area. A radiation protection shift turnover was observed on July 13. Plant conditions were appropriately assessed, and expected activities involving radiation protection personnel were discussed.

#### 6.2 Security Program Implementation

The inspectors observed security access controls at the primary access point and the auxiliary access point. Personnel and packages entering the protected area were properly surveyed. Vehicles entering the protected area were also searched. On June 27, an inspector observed a security "Shadow Force Drill." Additional security officers were brought in to relieve the onshift crew. The onshift crew was designated to respond to the security threat from their post positions. Prior to beginning the drill, the "adversary force" was briefed on the intrusion objectives. During the drill the security officers responded to intercept the "adversary force" at selected positions. The "adversary force" provided a meaningful test of the licensee's security response capabilities.

#### 6.3 Valve and System Lineup

The inspectors verified that valves within engineered safety features system major flow paths were properly aligned. The systems selected were residual heat removal, safety injection, AFW, chemical volume and control system, and service water systems. The inspectors walked down these systems and verified that the lineups were in accordance with the operating procedures and met the Technical Specification requirements for system operability. The inspectors toured the control room to verify that control board indication reflected field conditions. There were no discrepancies noted in the plant or on the control room board indications.

#### 6.4 Control Room Observations

During this inspection period, complex work activities and evolutions were observed from the control room. The operators provided direct oversight of troubleshooting activities involving the solid state protection system.

Operator communications were clear and consistent with management's expectations. The observation managers provided meaningful assessment of operator and plant personnel performance. The unit supervisors' administrative workload appeared reduced, thereby providing the opportunity to oversee additional work activities. NRC Inspection Report 50-445/92-20; 50-446/92-20 identified lack of unit supervisor involvement to be a causal factor in the loss of spent fuel pool cooling event. The inspectors reviewed the status of control room annunciators and found the operators and shift supervisory personnel were cognizant of each annunciator. One example, identified in paragraph 7.2, was noted where the status of a local panel was not provided to control room personnel.

#### 6.5 Movement of Spent Fuel for Refueling Outage 2 New Fuel

The inspector reviewed an ONE Form concerning the lateral deflection of Spent Fuel Assembly A-26 while being transported from Spent Pool No. 1 Location K-22 to location H-15. Discussions with the fuel handling supervisor indicated the fuel assembly contacted the top of the spent fuel pool rack while being lowered into position. A slight deflection of the fuel assembly from vertical was observed and the load cell indicated that it was being partially supported by the storage rack. The supervisor stated that the assembly did not bow and that the fuel assembly just tilted slightly (approximately 4 inches). The fuel handling supervisor immediately had the auxiliary operators stop and straighten the spent fuel assembly. No damage was observed to either the spent fuel assembly or the storage rack.

Prior to continuation of fuel movement, an ONE form was written and remedial actions were initiated. The inspector observed that additional spent fuel movement was performed in accordance with the procedure and that communications were appropriate between the fuel handling supervisor and the fueling bridge operator.

#### 6.6 Auxiliary Operator (AO) Logs

The inspector reviewed AO logs for the week of July 6-10, 1992, for the safeguards and auxiliary building. Review of these logs indicated that the AOs were making at least two inspection rounds per shift as required by Procedure OWT-104, Revision 9, "Operations Department Log Keeping and Equipment Inspections." It was also noted that abnormal conditions or out-of-specification readings were circled in red. A violation was identified during the previous inspection involving AO logs for abnormal conditions (NRC Inspection Report 50-445/92-14; 50-446/92-14, paragraph 6.5) The inspector did identify that the AOs were not always strictly meeting the requirement of OWT-104, paragraph 6.2.4, for addressing abnormal conditions in the log comment section. The procedure required that the following be included:

- The reason for the condition or reading,
- The corrective action performed or attempted,

- The results of the corrective action, and
- Time and person notified.

A majority of the comments reviewed listed a work request number with no details. The inspectors informed the operations manager of this practice. The licensee is reviewing whether the comments are necessary or if the requirement should be deleted. The inspector concluded that the identified AO practice did not constitute a safety concern.

The licensee also performed a review of AO logs and compared them to the security access records. The licensee found that the AOs had made the required entries into areas where their logs were to be taken. However, the licensee concluded that the entries were not always of sufficient duration for the AOs to perform their reviews in accordance with management's expectations. The licensee has reiterated its expectations to the AOs on what performance is required of them.

#### 6.7 Reactor Startup

The inspector observed activities associated with the reactor startup on June 12. The licensee met the requirements of operations Procedure ODA-108, Revision 5, "Post RPS/ESF Actuation Evaluation," which included assessing the cause for the reactor trip and the corrective actions taken to preclude recurrence. The licensee undertook reasonable actions to identify the cause for the reactor trip. Because a definitive cause for the MFW pumps tripping could not be identified, the Vice President, Nuclear Operations provided the authorization to return to power operations. The inspector observed that operators were cognizant of plant conditions throughout the restart activities and that communications were appropriate. The reactor was taken critical at 5 a.m. on June 13 and full power operation attained on June 16.

#### 6.8 Summary of Findings

Radiation protection personnel maintained awareness of changing plant conditions and work activities in the radiologically controlled area. Shift turnover was conducted in a professional manner and provided for an appropriate review of plant conditions and planned work activities.

The security officers maintained control of access into the protected area. The objectives of the "Shadow Force Drill" were met.

Improvement was noted in the daily communication between licensed and nonlicensed operators. One instance was identified where the status of an annunciator on a local panel was not identified to the reactor operators. This indicated that additional management attention was warranted to assure that communications occur at the level and completeness expected. Management oversight of daily and complex evolutions was evident. The observation managers, established following the loss of spent fuel pool cooling event, were effective in assessing personnel performance. The operators performed

well during the reactor startup and return to power operations. The licensee identified that auxiliary operator performance was not always consistent with managements' expectations.

## 7. MAINTENANCE OBSERVATION (62703)

### 7.1 MDAFW Pump 1-01 Work History

On June 23 the AFW system actuated as a result of both blackout sequencers actuating. The TDAFW pump was promptly shutdown. The two MDAFW Pumps 1-01 and 1-02 remained in operation for approximately 1 1/2 hours. During this time, the MDAFW Pump 1-01 inboard pump bearing packing extruded. This resulted in excessive leakage. Corrective Maintenance Work Order 1-92-01/516 was initiated on June 24 to repack the inboard and outboard stuffing boxes and to drain/flush and refill the inboard bearing housing with oil. The work activity was initiated later that day and completed on June 25.

The inspectors reviewed the completed work package. The work instructions specified the use of graphite yarn packing only and referenced the applicable steps in maintenance Procedure MSM-GO-7210, Revision 1, "Graphite Pump Packing," for repacking the bearings. Two copies of the applicable section (8.4) were provided so the work on the inboard and outboard bearing could be independently documented. Seven graphite yarn packing rings were placed in each stuffing box as documented in each attached MSM-GO-7210, Section 8.4. The inboard bearing housing oil was replaced. No water was found in the oil reservoir. The pump was then started to permit the packing to be adjusted and then run-in. The active limiting condition for operation was exited and MDAFW Pump 1-01 returned to service.

The inspectors requested the work history for MDAFW Pump 1-01. It was noted that both pump bearings had been replaced in October 1991. This work activity was completed under Corrective Work Order C91-6082. Subsequently, Work Order C92-0204 was implemented on January 10 to repack the inboard pump bearing. A review of Work Order C91-6088 revealed that the work instructions also referenced Section 8.4 to MSM-GO-7210. In this case though, the work package contained only one copy of Section 8.4. It was apparent that this section had been used to document the repacking performed for both the inboard and outboard pump bearings. Section 8.4.11 documented that 9 yarn packing rings had been used to fill the gland. A total of 14 packing rings should have been expected based on the vendor manual drawing with no lantern ring installed. The work package does not designate how many packing rings were installed in each stuffing box. A review of Work Order 92-0204, performed on January 10, documents that 5 packing rings were installed in the inboard pump bearing stuffing box.

During the performance of Work Order 92-017516, the licensee identified the presence of only three packing rings in the outboard pump bearing stuffing box. Based on the documentation provided for the above three corrective maintenance activities, the inspectors concluded that only three packing rings had been added to the outboard pump bearing stuffing box when the pump bearing

was replaced in October 1991. On July 9 the inspectors identified that an ONE Form had not been initiated to evaluate the cause for the inboard pump bearing packing extruding, or for the as-found condition of the outboard pump bearing not having the expected number of packing rings installed.

The ONE Form process reports adverse conditions that affect quality-related materials, parts, components, activities, processes, procedures, and documents during the operations phase. Attachment 8.4 of STA-421, Revision 2, "Operations Notification and Evaluation (ONE) Form," lists the conditions which should be reported on an ONE Form. Contrary to this attachment, an ONE Form was not initiated. Additional instructions in the procedure require the individual who discovers the adverse condition to initiate an ONE Form. STA-421, Revision 5, "Processing of Operations Notification and Evaluation (ONE) Forms," Section 6.1.1, states "Any individual discovering an actual or potential adverse condition shall identify the condition in accordance with STA-421, which requires the condition be documented on an ONE Form and the ONE Form be delivered to the Shift Supervisor."

The inspector noted that maintenance, operations, and plant management personnel had the opportunity to assure that an ONE Form was initiated. The failure to initiate an ONE Form as required by STA-421 is a violation of Criterion XVI of Appendix B to CFR Part 50 (445/9224-01). The inspector noted that this violation is very similar to the violation identified in NRC Inspection Report 50-445/92-20; 50-446/92-20, paragraph 6.3. Subsequent to the inspectors' identification on July 9, the licensee initiated ONE Form 92-653 on July 10 to evaluate the following three conditions:

- o Inboard stuffing box packing on the 01 MDAFW pump (CP1-AFAPMD-01) appears to be failing prematurely.
- o When packing was replaced in the outboard end of the pump, only three rings were found in the stuffing box. Usually the stuffing box accommodates 6 or 7 rings.
- o Because of design differences, the 02 MDAFW pump requires a combination of ribbon and yarn packing. The 01 pump requires only yarn packing because of the pump shaft not being concentric with the stuffing box (DCN 82592/0). However, the Master Equipment List shows both yarn and ribbon packing applicable to the 01 pump.

## 7.2 Spent Fuel Pool Process Radiation Monitor Review

On July 7 the inspector identified that two alarms were present on the spent fuel pool local panel but were not identified in the reactor operators alarm log. The reactor operators on shift were not aware that the two alarms were in or out there was any work ongoing. The two alarms were Spent Fuel Pool Pump 02 trip (alarm 1.5) and Spent Fuel Pool Cooling Loop 1 radiation alert (alarm 3.4). The operator status board showed that Spent Fuel Pool Pump 02 was out of service. The inspector noted that the radiation monitor computer showed that the Spent Fuel Pool Heat Exchanger 01 to Radiation Detector XRE-

4863 had been out of service for 12 days. When the unit supervisor reviewed the open work packages, he noted that the radiation detector had been taken out of service on June 23, 1992.

Radiation Monitor XRE-4863 was tagged out of service on June 23 and Corrective Maintenance Work Order 4-92-0565 implemented on June 25. The corrective maintenance activity was to correct a leak at Flow Indicating Switch X-FIS-4863 and at the couplings upstream and downstream of the switch. The work activity was completed the same day and the clearance released on June 26. It was found, however, that the couplings still leaked so the work package remained open and corrective maintenance was rescheduled for July 8, 1992.

The inspector noted that the work package was to be performed again without any revisions. The inspector questioned the use of the same work instructions that had previously had all the instruction steps signed off as complete. The work instructions did not provide for a second series of sign offs. The licensee identified that this practice was permitted by Procedure STA-606, Revision 18, "Work Requests and Work Orders," Section 6.6.3.11, which states that, "WC instructions may be repeated to obtain an acceptable result without a revision to the work order." This observation was discussed with maintenance management personnel and it was determined to have met their expectations and the procedural requirements.

The inspectors also reviewed the auxiliary operators logs for the period June 23 through July 7, 1992. It was noted that Alarm 3.4 was first identified as being in on June 23 and was logged each shift until June 27. However, during this period, the reactor operators were not notified that the alarm was in and had not been including it as an alarm which was providing an input to a main control board annunciator. The licensee reviewed the auxiliary operators log practices and now requires that each auxiliary operator identify the annunciators that are in for each of their local panels. The reactor operators then verify that their alarm status logs are correct for each main control board annunciator.

### 7.3 Postreactor Trip Troubleshooting and Maintenance

The inspector observed the troubleshooting activities conducted by the I&C department in close coordination with operations department. Initial troubleshooting consisted of a detailed review of electrical and logic system drawings. This review along with post-trip data review indicated several realistic scenarios for a common MFW pump trip. These trips are activated by relays located in the SSPS cabinets. Both trains of SSPS were visually inspected for relays "pulled in." SSPS Train A had SG 4 low pressure relay actuated. This relay is part of the antiwater hammer protection circuitry that requires only one of four signals to cause a trip of both MFW pumps.

Work Package 1-92-16361-00 was written to troubleshoot the Train A SSPS cabinet in accordance with Procedure MDA-111, Revision 0, "Maintenance Department Troubleshooting Activities." While the package was being written,



I&C drew several circuit cards from stock and began to bench test the universal logic card in anticipation of the installed card failing during performance of the Train A SSPS logic test (OPT-445). Operations attempted to verify the earlier visual findings of the actuated relay by performing OPT-445; however, all logic tests passed and SG 4 low pressure relay did not actuate again. Therefore, after additional consultation with Westinghouse and site personnel, the licensee decided to replace the universal logic card and two additional cards that could have affected its output and thus caused SG 4 low pressure relay to actuate.

The cards removed from Train A SSPS were bench tested and subjected to high temperatures in attempts to recreate the failure that led to the trip of both MFW pump. The cards did not fail and have been sent to Westinghouse for additional testing.

The review of the associated work activities found no discrepancies. The inspector found I&C and operations personnel involved in the troubleshooting to be well organized and they proceeded in a slow, cautious, and methodical method that ensured equipment and personnel safety.

Management made the decision to restart after additional monitoring equipment was installed in the circuitry to monitor for possible future intermittent relay actuation. No clear indication of failures was available and the troubleshooting activities appeared to have been broad and in-depth.

#### 7.4 Main Steam Atmospheric Relief Valve

The licensee performed corrective maintenance Work Order 1-92-017903-00 for Main Steam Atmospheric Relief Valve 1-PV-2327. The work order was initiated to troubleshoot the valve because it had previously failed to stroke within the time established for inservice testing. The inspector verified that the applicable Limiting Condition for Operation Action Requirement was entered.

Prior to beginning the work activity on June 30, the I&C technicians performed a detailed review of the valve control logic and received a comprehensive pre-job briefing from the I&C supervisor. The work activity was closely coordinated with the operators and an auxiliary operator was provided to stroke the valve with the upstream manual isolation valve closed. During the initial valve stroke, the valve exceeded the inservice test stroke time requirement. The auxiliary operator communicated that he had not kept the open signal present throughout the valve stroke and that was why the valve stroke time was greater than expected. Subsequent valve stroke times were within the inservice test requirement. Procedure OPT-504A, Revision 3, "Operability Test For Various Main Steam Valves," was completed satisfactorily and the valve returned to service.

The inspector noted that the inservice test valve stroke time had been revised in Procedure OPT-504A. This was based on increasing the valve stroke length to provide increased steam flow capacity. The inspector reviewed Design Modification 90-0258, Revision 0, which revised the main steam atmospheric

relief valves (1-PV-2325, -2326, -2327, and -2328) to provide increased flow capability to 820,000 - 880,000 pounds/hour at 1200 psig. The applicable design basis documents and procedures were revised to reflect the increased steam flow capabilities of the atmospheric relief valves.

#### 7.5 Observation of Valve Replacement on the Postaccident Sampling System

The inspectors observed work activities performed on Solenoid Valve RCP-2 in the postaccident sampling system. Work Order 1-92-1067 required I&C to replace Valve RCP-2 with a new solenoid valve. This work activity required that radiation protection personnel perform an assessment of the radiological hazards prior to the crew beginning work.

The inspectors observed a radiation protection (RP) technician survey the work area and perform swipe tests on the local area where the I&C technicians would be working. The RP technician briefed the work crew and the inspectors on the survey conditions and the radiological controls.

During the work activities, the RP technician consistently monitored the general area and the I&C work activities. The inspectors observed the I&C technicians perform their work in accordance with Work Order 1-92-1067-00 and approved procedures. The I&C technicians coordinated their activities with chemistry. The I&C technicians removed the existing solenoid valve in accordance with the work order and replaced it with the new solenoid valve. Work instructions were followed step by step. Review of the work package indicated that all required signoffs were performed. No discrepancies were observed during this work activity.

#### 7.6 TDAFW Pump

The inspectors observed the initial tagging out of the valves associated with the TDAFW pump for the required preventive maintenance to be performed.

The inspectors observed that the AO properly implemented the clearance order on valves to the TDAFW pump. Communication between the AO and the control room was good. No discrepancies were noted during the tag-out process. The AO performed his duties as required.

Upon completion of the tagging process, mechanical maintenance personnel changed the oil and collected samples of the oil as required by Work Order 3-92-311957-01 and Procedure MSM-GO-0101, Revision 1, "Lubricant Sampling." Maintenance personnel followed the work order instructions as required. Signoffs were done as work steps were completed. The inspector did not note any discrepancies.

#### 7.7 Summary of Findings

Maintenance activities were performed in accordance with the work instructions. One violation was identified for the failure to initiate an ONE Form for an adverse condition on one of the MDAFW pumps. An observation was

made concerning the completeness of work instructions for previous work on the MDAFW pump and a radiation monitor. The work instructions and assessment of work performed did not appear to completely describe the work performed.

#### 8. SURVEILLANCE OBSERVATIONS (61726)

The inspectors observed the surveillance testing of safety-related systems and components listed below to verify that the activities were being performed in accordance with the Technical Specifications. The applicable procedures were reviewed for adequacy, test instrumentation was verified to be in calibration, and test data was reviewed for accuracy and completeness. The inspectors ascertained that any deficiencies identified were properly reviewed and resolved.

The inspector witnessed portions of the following surveillance test activities:

##### 8.1 Train A Safeguards Slave Relay K603 Actuation Test

The inspector witnessed the control room staff perform Procedure Change Notice (PCN) OPT-465A, "Train A Safeguards Slave Relay K603 Actuation Test," Revision 3. This test was performed in Mode 1. This test started Diesel Generator 01, closed Centrifugal Charging Pumps 1 and 2 miniflow valves, opened centrifugal charging pump safety injection isolation valves, deenergized screen wash header exhaust fans, primary exhaust supply fans, and actuated the Train A sequencer.

The inspector witnessed the unit supervisor conduct a thorough briefing with all participants involved with the test. The inspector observed the operators perform their required prerequisites, such as aligning the primary plant ventilation system to ensure a negative pressure will be maintained in various areas, and also check valve positions. The inspector verified that electrical maintenance technicians measured the voltage between terminals to verify that the Relay K603 contact was open, and that the resistance across the terminals on all supply fans indicated open.

Upon actuation of slave Relay K603, PCN OPT-465A was complete and the operators began restoring the systems involved back to normal operating position. Observations by the inspector during restoration indicated that both office and service area recirculation fans were turned on by the operators as required by PCN OPT-811, "Office and Service Area Ventilation System," Revision 4. However, PCN OPT-465A has a note that states, "The Office and Service Area Recirculation fans are 100 percent capacity fans. The second fan should be started just prior to energizing the K603 relay. Do not run both fans simultaneously for an extended period of time." This note appears to be in conflict with SOP-811 which requires that both fans be in operation as a normal lineup. The inspector informed the licensee of this procedural discrepancy. A licensee representative told the inspector that he

thought that the FSAR listed the fans as 50 percent capacity and, therefore, the two fans running met the required intent. The licensee is reviewing the procedure requirements.

During the latter part of the inspection period, the licensee informed the inspector that those fans were 50 percent capacity fans as indicated in FSAR Section 9.4C.6. The licensee also incorporated PCN OPT-465A-R3-2 to delete the note which identifies the office and service area recirculation fans as 100 percent capacity. This procedure change corrects the conflict between PCN OPT-465A and SOP-811.

### 8.2 Diesel Generator Operability Test

The inspector observed portions of PCN OPT-214A, "Diesel Generator Operability Test," Revision 6. This test was performed in conjunction with Train A Safeguards Slave Relay K603 actuation test. The diesel was started with the actuation of K603 slave relay. The inspector observed the operators perform required prerequisites prior to the start of the diesel. Communication between the reactor operator and AO was good. Observations by the inspector indicated that the control room operators performed well and adhered to procedures. Once the diesel generator was started, the operators used the recommended loading sequence to increase load to 6.3 MW as required by OPT-214A. All required steps were followed during this evolution of loading. No deficiencies were identified.

### 8.3 Spent Fuel Pool Cooling System

The inspector witnessed the operators perform PCN OPT-223, "Spent Fuel Pool Cooling System Operability Test," Revision 1. This procedure was modified to eliminate an AO from manipulating Valve XSF-0003 because it is located in a contaminated area, and the spent fuel pool is normally in operation at all times and, therefore, some procedural steps in PCN OPT-223 are not necessary.

The unit and shift supervisors briefed the operators involved in the test and thoroughly explained that SOP-506, "Spent Fuel Pool Cooling And Cleanup System," Revision 5, would be used in conjunction with PCN OPT-223. This briefing was clear and all personnel involved understood their responsibilities. The test was performed as instructed, and test data recorded was within the acceptance criteria. The shift supervisor informed the inspector that a procedure change had been submitted to eliminate certain steps in PCN OPT-223. No deficiencies were noted.

### 8.4 AFW System Operability Test

The inspector observed OPT-206A, "Auxiliary Feedwater Operability Test," Revision 6, on the #1 AFW pump. The inspector accompanied the operators during the performance of the operability test. The AO performed his duties as required by PCN OPT-206A and the AO field supervisor verified his performance. Communication was difficult because of the AFW turbine running; however, required tasks were accomplished in a satisfactory manner. Review of the

preliminary data indicated that all steps were followed and recorded data was within acceptable limits. Management attention was evident in that the operations manager was present during this evolution.

#### 8.5 Calibration Review

The inspector verified on a selected basis that required calibration checks were performed as required on the following items: (1) SI Pump 1-01 meter/relays, (2) RHR Pump 1-01 meter/relays, (3) Service Water Pump 11 meter/relays, and (4) diesel generator turbo oil pressure and combustion air pressure indication.

Review of existing records indicated that the above items were calibrated as specified except for the turbo oil pressure indication; however, the date of that calibration fell within the 25 percent tolerance band and was scheduled to be performed. No discrepancies were identified.

#### 8.6 Summary of Findings

The licensee implemented the surveillance program in accordance with procedures. The AO field supervisors were effective in assessing the AOs performance during surveillance activities. Management involvement was evident on each operational test witnessed by the inspectors. The operators were knowledgeable of their duties/tasks and performed as required by procedure. Overall, these observations indicated a positive trend toward self-verification and management involvement in the day-to-day activities.

### 9. SUMMARY OF TRACKING ITEMS

The following items were opened in this inspection report:

Violation 445/9224-01

The following items were closed in this inspection report:

Violation 445/9033-01

Violation 445/9162-01

Violation 445/9162-02

Violation 445/9162-03

LER 90-32

LER 91-29

LER 91-30

LER 90-33

LER 91-13

10. EXIT MEETING

An exit meeting was conducted on July 17, 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.