APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-445/90-45
50-446/90-45

Unit 1 Operating License: NPF-87
Unit 2 Construction Permit: CPPR-127
Expiration Date: August 1, 1992

Dockets: 50-445
50-446

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: December 5, 1990, through January 15, 1991

Inspectors: W. D. Johnson, Senior Resident Inspector
R. M. Latta, Senior Resident Inspector
S. D. Bitter, Resident Inspector
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Reviewed by: Dwight D Chamberlain 1-25-91
D. D. Chamberlain, Chief, Project Section B Date
Division of Reactor Projects

Inspection Summary

Inspection Conducted December 5, 1990, through January 15, 1991
(Report 50-445/90-45; 50-446/90-45)

Areas Inspected: Unannounced resident safety inspection of plant status, operational safety verification, onsite followup of events, maintenance observation, surveillance observation, cold weather preparation, followup on previously identified items, followup on corrective actions for violations, and evaluation of Unit 2 activities.

Results: Unit 1 operated at power for the duration of this inspection period. System and licensee responses to operational events were appropriate. Maintenance and surveillance activities observed were properly conducted. A review of the licensee's freeze protection activities indicated that the freeze protection program was effective. Licensee corrective actions for the violations reviewed were appropriate. One noncited violation involving a missed surveillance on three chemical and volume control system (CVCS) check

valves is discussed in paragraph 3. An area for further inspection followup (Inspector Followup Item (IFI) 445/9045-01) was identified in paragraph 4.a related to licensee action regarding the receipt inspection failure to identify an improper relay which was installed on the Train B emergency diesel generator. It was noted during this inspection that the licensee's self-assessment and corrective action activities were functioning well. This is evidenced by the identification and prompt initial resolution of the nonconservative assumption found in the overtemperature N-16 setpoint calculation as discussed in paragraph 3 and by the stop work order related to Unit 2 piping analysis as discussed below.

On January 2, 1991, construction activities were resumed on Unit 2, which was approximately 85 percent complete. A stop work order involving the Scope A piping and stress reconciliation engineering contractor was issued on December 13, 1990. Subsequent to the implementation of a comprehensive corrective action program, the stop work order was lifted on January 5, 1991. The early identification of this issue by the licensee's quality organization and the decisive action on the part of the Unit 2 management organization is identified as a strength in paragraph 10.b.

DETAILS

1. Persons Contacted

*J. L. Barker, Manager, Independent Safety Evaluation Group (ISEG)
*M. R. Blevins, Manager of Nuclear Operations Support
*H. D. Bruner, Senior Vice President
*R. C. Byrd, Manager, Quality Control (QC)
*W. J. Cahill, Executive Vice President, Nuclear
*C. B. Corbin, Licensing Engineer
E. T. Evans, Electrical Systems Supervisor
*J. L. French, Independent Advisory Group
*T. L. Heatherly, Licensing Compliance Engineer
*C. B. Hogg, Chief Engineer
*T. A. Hope, Technical Support Compliance Supervisor
*J. J. Kelley, Plant Manager
*H. Lawroski, Consultant
*F. W. Madden, Mechanical Engineering Manager
*E. F. Ottney, Monitoring Project Manager, CASE
*D. E. Pendleton, Stipulation Manager
*M. J. Riggs, Plant Evaluation Manager, Operations
*A. B. Scott, Vice President, Nuclear Operations
*J. C. Smith, Plant Operations Staff
*P. B. Stevens, Manager of Operations Support Engineering
*C. L. Terry, Director, Nuclear Overview
*R. G. Withrow, Unit 2 Engineering
*D. R. Woodlan, Docket Licensing Manager

*Present at the exit interview.

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

2. Plant Status - Unit 1 (71707)

At the beginning of this inspection period, the unit was operating at 94 percent power. Power was reduced to approximately 80 percent on December 12, 1990, while unsuccessfully attempting to locate a suspected main condenser tube leak. Power was returned to 96 percent on December 15. The unit operated at near full power for the remainder of the inspection period.

3. 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 are 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 Specification (TS) action statements in effect.

During plant tours, the inspectors found general plant conditions, including housekeeping, to be good. All observed leaks had been identified as indicated by the presence of a work request tag or catch container routed to a drain.

During a tour of the control room back panel, the inspector observed one of the solid state isolation equipment cabinet doors open with no indication of work in progress. The shift supervisor was informed and the cabinet was closed and locked.

During routine control room observations, the inspector noted that on December 16, 1990, the Train B hydrogen recombiner failed its operability test, OPT-211A, which required the recombiner to heatup to 700° Fahrenheit (F) within 90 minutes. The recombiner temperature was slightly above 500°F after 90 minutes. A new reference power was established by performing a heatup test in accordance with OPT-211A, and the surveillance was then performed with satisfactory results.

In addition, the following licensee-identified problems were reviewed by the inspector.

- On December 12, 1990, the licensee determined, during a record review, that the CVCS check valve operability test, Section 9.3 of OPT-201A, "Charging System Operability Verification," had not been performed on certain check valves within the maximum allowable time since completion of the previous test. The test is required to meet the ASME Boiler and Pressure Vessel Code, Section XI, testing requirement for CVCS check Valves 1-8481A (open direction), 1-8481B (closed direction), and 1-CS-8480B (closed direction) and is required by TS 4.0.5. The test procedure, OPT-201A, was performed on November 30, 1990, but was performed using the Train B charging pump instead of the Train A pump as required. This resulted in testing these check valves in the wrong direction. The valves had last been tested on August 16, 1990. The surveillance is required quarterly and with the 25 percent extension allowed in accordance with TS 4.0.2, the violation date was December 7, 1990, which was exceeded by 5 days. The surveillance was performed satisfactorily on December 12, 1990.

  The surveillance coordinator had been in the process of reviewing and updating the operations department section of the Managed Maintenance Computer Program (MMCP) based on operators' comments and input

regarding the method used to identify the specific train to be tested during any specific surveillance work order. The review and revisions were not complete at the time of the missed surveillance but have been completed since the occurrence. This enhancement is expected to prevent problems of this type in the future.

The licensee's failure to meet the surveillance requirement for these check valves is a violation of TS 4.0.5. This licensee-identified violation is not being cited because the criteria specified in Section V.G.1 of the Enforcement Policy have or will be met. The licensee initiated immediate corrective action to satisfactorily perform the surveillance and has initiated action as described above to prevent recurrence. In addition, the licensee plans to issue Licensee Event Report (LER) 90-044-00 to document this problem. The inspector will complete his review of the event during the review of LER 90-044-00.

- On January 9, 1991, the licensee identified a potential nonconservatism in an assumption used to calculate the Overtemperature N-16 (OT-N16) setpoint. Operations Notification and Evaluation (ONE) Form FX 91-0131 was written by the licensee to address the issue. According to the licensee, the error had the potential to allow departure from nucleate boiling (DNB) to occur under certain accident conditions. Westinghouse has responded to the licensee's inquiries regarding this matter and both agree that sufficient margin to DNB exists as a result of conservatism in other parts of the OT-N16 calculation. Technical Evaluation TEWC-91 -82 was written by the licensee to document these results. The licensee was pursuing a final resolution of the issue with Westinghouse. Licensee action for initial resolution of this matter was considered prompt and appropriate.

4. Onsite Event Followup (93702)

a. Emergency Diesel Generator Voltage Regulator Failure

On December 13, 1990, a 120 Vac voltage regulating (VR) relay was replaced in the Train B emergency diesel generator (EDG) voltage regulator circuit (Work Order C90-7681). The original VR relay, a Potter and Brumfield Model KUP14A15, was being replaced to eliminate minor relay chattering as the EDG voltage increased during EDG startup. The replacement relay, a Deltrol Controls 166 style, cycled excessively during postinstallation testing and failed. Troubleshooting by the licensee indicated that the Deltrol relay's pickup and dropout characteristics were different from the Potter and Brumfield relay in that it cycled for a longer period of time as generator voltage increased during EDG startup and caused overheating and subsequent failure of the relay and socket. The socket was replaced. The original Potter and Brumfield relay was tested and reinstalled in the voltage regulator circuit and resulted in acceptable performance during retesting. The licensee generated ONE

Form FX 90-2554 to review the matter and was investigating why the difference between the Deltrol relays and the Potter and Brumfield relays was not identified during the receipt inspection. Licensee action on this matter will be reviewed further during a future inspection and will be tracked as IFI 445/9045-01.

During the initial attempt to test the diesel following the VR relay replacement, the diesel did not start. The diesel generator was aligned in accordance with OPT-214A, "Diesel Generator Operability Test," for starting the diesel using slave Relay K603 and starting air Valve 1DO-0278. When the slave relay was actuated, the diesel did not start. The test lineup was specially arranged to start the diesel generator using only one of the four installed starting air valves. The remaining three valves were disabled. This is not the normal start alignment in that at least two air start valves would actuate normally for manual or emergency starts assuming a single failure affected the remaining two valves. At the time of this test, one of the two starting air receivers for this diesel generator had been previously isolated and depressurized for maintenance. This allowed the starting air header pressure from the isolated air receiver to decrease below 150 psig, which opened a pressure switch contact for the actuation logic. When the test was performed, the slave relay contact operated properly, but the pressure switch contact prevented opening of the air valve. The air receiver was restored to service and the test was satisfactorily performed. The licensee was reviewing the physical arrangement of the diesel starting air system and the related operating and test procedures to determine if any clarifications should be incorporated into these procedures. ONE Form FX 90-2542 was written by the licensee to track this matter. This does not present an operability concern for starts of the diesels in that only one air receiver is required under normal start sequences with actuation of at least two air start valves.

b. Emergency Safeguards Features (ESF) Actuation While Removing Light Bulb

On January 3, 1991, at approximately 11:48 p.m. (CST), an auxiliary operator observed that the "operate" light on X-RE-5895A, one of the control room ventilation air intake radiation monitors, was not illuminated but that the monitor unit was operating. As the light bulb was removed for replacement, it flashed once, and the monitor unit deenergized with a blown fuse. The radiation monitor deenergizing initiated the ESF logic to cause the control room ventilation system to shift into the emergency recirculation mode of operation. All equipment responded as designed and no system other than control room ventilation was affected. The control room ventilation makeup supply fan from the affected air intake was secured to comply with the TS 3.3.3.1 action requirement. At 1:35 a.m. on January 4, the control room ventilation was restored to its normal lineup. The licensee notified the NRC Operations Center in accordance with 10 CFR 50.72(b)(2)(ii).

The licensee generated a ONE Form (FX 91-0113) and performed a post-ESF actuation evaluation in accordance with Procedure ODA-108, "Post RPS/ESF Actuation Evaluation."

The licensee was investigating why the light bulb replacement would cause the power supply fuse to blow. The inspector reviewed the ODA-108 evaluation and will further review the event and licensee's actions upon issuance of LER 91-001-00.

Equipment and initial licensee corrective actions were deemed appropriate for these events. The long-term corrective actions will be evaluated during subsequent routine inspection activities and LER review.

5. Monthly Maintenance Observation (62703)

Station maintenance activities for the safety-related and nonsafety systems and components listed below were observed to ascertain that they were conducted in accordance with approved procedures, regulatory guides, and industry codes or standards, and in conformance with the TS.

Maintenance activities observed included:

- Performance of the stroke length measurement of 1-PV-2326, the atmospheric relief valve on the No. 2 steam generator (Work Order P90-8773).
- Connection of a load bank to battery Charger BC1ED-1 and loading of the charger as part of troubleshooting Work Order C90-7926.
- Staging of material and entry into the "A" main condenser water box while investigating a possible condenser tube leak (Work Order C90-7828).
- Repair of a body-to-bonnet leak on feedwater heater gage glass isolation Valve 1-HD-0664 (Work Order C90-7687).
- Limit switch adjustment on moisture separator reheater (MSR) heating steam Valve 1-TV-6580B (Work Order C90-7474).
- Replacement of annunciator power Supply No. 36 (Work Order C91-0009).
- Inspection of "F" frame size feeder breakers in 208/120Vac Class 1E lighting distribution Panels ESB1 (CP1-ELDPEC-01), ESB4 (CP1-ELDPEC-04), EABD2 (CPX-ELDPEC-22), and ESBD1 (CP1-ELDPEC-11) (Work Order C90-7761, Work Sheet 11). These breakers were inspected to verify that they were automatic tripping type breakers as specified in design drawings. Model numbers were TFJ236125 for ESB1 and ESB4 and TFJ236225 for EAP[illegible] and ESBD1. These breaker model numbers indicate automatic t[illegible]pe breakers. Drawings E1-2400 and E1-942 indicated a trip s[illegible] of 200 amps for ESB1. This panel had a breaker with a long-ter[illegible] of 125 amps. This breaker was replaced by Design Change Authorization (DCA) 82504 in 1989.

Although Drawing E1-901 was changed to reflect the DCA, E1-2400 and E1-942 were not changed. Licensee personnel initiated action to correct these two drawings.

Maintenance activities observed during this inspection period were performed in an acceptable manner by qualified personnel using adequate procedures and administrative controls. No discrepancies were identified during the witnessing of these maintenance activities.

6. Monthly Surveillance Observation (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 TS. 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:

- Procedure OPT-453A, "Train A Safeguards Slave Relay K644 Actuation Test" (Work Order S90-2545)
- Procedure OPT-205A, "Train A Containment Spray System Operability Test" (Work Order S90-2538)
- Procedure OPT-217A, "Turbine Overspeed Protection System Test" (Work Order S90-3319)
- Procedure OPT-515A, "Diesel Generator Fuel Oil Transfer System Operability Test" (Work Order S90-2686)
- Procedure OPT-406A, "Safeguards Slave Relay with Blocking Circuit Test" - This procedure tested slave Relays K604A, K605A, and K606A (Work Order S90-2794).

Surveillance activities observed during this inspection period were performed in an acceptable manner by qualified personnel using adequate procedures and administrative controls. No discrepancies were identified during the witnessing of these surveillance activities.

7. Cold Weather Preparation (71714)

The inspector monitored the licensee's activities regarding the implementation of Procedure STA-634, "Freeze Protection Program," and Procedure TSP-522, "Freeze Protection Preparation Guidelines," and found the freeze protection program and preparations to be effective. System walkdowns were performed by the system engineers and operators and potential problem areas were identified. Temporary enclosures, portable

heaters, additional insulation, and additional heat tracing were installed as a result of the system walkdowns. Management maintained a high level of involvement in ensuring that all identified problem areas were addressed by corrective actions. Several periods of subfreezing weather during this reporting period resulted in minimal operational impact.

8. Followup on Previously Identified Items (92701)

(Open) Open Item 445/9013-04: Auxiliary feedwater system (AFW) check valve backleakage.

This item was initiated in April 1990 when minor backleakage into the AFW system from the main feedwater (MFW) system was observed during low-power operations. During subsequent startups, similar backleakage has been observed. To monitor the backleakage during startups, the licensee installed additional pressure and temperature instrumentation on the AFW lines. When backleakage has been indicated by rising temperature on an AFW line temperature instrument in the control room, the operators have used Procedure ABN-305A, "Auxiliary Feedwater Malfunction." The temporary temperature instrumentation installed upstream of the permanent temperature instruments has not indicated elevated temperatures. This indicates that backleakage is minimal. Corrective actions under ABN-305A include venting the AFW piping in the pump rooms to reestablish a differential pressure across the check valves and running an AFW pump for a short time to provide forward flow through the check valves. In addition, during power ascension after the preheater bypass valves have been shut, the manual isolation valves for these valves have been shut to stop the leakage path from MFW to AFW through the preheater bypass valves.

The minor backleakage of AFW check valves observed on occasion has had no adverse effect on AFW system operability and does not affect the safety function of the valves. The minor leakage does, however, continue to be an operational inconvenience during unit startups for a relatively short period. The licensee was evaluating potential design alternatives for this system to eliminate this operational inconvenience. The options include replacing the valves with another model and other potential design changes. The NRC will evaluate the licensee's final position on this matter when completed. This item remains open.

9. Followup on Corrective Actions For Violations (92702)

The inspector reviewed the licensee's response to the below listed violations to determine whether corrective actions were taken as stated and whether response to the events was adequate and met regulatory requirements, license conditions, and commitments.

(Closed) Violation 445/8930-01: Operating AFW system valves in the improper sequence.

This violation occurred on May 5, 1989, while realigning the AFW system and allowed a reverse fluid flow path from the steam generators to the

condensate storage tank via the AFW piping. This violation and the resulting reverse liquid flow were nearly identical to an event of April 23, 1989. This latter event was cited as Violation 445/8924-01. This violation was closed in NRC Inspection Report 50-445/89-72; 50-446/89-72.

Corrective actions included:

- counseling the involved personnel on procedure usage and compliance,
- revising administrative procedures to emphasize performance of procedure steps in sequence,
- implementing an action plan to enhance procedural compliance. This included discussions with operators on procedure compliance and adding discussion of this event to the requalification and replacement training programs,
- adding the AFW system to the list of procedures required to be available and referenced when performing field work,
- performing overviews by quality assurance personnel of system operating procedure implementation, and
- conducting performance-based audits and surveillances by quality assurance.

This violation is closed.

(Closed) Violation 445/8930-02: Failure to take adequate corrective action relative to multiple AFW check valve failures.

This violation involved four examples of inoperable Borg-Warner, pressure seal, swing check valves associated with the AFW system. Specifically, these valves were determined to have the disc stuck under the seat ring because the valve bonnet/disc assemblies had been mispositioned as a result of incorrect valve assembly procedures.

As previously documented in NRC Inspection Report 50-445/90-09; 50-446/90-09, the inspectors evaluated the licensee's response to the associated construction deficiencies (SDARs CP-89-015 and CP-89-019) and had determined that adequate corrective measures had been implemented to provide reasonable assurance that the subject check valves would perform their safety function of preventing excessive reverse flow.

Additionally, during this reporting period, the inspectors evaluated the licensee's response to the referenced violation concerning four separate but related examples of pressure seal, swing check valve failures which had occurred from 1985 to 1989. This review included the assessment of the licensee's corrective actions delineated in TU Electric's correspondence/documentation: TXX-89596 dated August 18, 1989; TXX-90053

dated January 31, 1990; Plant Incident Reports 89-110 and -129 and 90-1413; Design Modification 90-233; Maintenance Procedure MSM-CO-8801; and selected maintenance work orders involving completed check valve corrective maintenance activities and postmaintenance test results.

Based on these reviews and inspection-related activities, it was determined that the AFW check valves associated with the four events described in the Notice of Violation and the remaining check valves of the type involved in these events have been inspected, modified as necessary, and satisfactorily tested. Additionally, it was ascertained that TU Electric had initiated corrective actions to ensure the timely evaluation of plant events and equipment failures, improve corrective actions, and enhance communications involving personnel awareness of operating events.

Collectively, these corrective and preventive actions appear to adequately address the identified deficiencies. Therefore, this violation is closed.

(Closed) Violation 445/8930-03: Inadequate postmaintenance/preoperational testing of AFW check valves.

This violation involved two examples of failure to adequately test AFW check valves: (1) subsequent to corrective maintenance activities conducted in 1983 and 1985 and (2) during the preoperational test program.

The inspector reviewed the licensee's response to this violation contained in TU Electric's letter (TXX-90053) dated January 31, 1990, as well as the records associated with Borg-Warner check valve modifications and postmaintenance testing results previously documented in NRC Inspection Report 50-445/90-09; 50-446/90-09. Additionally, the inspector reviewed Procedure STA-623, Revision 6, "Post-Work Test Program"; the associated Post-Work Test Guideline; and the licensee's Master Surveillance Test List, Revision 16.

Based on these reviews, it was determined that the licensee had revised the postwork test guidelines to include seat leakage and valve stroke testing for ASME Section XI, Category C, safety-related check valves involved in the 1983, 1985, and April 23 and May 5, 1989, events to ensure that these valves were seating properly. It was also determined that these valves were satisfactorily tested prior to declaring the associated system operable in accordance with the TS and that these valves are scheduled for periodic retesting as prescribed by TU Electric's inservice test plan. These corrective and preventive actions appear to adequately address the identified deficiencies. Therefore, this violation is closed.

10. Unit 2 Activities (37055, 48053, 50071, 50073, 50075)

During this inspection period, routine tours of the Unit 2 facility were conducted in order to assess equipment conditions, security, and adherence to regulatory requirements. In particular, plant areas were examined for evidence of fire hazards and installed instrumentation damage and to

determine 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 the utility's preparations for the resumption of construction activities for Unit 2.

a. umption of Construction Activities on Unit 2

January 2, 1991, construction activities on Unit 2, which is approximately 85 percent complete, were reinitiated. It was noted that the licensee suspended construction on Unit 2 in April 1988 in order to concentrate their resources on the completion of Unit 1.

In preparation for the resumption of construction, Unit 2 project management established a completion schedule which included the resumption of engineering efforts in June 1990. This concerted engineering effort in advance of the resumption of construction activities was initiated in order to confirm the existing equipment/system configurations, review and update existing construction work packages, evaluate outstanding design modifications, and develop supporting engineering documentation.

Additionally, project milestones have been established which tentatively forecast the first system turnover in August 1991, open vessel testing in January 1992, primary plant hydrostatic testing in April 1992, hot functional testing in July 1992, integrated leakrate testing in September 1992, and a proposed fuel load date of January 1993. It is noted, however, that these dates have been developed for planning purposes only and are provided for information only.

b. Unit 2 Engineering Activities (37055)

On December 13, 1990, the licensee informed Region IV of a stop work order (SWO), No. 90-001, which was initiated by Unit 2 project management to temporarily suspend the engineering activities provided by the Scope A (piping and stress reconciliation) engineering contractor (Bechtel). This SWO resulted from the preliminary findings of a quality assurance (QA) audit involving Unit 2 pipe stress analysis and supports (PSAS) calculations which contained errors.

In particular, the stress calculations audited in the licensee's report (QAA-90-060) included 13 of 102 pipe supports and 4 of 55 stress calculations that had been completed by the Scope A contractor prior to the audit. Based on a review of the audit findings and meetings with members of the Unit 2 engineering staff, it was determined that all of the piping and supports involved were associated with ASME Class 2 and 3 systems which included both small and large bore piping. Additionally, it was determined that all of the piping systems contained water which, by design, was at or near ambient temperature. In general, the reference audit report identified several instances where procedures had not been

implemented properly. These examples included the failure to adhere to TU Electric's Design Manual 2 EP-512 or Design Guideline 2 EP-513 as well as errors involving mathematical calculations. Based on the audit findings, all four of the stress calculations contained errors and 8 of the 13 pipe supports had problems identified. These audit error findings were typified by the following discrepancies:

- The induced masses used to simulate a seismic response in a vertical submerged pipe were approximately one-half of what they should have been.
- Stiffness values utilized were different from the ones calculated from generic values.
- Local bearing stresses were not evaluated.
- A valve data sheet included in the calculation did not apply to the calculation.
- There were mathematical errors in which the combined weld stresses, a margin factor, and a force on a weld had been computed incorrectly.
- A plate was incorrectly modeled as tube steel.
- An allowable weld stress was incorrectly calculated based on a nonconservative yield stress.
- There were documentation discrepancies and improper completion of calculation checklists.

Subsequent to the identification of these issues, Unit 2 project management rapidly developed a comprehensive corrective action plan which not only involved the Scope A engineering contractor's activities on site but also included the San Francisco, California, and Gaithersburg, Maryland, offices of the Bechtel Corporation. This corrective action plan included:

- Providing immediate specific training for all PSAS preparers and checkers and a review of preparer and checker responsibilities
- Performance of an additional detailed check of all calculations completed/checked but not issued prior to the training identified above
- The collection and categorization of all pertinent information relative to the calculations identified for rechecking
- The requirement that check prints be provided to the calculation reviewer as an additional assurance that line-by-line checking has been performed.

Additionally, the Unit 2 project engineering organization developed a plan to review all of the previously completed calculations contingent upon the results of the above identified corrective actions and to implement a sampling verification program to monitor the effectiveness of the PSAS training.

As a result of the implementation of these corrective actions, Unit 2 project management rescinded the SWO against the Scope A engineering contractor on January 5, 1991.

The inspector reviewed the findings of the licensee's audit report, QAA-90-060 dated January 7, 1991, and conducted selected documentation reviews and interviews involving Unit 2 project engineering personnel. Based on these inspection activities, it was determined that the PSAS program, as it was applied to the design criteria reviewed, was generally acceptable; however, the implementation of the program relative to the checking process was inadequate as reflected in the number of errors identified. Additionally, it was determined that although none of the identified calculation errors would have impacted the qualification of the hardware, the potential existed that similar problems in other pipe support and stress calculations, if left undetected, could have had adverse implications.

In response to this issue which was identified by the licensee's quality audit program, it was determined that Unit 2 project management had acted promptly in issuing the SWO against the Scope A engineering contractor, and that the corrective action program which was implemented prior to the lifting of the SWO appeared to be comprehensive. This process which resulted in the early identification of a potentially significant design control issue and the resulting aggressive corrective action program implemented by the licensee's management is identified as an organizational strength in the Unit 2 project management, engineering, and quality organizations.

c. Unit 2 Diesel Generator Rework

The inspectors continued to monitor the licensee's rework activities on the Train A EDG. Because the rework of this EDG is essentially complete, most of the licensee's efforts during this inspection period have been directed toward reassembling the engine.

In the conduct of their routine tours and observations, the inspectors witnessed portions of the following activities:

- Lapping of the cylinder valves
- Torquing of the main bearing fasteners
- Piston assemble (skirt to crown)

- Machining of the cylinder sleeves to establish proper fitup prior to reinstallation in the engine block

- Installation of the cylinder sleeves and O-rings into the block

These activities were conducted in accordance with the following two procedures and various maintenance work requests:

- MSM-CO-3830, Revision 0, "Emergency Diesel Engine Disassembly and Assembly"

- MSM-CO-3349, Revision 1, "Emergency Diesel Engine Pistons, Rods, and Rings Maintenance"

In general, the inspectors observed that cleanliness controls were very good, materials were properly stored and controlled, and mechanical maintenance and QC personnel were familiar with procedural requirements and were exhibiting good work practices.

d. Structural Steel and Supports

During this reporting period the inspector witnessed the repair/rework of several safety-related service water pipe supports. These construction activities were being conducted in the Unit 1 - Unit 2 common area inside the radiologically controlled area (RCA). It is noted that approximately 2000 pipe supports/hangers have been identified within the common area which will require reinspection. Within this population, approximately 800 supports are expected to require some degree of rework. Master controlled drawings have been issued for approximately 200 of these supports and the craft are currently working these items, by room, inside the RCA. This work is expected to continue at a controlled rate into the first quarter of 1992.

In particular, the inspector observed the work activities associated with Construction Work Order (CWO) C900007879 for support Tag Nos. SW-2-129-034-A43R, -007-A43R, and -033-A43R, and CWO C900007330 for pipe support Tag Nos. SW-2-102-004-A133A.

In general, the construction work packages were well organized, contained the appropriate controlled drawing, copies and were complete. Craft personnel were knowledgeable and attentive to detail and construction QC personnel were actively involved in the work process.

e. Materials Staging Building

During this inspection period, the licensee modified the boundaries of the protected area to include the recently completed materials staging building (MSB). As previously documented in NRC Inspection Report 50-445/90-31; 50-446/90-31, the MSB not only serves as a

warehouse/staging area for both units but also provides office space for essential Unit 2 personnel. The location of key personnel as well as the availability of construction material and high-turnover items within the protected area is another example of the enhanced project approach to Unit 2 construction.

Within the areas examined, the licensee's project work controls and problem identification programs appear to be functioning adequately. Inspection results indicated that the Unit 2 project management approach continues to represent an organizational strength as exemplified by the early identification and rapid response to the PSAS calculation errors.

11. Exit Meeting (30703)

An exit meeting was conducted on January 15, 1991, 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 NRC inspectors summarized the scope and findings of the inspection.