

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-498/90-26
50-499/90-26

Operating License: NPF-76
NPF-80

Sockets: 50-498
50-499

Licensee: Houston Lighting & Power Company (HL&P)
P.O. Box 1700
Houston, Texas 77251

Facility Name: South Texas Project (STP), Units 1 and 2

Inspection At: STP, Matagorda County, Texas

Inspection Conducted: August 1-31, 1990

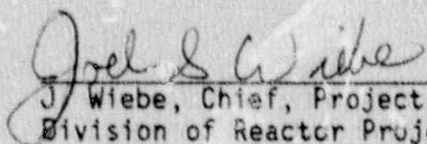
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9/21/90
Date

Inspection Summary

Inspection Conducted August 1-31, 1990 (Report 50-498/90-26; 50-499/90-26)

Areas Inspected: Routine, unannounced inspection included plant status, onsite followup of events at operating power reactors, licensee action on previous inspection findings, followup on corrective actions for violations and deviations, onsite followup of written reports of nonroutine events, operational safety verification, monthly maintenance observations, and monthly surveillance observations.

Results: The licensee's assessment of the recent events appears to have been proactive. The assessment was continuing at the end of the inspection period

and had not identified a common root cause but had identified four areas which appeared to have contributed to the events. The NRC's assessment of the events, including corrective action with respect to contributing causes, will continue during a subsequent team inspection.

Within the areas inspected, no violations were identified. Two unresolved items, one violation, and three licensee event reports are being closed out in this report. Licensee actions taken in response to the events appeared appropriate and were verified to be complete. Two systems were inspected for operability: the Unit 2 auxiliary feedwater (AFW) system, and portions of the demineralized water (DW) storage and transfer system. All components of the AFW system were found in the correct positions to support plant operation. However, numerous discrepancies were observed during the walkdown of the DW system. Additionally, the DW operating procedure was determined to be of lower quality than is normally produced by the licensee (paragraph 7). Three maintenance activities (paragraph 8) and four surveillance activities (paragraph 9) were observed without any significant concerns being identified. The technicians were noted to be knowledgeable and competent and performed the activities in a slow and careful manner.

DETAILS1. Persons Contacted

- *W. H. Kinsey, Vice President, Nuclear Generation
- *S. L. Rosen, Vice President, Nuclear Engineering
- *S. M. Dew, Manager, Nuclear Purchasing and Material Management
- *M. R. Wisenburg, Plant Manager
- *W. J. Jump, Maintenance Manager
- *A. C. McIntyer, Manager, Design Engineer
- *A. K. Khosla, Senior Engineer, Licensing
- *J. R. Lovell, Manager, Technical Services
- *J. W. Loesch, Plant Operations Manager
- *K. J. Christian, Unit 1 Operations Manager
- *W. L. Giles, Unit 2 Operations Manager
- *M. A. McBurnett, Nuclear Licensing Manager
- *W. L. Mutz, INPO Coordinator
- *M. Chakravorty, Nuclear Safety Review Board
- *C. A. Ayala, Supervising Engineer, Licensing
- *J. T. Westermeier, General Manager, Site Facilities
- *S. M. Shrophire, Central Power & Light
- *D. R. Keating, Director, Independent Safety Engineering Group
- *D. J. Denver, Manager, Plant Engineering Department
- *T. J. Jordan, General Manager, Nuclear Assurance

In addition to the above, the inspectors also held discussions with various licensee, architect engineer (AE), maintenance, and other contractor personnel during this inspection.

*Denotes those individuals attending the exit interview conducted on August 31, 1990.

2. Plant Status

Unit 1 began this inspection period by becoming critical at 3:29 a.m. on August 1, 1990. The unit had been manually tripped the previous day when the "A" feedwater isolation valve went fully closed as a result of an error by an instrumentation and controls (I&C) technician. Unit 1 achieved 100 percent power on August 3, 1990. The unit remained at 100 percent power through the close of this inspection period.

Unit 2 began and ended this inspection period at 100 percent power.

3. Onsite Followup of Events at Operating Power Reactors (93702)

On August 6, 1990, Unit 1 experienced an inadvertent dilution of the reactor coolant system when a mixed bed demineralizer was placed in service. This event was addressed in a special inspection report (50-498/90-28; 50-499/90-28). This inspection report also addresses the erroneously locked open valve on the AFW system that was discovered on July 30, 1990.

A special assessment of the licensee's safety assessment/quality verification program was conducted August 7-10, 1990. This assessment was focused on licensee actions to identify and correct the reason(s) for the recent challenges to safety-related equipment at STP.

The licensee presented an overview of the events and management actions to determine the cause(s) for the events. Discussions were then held with personnel responsible for evaluating the events and implementing the corrective actions. Lastly, discussions were held with operators and I&C technicians to ascertain what they believed to be the cause(s) for the events.

Four areas were identified by the licensee which may have contributed to the events. There did not appear to be a single factor relevant to a majority of the events. The four areas identified to the inspectors were: timeliness of corrective actions; backlog of maintenance items; written communications; and material condition of the nonsafety-related components in the plant.

The inspectors found that the licensee had been proactive in trying to determine the cause(s) for the events. Inspections had included a procedural compliance task to evaluate personnel errors and make recommendations for correcting problems. The inspectors also found that licensee management was aware of the potential issues identified by personnel interviewed. The areas noted above will be further evaluated by the NRC staff during a special team inspection scheduled for October 1990.

4. Licensee Action on Previous Inspection Findings (92701)

(Closed) Unresolved Item (498/8809-01): Missed Fire Watch Inspections

During a previous inspection performed in January 1988, several examples of missing fire watch entries were identified. Review of the security access log report revealed that hourly fire watch tours were missed in the Isolation Valve Cubicle Room No. 6, contrary to procedural requirements. This subject area was declared an unresolved item (498/8809-01).

Further review of the missed fire watches was performed by the NRC's Office of Investigations (Case Number 4-88-004). Enforcement Action (EA) No. 88-216 was subsequently taken following an indepth investigation of the incident by the NRC. Violation EA 88-216 was closed out in NRC Inspection Report 50-498/89-22; 50-499/89-22, therefore, the original Unresolved Item 498/8809-01 is also considered closed.

This unresolved item is closed.

(Closed) Unresolved Item (498/8801-09): Replacement of Relays That Have Exceeded Their Design Life

A Unit 1 operational readiness team inspection was performed in January 1988. A concern was identified in the area of electrical relays. Selected relays (7000 series Agastat relays) were commercial grade relays

that were determined to have a projected qualified life of only 2 years but had been installed for more than 2 years. The subject area was considered an unresolved item (498/8801-09) until it was determined if the installed relays were acceptable. This issue was also determined by the NRC to be one of five issues that required resolution prior to power escalation above 5 percent.

The licensee responded to the five issues relating to the full power license and to the open and unresolved items identified by the operational readiness inspection team. The responses were documented in HL&P Letter ST-HL-AE-2539, dated April 15, 1988. Attachment II of this letter stated that all Non-Class 1E Agastat relays which performed safety-related functions had been replaced. Additionally, the response letter also stated that a member of the NRC staff reviewed this unresolved item (498/8801-09) during a followup inspection in March 1988. At that time, the NRC inspector verbally indicated that this unresolved item was considered closed.

During this inspection period, a review of the corrective actions taken by the licensee was performed. It was determined the licensee had replaced all 7000-series Agastat relays in safety-related circuits (7 total) in February 1988.

Although not required prior to issuance of the full power license, the licensee verbally committed to replace all other 7000-series Agastat relays. All of these relays were replaced in Unit 1 by April 1989, except one. This single relay was installed in the plant but was not connected to an electrical circuit.

This unresolved item is closed.

5. Followup on Corrective Actions for Violations and Deviations (92702)

(Closed) Violation (498/8904-01): Failure to Perform a Surveillance Test Due to Personnel Error

On February 8, 1989, the licensee discovered that the monthly analog channel operational surveillance test for the gaseous waste processing system oxygen analyzer had not been performed and that operations had continued without the required grab samples being taken. This was a violation (498/8904-01) of TS 3.3.3.11 surveillance requirements.

The failure to perform a surveillance test within the required interval is a reportable event. The licensee submitted Unit 1 Licensee Event Report (LER) 89-007 to the NRC in response to the missed surveillance. LER 89-007 was closed out in NRC Inspection Report 50-498/89-22; 50-499/89-22.

The corrective actions taken by the licensee included: (1) immediately performing the missed surveillance upon discovery that it was overdue; (2) adding a checkpoint to the shift supervisor Relief Checklist OPG03-ZA-0063-1 to ensure that the daily drop dead surveillance report (computer

printout) has been reviewed; and (3) adding the overdue surveillance report (daily briefing of items approaching, or on, their drop-dead dates) to the work control center daily agenda. The NRC inspector verified that the corrective actions taken were appropriate and were correctly implemented.

This violation is closed.

6. Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities (92700)

(Closed) Unit 1 LER 89-02: Failure to Provide Backup Overcurrent Protection for Two Containment Electrical Penetration Circuits and Failure to Perform Surveillance Testing of Electrical Penetration Protection Breakers

The containment backup overcurrent protection was designed to ensure that any postulated electrical faults cleared before containment penetration damage occurred. Updated Final Safety Analysis Report (UFSAR) Table 8.3-14 identified all the containment penetration conductor overcurrent protection devices.

On January 6, 1989, the licensee identified that two electrical penetration circuit breakers were not provided with backup overcurrent protection as committed to in the UFSAR. On January 31, 1989, during review of overcurrent protection calculations, it was identified that Technical Specification-required surveillance tests of a primary protective device in one circuit had not been tested.

The licensee completed a technical review of electrical penetration conductor protection on February 10, 1989. The review resulted in the identification of six items that could potentially impact plant operations or licensing commitments. These items included primary circuit breakers not included in UFSAR Table 8.3-14, backup circuit breakers which would not provide long-term protection of the penetration conductors, and designated primary circuit protection not actually part of the circuit. Each of the deficiencies have been corrected through either updating the UFSAR or modifying the circuit to include the appropriate overcurrent protection.

The licensee verified that the penetration protection breakers not included in the surveillance program were tested during the startup program. These breakers were added to the surveillance program. Testing of these penetration protection breakers to the hydrogen recombiners was performed satisfactorily.

This LER is closed.

(Closed) Unit 2 LER 89-12: Unplanned Initiation of the Unit 2 Fuel Handling Building Exhaust Filtration Because of a Radiation Monitor Failure

On April 14, 1989, the licensee performed a scheduled surveillance on the "A" fuel handling building (FHB) heating, ventilation, and air

conditioning (HVAC) system. During the performance of this surveillance, the "B" FHB HVAC system received an engineered safety feature (ESF) actuation on a detected airborne high radiation level in the FHB ventilation duct. The redundant radiation monitor for the "A" FHB HVAC system, which monitors the ventilation system through the same duct, did not detect any increase in airborne activity. The monitors were designed to alarm in the event of a spent fuel accident within the FHB. However, no spent fuel was present within the Unit 2 FHB.

The licensee performed air grab samples from within the ventilation duct work. No increased airborne activity above background was detected. The "B" train radiation was checked to verify that it was properly calibrated. Although the calibration check was satisfactory, the inlet filter was found to be restricted clogged. The licensee was not able to recreate the event by restricting flow through the filter. The "A" train was checked to verify that no leaks were present that could have caused the sample to be diluted prior to entering the monitor. No leakage was identified. The inspector found the licensee's corrective actions to be appropriate.

This LER is closed.

(Closed) Unit 2 LER 89-026: Unit 2 Reactor Trip from 100 Percent Power on a Negative Rate Trip Because of a Dropped Control Rod

On October 13, 1989, Unit 2 tripped from 100 percent power because of a dropped control rod. At the time of the event, no surveillance or maintenance activities associated with the rod control system were ongoing. Following the reactor trip, the licensee inspected the rod control system power supplies and the rod control system power cabinets. No abnormal conditions, including loose leads or blown fuses, were identified. The resistance through all the stationary grippers was measured through the control cabinets and found to be normal.

The reactor trip breakers were closed and the control rods withdrawn six steps and then reinserted. All control rods responded as indicated by the digital rod position indicating system. After being unable to identify any problems with the power supplies, moveable grippers, stationary grippers, or lift coils, the licensee instrumented the stationary gripper circuits in the event of an another dropped control rod.

On October 15, 1989, while withdrawing Control Bank "A," one control rod dropped from 21 steps out. All control rods were then fully inserted. The licensee was then able to identify an open diode in the control circuitry associated with the dropped rod. The diode has been replaced. The gripper circuit diodes were inspected for Unit 1 during the latest refueling outage (Work Request (WR) RS-59298).

The licensee reviewed the industry data for diode failure and identified that industry problems with the diodes had not been experienced.

The licensee inspected the control rod drive system diodes for Unit 2. One diode was found to have a poor solder connection, and approximately 25 percent of the 120 diodes were found to have characteristics which exceeded the specifications and were replaced.

This LER is closed.

7. Operational Safety Verification (71707)

The purpose of this inspection was to ensure that the facility was being operated safely and in conformance with license and regulatory requirements. This inspection also included verifying that selected activities of the licensee's radiological protection program were being implemented in conformance with requirements and procedures and that the licensee was in compliance with its approved physical security plan.

The inspectors visited the control rooms on a routine basis and verified that control room staffing, operator decorum, shift turnover, adherence to Technical Specification limiting conditions for operation (LCOs), and overall control room decorum were in accordance with requirements. The inspectors conducted tours in various locations of the plant to observe work operations and to ensure that the facility was being operated in conformance with license and regulatory requirements.

As part of the operational safety verification portion of the inspection, several systems were walked down to determine if they were in positions to support plant operation. The systems included the Unit 2 AFW system and portions of the DW storage and transfer system (common to both units). The systems were compared to the system operating procedures and piping and instrument diagrams (P&IDs). Specific attributes inspected included verification of the major flow paths, equipment condition, and operable support systems.

The AFW system was designed to provide cooling water to the steam generators upon loss of normal feedwater. All AFW system components were found in the correct position to support plant operation. Items that were observed during the walkdown and procedure review included: (1) nonsafety-related Valve 2-DW-1658 and several vendor, skid-mounted valves were missing from the valve lineup checklist; (2) Vent Valve 2-AF-360 was installed in the plant but was not shown on the P&ID; and (3) several procedure and P&ID typing or personnel errors were reported to the licensee.

The demineralized water storage and transfer system was designed to provide a sufficient quantity of quality water to the reactor coolant system, reactor coolant auxiliary system, condensate system, and feedwater system. Although nonsafety-related, the system is described in the UFSAR. Nothing was identified that would have prevented the system from performing its intended function, however, a significant number of discrepancies were observed. These observations included: (1) seal locks were missing from Valves 0-DW-892, -894, and -682, although locks were required by the licensee's locked valve program; (2) about 25 valves were missing from the

valve lineup of Procedure OPCP11-DW-0001, "Demineralized Water Storage and Transfer System Operation," Revision 2; (3) at least 20 errors were noted in the procedures; (4) at least 20 differences in valve positions, between positions shown on the P&IDs and positions listed in the valve lineup, were noted; (5) two 120VAC power supply breakers listed in the electrical checklist did not exist in the plant; (6) at least five 120 VAC power supply breakers were missing from the electrical lineup; (7) one valve was listed twice in the valve lineup; (8) one electrical power supply was listed three times in the procedure electrical checklists; and (9) two electrical distribution panels in the plant had their nameplates reversed. The procedure, OPCP11-DW-0001, was subsequently determined to be of lower quality than normal for the licensee. All procedure and walkdown comments were submitted to the licensee for resolution. None of the items noted by the inspector appeared to directly impact safe operation of the plant.

No change in operator performance was noted this inspection period. The licensee's need to continue with an aggressive program for upgrade of facility operating procedures remained evident.

No violations or deviations were identified.

8. Monthly Maintenance Observations (62703)

Selected maintenance activities were observed to verify whether the activities were being conducted in accordance with approved procedures. The activities observed included:

- Preventive Maintenance (PM) EM-2-CC-88001687, "Inspection Test, and Lubrication of the Unit 2 Spent Fuel Pool Heat Exchanger Cooling Isolation Valve (C2-CC-MOV-0447)"
- WR AM-104711, "Troubleshooting and Repair of a Qualified Display Processing System (QDPS) Power Supply"
- WR JW-134066, "Troubleshooting of Diesel Generator 12 Jacket Water High Temperature Trip"

The inspector verified that the activities were conducted in accordance with approved work instructions and procedures, test equipment was within the current calibration cycles, and housekeeping was being conducted in an acceptable manner. All observations made were referred to the licensee for appropriate action.

PM EM-2-CC-88001687 was performed by electrical technicians on Spent Fuel Pool Heat Exchanger Cooling Isolation Valve C2-CC-MOV-0447. The work consisted of inspecting, testing, and lubricating the motor operator for the valve. The inspector observed: (1) the adjusting of the limit switches specified by OPMP05-ZE-0300, "Limitorque MOV Motor Inspection and Lube," Revision 10; (2) the diagnostic testing specified by OPMP05-ZE-0309, "MOV Diagnostic Testing," Revision 2; and (3) the dynamic

stroke testing specified by 2TEP07-CC-0006, "Dynamic Stroke Testing of Spent Fuel Pool Heat Exchanger Cooling Isolation Valves," Revision 0. No concerns were noted during the work performance or following final document reviews.

WR AM-104711 was performed by I&C technicians at the QDPS database processing Unit A (DPU-A). The work consisted of troubleshooting the DPU-A power supply and processing and bench-testing the new power supply. The inspector observed the portions of this WR that had the technicians verify prerequisites prior to deenergizing DPU-A, troubleshoot and determine that the power supply was defective, and bench-test the new power supply. No concerns were noted.

On August 29, 1990, Emergency Diesel Generator (EDG) 12 tripped when placed in the cooldown cycle mode of operation (non-valid failure trip). A Priority 3 WR (dated March 1990) was outstanding on EDG 12 when the EDG tripped a second time. This WR was upgraded to a Priority 1 WR. I&C technicians were requested to verify the calibration of a temperature switch and temperature valve. Both were found to be in good working order. Troubleshooting work instructions were issued to leak check the instrument's pneumatic control circuit tubing. Temperature Valve NI-JW-TV-5511 was noted to be leaking. This air leak was allowing the EDG to trip on simulated high jacket water temperature (this trip is bypassed in the emergency mode of operation). The pressure retaining boundary of the valve was tightened, which eliminated the source of air leakage. The EDG was subsequently run without any problems being observed.

Two observations were made and reported to the licensee for resolution. First of all, the technicians disconnected and reconnected instrument tubing to the temperature valve during troubleshooting activities. This activity was not clearly documented in the work package, contrary to procedural requirements. The activity was performed on nonsafety-related tubing, therefore, a safety concern did not exist. Second, when the temperature valve was removed by a different crew of technicians, the removal and installation was documented on Configuration Change Log OPGP03-ZM-0021-1. Blocks 20 and 21 of the form were blanks for writing the names of the craftsmen involved in the removal/installation of the component. The names in Blocks 20 and 21 did not agree with the names of the craftsmen who actually performed the work (different initials in Blocks 12, 13, 18, and 19 on the form). Corrective actions taken by the licensee included updating the data package to include the required documentation of work performance and signoffs. The licensee planned to review Procedure OPGP03-ZM-0021, "Control of Configuration Changes," to determine if the control of instrument tubing connections was clearly described.

The licensee's maintenance program was implemented in accordance with the approved procedures. Personnel were cognizant of the activities they were performing. Clarification of configuration control documentation requirements appeared to be needed.

9. Monthly Surveillance Observations (61726)

Selected surveillance activities were observed to ascertain whether the surveillance of safety significant systems and components were being conducted in accordance with Technical Specifications and other requirements. The following surveillance tests were observed and the documents reviewed:

- OPSP02-SI-0955, "Accumulator C Level Group 4 Analog Channel Operational Test (ACOT)," Revision 0;
- OPSP02-SI-0965, "Accumulator C Pressure Group 4 ACOT," Revision 0;
- OPSP02-FW-0549, "Steam Generator D Narrow Range Level Set 2 ACOT," Revision 0; and
- 2PSP06-PK-0005, "4.16KV Class 1E Degraded Voltage Relay Channel Calibration/Trip Actuating Device Operational Test Channel 1," Revision 2.

Specific items inspected included verifying that as-left data was within acceptance criteria limits, test equipment used was within current calibration cycles, and test performers were adhering to approved procedures. In addition to observation by the inspector of the activities, the procedures were reviewed for technical accuracy and conformance to Technical Specification requirements.

Procedure OPSP02-SI-0955 was performed by I&C technicians on the safety injection (SI) Accumulator 2C high/low level alarm circuitry. The procedure provided instructions to verify that the accumulator high (9088 gallons) and low (8858 gallons) level alarm setpoints were within acceptance criteria limits. Procedure OPSP02-SI-0965 was also performed by I&C technicians on the SI Accumulator 2C high/low pressure alarm circuitry. The procedure provided instructions to verify that the accumulator high (662 psig) and low (603 psig) pressure alarm setpoints were within required limits. Procedure OPSP02-FW-0549 was performed by I&C technicians on the Steam Generator 1D narrow range level alarm and trip circuitry. The procedure provided directions to verify that the Steam Generator 1D high-high (87.5 percent) and low-low (33 percent) trip setpoints were within required Technical Specification limits. All three monthly ACOTs were performed without incident. All setpoints were found within required acceptance criteria limits, and no concerns were identified.

Procedure 2PSP06-PK-0005 was performed by electrical technicians at the Unit 2, 4.16KV Class 1E Bus E2B. This monthly test was performed to verify that the Channel 1 degraded voltage relay located on E2B was operable. All as-found data was noted to be within acceptance criteria limits, and no concerns were identified.

Licensee personnel performed well in this area. The persons who performed the activities appeared knowledgeable and competent, used the correct test equipment, adhered to the approved procedures, and were careful while performing the assigned tasks.

No violations or deviations were identified in this area of the inspection.

10. Exit Interview

The inspectors met with licensee representative. (denoted in paragraph 1) on August 31, 1990. The inspectors summarized the scope and findings of the inspection. The licensee did not identify as proprietary any of the information provided to, or reviewed by, the inspectors.