

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket Nos: 50-498; 50-499
License Nos: NPF-76; NPF-80

Report No: 50-498/96-08; 50-499/96-08

Licensee: Houston Lighting & Power Company (HL&P)

Facility: South Texas Project Electric Generating Station,
Units 1 and 2

Location: 8 Miles West of Wadsworth on FM 521
Wadsworth, Texas 77483

Dates: October 20 through November 30, 1996

Inspectors: J. M. Keeton, Senior Resident Inspector, Acting
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Division of Reactor Projects

EXECUTIVE SUMMARY

South Texas Project, Units 1 and 2
NRC Inspection Report 50-498/96-08; 50-499/95-08

This resident inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 6-week period of resident inspection.

Operations

- The shift supervisor maintained good command and control during the loss of an emergency response facility data acquisition and display system processor. Alarm response activities and communications were considered noteworthy.
- Equipment availability and material condition were excellent.

Maintenance

- Maintenance activities observed were professionally performed by very knowledgeable mechanics and technicians. Maintenance supervisors were providing an appropriate level of field supervision and oversight.
- The repair of the Unit 2 Channel 4 over power differential temperature cards was well planned and executed to minimize risk.

Engineering

- An engineer demonstrated good attention to detail in identifying incorrect scaling data for the Unit 1 feedwater flow transmitters.
- The condition reporting process was well understood and used by engineers with management encouragement.
- The modification package and review for the replacement of control room and fuel handling building heating, ventilation and air conditioning damper power supplies, from battery packs to the station batteries did not thoroughly consider all relevant design input information and confirm all design inputs. This was an isolated situation not representative of the state of other design changes reviewed.

Plant Support

- The licensee exhibited very good performance in activating and operating the Technical Support Center during a graded emergency preparedness exercise.
- Fire watch training was not effective in ensuring personnel were able to describe a Class C fire or the type extinguisher that should be used.

Report Details

Summary of Plant Status

Units 1 and 2 operated at essentially 100 percent reactor power throughout this inspection period.

I. Operations

O1 Conduct of Operations

O1.1 Control Room Observations (Units 1 and 2)

a. Inspection Scope (71707)

Using Inspection Procedure 71707, the inspectors routinely observed conduct of operations in the Units 1 and 2 control rooms. Daily control board walkdowns, attendance at shift turnover meetings, observations of operator performance, and reviews of control room logs and documentation were performed.

b. Observations and Findings

The inspectors observed operators in both control rooms as they responded to annunciator alarms, performed control board manipulations, and performed control board walkdowns for shift turnovers. The observed activities were performed in accordance with management's expectations. Communication, log keeping, and shift turnovers were thorough and professional. Control board manipulations were performed with appropriate caution and attention to detail.

On November 6, the inspector observed the Unit 2 control room operators responding to multiple computer alarms in accordance with alarm response procedures when a processor failed in the emergency response facility data acquisition and display system. The shift supervisor maintained good command and control throughout the evolution. The cause of the alarms was promptly identified and communicated by the operators. The Instrumentation and Controls supervisor was notified in a timely manner.

c. Conclusions

The operators continued to operate the plant in a professional manner. Alarm response activities and communications were considered good.

O2 Operational Status of Facilities and Equipment

O2.1 Plant Tours (Units 1 and 2)

a. Inspection Scope (71707)

The inspectors toured portions of the accessible plant areas in Units 1 and 2 on a daily basis. Areas of special attention during this inspection period included:

Unit 2 mechanical auxiliary building charging pump rooms and chemical and volume control system valve piping and penetration areas.

Unit 1 mechanical auxiliary building component cooling water system pumps, valves, and piping.

Standby Diesel Generators 12 and 23.

Unit 2 isolation valve and auxiliary feedwater pump cubicles.

All areas toured were appropriately clean and orderly. Equipment availability and material condition were excellent.

O8 Miscellaneous Operations Issues

O8.1 (Closed) Violation 499/96001-01: Two Main Feedwater Isolation Valves Out of Service in Mode 3

This violation cited a failure to meet the operability requirements of Technical Specification 3.7.1.7 while Unit 2 was in MODE 3 because two main feedwater isolation valves were inoperable at the same time. The licensee determined that the event was a result of a misapplication of Technical Specification (TS) 3.7.1.7 and a failure of the shift supervisor to recognize that TS 3.0.3 should have been entered. A detailed description of this event was documented in NRC Inspection Report 50-498/96-01; 50-499/96-01. LER 499/96-001 was written to describe the event and delineate the corrective actions. Based on the corrective actions taken this violation is closed.

O8.2 (Closed) Licensee Event Report (LER) 499/96-001: TS 3.0.3 Entry Due to Two Main Feedwater Isolation Valves Being Inoperable at the Same Time

This LER was written in response to Violation 499/96001-01 discussed in Section O8.1. The analysis of the event and root cause identification were good. The corrective actions have been completed. This LER is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments on Field Maintenance Activities

a. Inspection Scope (62707)

The inspectors observed all or portions of the following work activities, identified by their work authorization numbers:

Unit 1:

- 79963 Packing replacement on Valve SI-MOV-001B, Train B emergency core cooling system refueling water storage tank suction valve.
- 97331 Calibration of all feedwater flow transmitters.

Unit 2:

- 97549 Solenoid valve replacement on Component Cooling Water Return Valve FV-4493.
- 97756 Channel 4 over power differential temperature (OPDT) card replacement and calibration.

b. Observations and Findings

The inspectors found the work performed under these activities to be professional and thorough. The mechanics and technicians demonstrated a detailed knowledge of procedures and equipment associated with the tasks. Supervisors and system engineers were observed monitoring job progress and providing oversight.

During as-found testing of the Valve SI-MOV-001B motor actuator, technicians determined that the indicated motor current was higher than expected. The technicians stated that the motor current had been trending near the top of the acceptable current band. The technicians also observed indications of packing material rubbing off on the valve stem. The technicians notified their supervisor and the scope of the maintenance was expanded to include packing replacement. The valve packing was replaced in accordance with approved work instructions. The inspector determined that the motor current was satisfactory in the postmaintenance test.

On November 22, the Unit 2 Channel 4 OPDT spiked low and caused a trip of its associated bistables for approximately 30 seconds. This condition had previously occurred for a shorter duration, however, no data was captured by the plant

computer to facilitate troubleshooting. Analysis of the November 22 data determined that the source of the problem was one of three printed circuit cards. On November 27, Instrumentation and Controls technicians replaced the three cards in question so that they could be mapped to identify the failed component. The channel was then calibrated and restored to service. The card replacement was performed in lieu of troubleshooting in order to reduce the amount of time that the bistables remained tripped. The inspector considered this good risk informed maintenance planning.

c. Conclusions

The inspectors concluded that routine maintenance activities observed were professionally performed by knowledgeable mechanics and technicians. Maintenance supervisors provided an appropriate level of field supervision and oversight. The repair of the Unit 2 Channel 4 OPDT cards was well planned and included actions to minimize risk.

M1.2 General Comments on Surveillance Testing

a. Inspection Scope (61726)

The inspectors observed all or portions of the following surveillances:

Unit 1:

- Plant Surveillance Procedure OPSP03-DG-0002, Revision 7: Standby Diesel 12 operability test.

Unit 2:

- Plant Surveillance Procedure OPSP03-AF-0007, Revision 6: Auxiliary Feedwater Pump 24 inservice test.

b. Observations and Findings

The inspectors found that the testing activities were professional and thorough. All observed tests were performed in accordance with the approved surveillance procedure. Technicians were experienced and knowledgeable of their assigned tasks. Surveillance tests were satisfactorily completed within their TS-required frequency, and procedures properly implemented the surveillance requirements. Test instruments were within their current calibration cycle. Dual verification was observed when required by procedures, and the technicians informed the control room operators of expected alarms.

c. Conclusions

The inspectors concluded that the observed surveillance tests were well performed and fully implemented the associated TS surveillance requirements.

III. Engineering

E1 Conduct of Engineering

During a procedure review of Plant Maintenance Procedure OPMP05-FW-0510, "Feedwater Flow Loop Calibration," a licensee engineer discovered that the Unit 1 scaling data values for the feedwater flow transmitters were the same as for Unit 2. If the Unit 2 values had been used in the calibration of nuclear instruments, the instrument error introduced would have been in the nonconservative direction. Upon discovery, the issue was discussed with the shift supervisor who directed a reactor power reduction to 50 percent until the issue could be resolved. The inspector followed the progression of problem resolution, operability reviews, and corrective action implementation. The amount of nonconservatism was found to be very small and within the accuracy range of the instrument set-points. The erroneous calibration data was found to have not been used during the most recent flow transmitter calibrations, nevertheless, all of the Unit 1 flow transmitters were recalibrated using the appropriate scaling data (Section M1.1). The licensee was investigating the human performance aspect in accordance with the condition reporting process.

E3 Engineering Procedures and Documentation

E3.1 Permanent Plant Modification Review

a. Inspection Scope (37550)

The inspectors reviewed the design change packages for modifications to the quality display parameter system, toxic gas monitors, and the heating, ventilation, and air conditioning (HVAC) systems for the control room and fuel handling building. The review verified conformance with applicable installation and testing requirements, 10 CFR 50.59 safety evaluations, postmodification testing requirements, and operability determinations. The inspectors also interviewed engineering and operations personnel involved with the modifications.

b. Observations and Findings

The inspectors reviewed the major modification performed under Design Change Packages 94-156-10 and 94-156-11, "QDPS Required Commitments", Revision 3. Since this modification to the quality display parameter system (QDPS) required both hardware and software changes, Westinghouse was hired as the primary vendor for the modification. The modification was originally scheduled to be

implemented during the Fall 1996 outage and the vendor's schedule was developed accordingly. Subsequently, the outage was moved up to May 1996, causing a compression in the vendor's development schedule. Although problems did arise with the vendor's product, they were identified in the normal course of the licensee's engineering review and validation of the design changes. The modification was implemented without complications and the licensee had not identified any system operability or availability problems.

The inspectors also reviewed Design Change Package 94-3615-10, "Toxic Gas Monitor Removal," and associated Unreviewed Safety Question Evaluation 95-0027 and Condition Report 95-9784. During the development of the package for removal of the toxic gas monitors, the licensee had failed to remove one of the associated surveillance tests required by Technical Specification 4.7.7.e. The licensee identified this error and issued Condition Report 95-9784 to correct the problem. The inspectors determined that the problem was satisfactorily resolved.

The inspectors also reviewed Plant Change Form 204649A, which removed battery packs from the fuel handling building HVAC system actuators and replaced them with a Class-1E power feed from the 125 Vdc station batteries. The implementation of this modification commenced in early 1995. In March 1996, the flow transmitter for Train B of the fuel handling building HVAC system damper failed, rendering Train B of fuel handling building HVAC inoperable. Condition Report 96-3056 and Licensee Event Report 96-02 indicated that the cause of the transmitter failure was the design change. The original plant change form and modification review were found to be inadequate. The concerns associated with the design change implementation were due to less than adequate consideration of all design input information and lack of confirmation of all design inputs. Condition Report 96-3056 and LER 96-02 documented comprehensive investigations and corrective actions. These concerns were considered an isolated case based on review of other plant change forms. The corrective actions included not only equipment/component changes, but also program and process changes. These actions included: (1) the installation of a 125 to 24 Vdc power converter, connected to the loss-of-AC damper closure circuits of the fuel handling building filtration system for both units, (2) a revision to the design change procedure to provide clearer guidance on gathering design inputs, (3) providing improved guidance for performance and documentation of design verification, and (4) provided training and re-emphasis of management expectations on modification ownership and the use of a modification team concept for modification activities.

E3.2 Condition Report Review

a. Inspection scope

The inspectors reviewed Condition Report 95-1360 which identified potential problems associated with the 125 Vdc power supply from the station batteries to the fuel handling building and control room HVAC systems. The inspectors also

reviewed Condition Report 96-3056, which documented the failure of the Train B fuel handling building exhaust system to operate in automatic mode.

b. Observations and Findings

The inspectors found that the condition reports were thorough and comprehensive. Condition Report 95-1360 addressed the concerns and the weaknesses of the new modification process. Because there were no actual equipment failures, most of the investigations and corrective actions revolved around programs and processes. The inspectors found that the corrective actions taken in response to the condition reports were adequate to prevent recurrence. The condition reports reviewed also generated operability and reportability evaluations which were reviewed by the inspectors and found to be adequate.

The inspectors interviewed four system engineers and five design engineers regarding the condition reporting process. All of the personnel interviewed understood the condition reporting process, all said they were never discouraged or put under pressure by management from writing a condition report but were actually encouraged by management to do so. All were adamant that they would not hesitate to write a condition report, under any circumstances (work load, management pressure, etc.) if an issue was identified.

E3.3 Conclusions on Engineering Procedures and Documentation

The inspectors concluded that two of the three selected modifications were properly installed and successfully tested to ensure operability. The modification pertaining to the fuel handling building and control room HVAC system dampers initially was inadequate, but did not cause any immediate system failures. The condition report and LER issued in March 1996, due to transmitter failure of the fuel handling building HVAC damper, was a more thorough and comprehensive investigation of the problem than the previous efforts by the licensee. The current configuration and status of the systems support operability.

E8 Miscellaneous Engineering Issues (92903)

E8.1 (Closed) Inspection Followup Item 498;499/93006-12: Pressure Locking and Thermal Binding of Gate Valves

This item involved the licensee's efforts to complete reviews of the Generic Letter 89-10 motor-operated valve population for susceptibility to pressure locking and thermal binding and to take corrective actions, where necessary, to ensure valve operability. Subsequently, the NRC issued Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves." The licensee's response to this generic letter is currently under review by the NRC Office of Nuclear Reactor Regulation. This issue will be fully resolved under Generic Letter 95-07; therefore, this item is closed.

E8.2 (Closed) LER 498/96-002: Failure to Meet Requirements of TS due to not Performing a Required Surveillance at an Increased Frequency Interval

On May 7, 1996, while reviewing trending analysis data of an inservice test on Essential Chilled Water Pump 11A, it was determined that on February 1, 1996, Vibration Point 4H indicated that the high alert range was entered. The test record indicated that reviewers did not recognize that the alert range had been entered. An increase in testing frequency was required when the pump parameter entered the alert range. For Essential Chilled Water Pump 11A, the normal quarterly testing frequency should have been increased to every 6 weeks when the alert range was entered.

The increase in testing frequency, required as a result of being in the alert range, had not been performed. The next inservice test of the pump, following the February 1, 1996, test, was performed at the normal testing interval on April 24, 1996. Failure to perform increased frequency testing, when required, was a violation of TS 4.0.5 requirements for the performance of inservice testing of ASME Code Class 1, 2, and 3 pumps in accordance with Section XI of the ASME Boiler and Pressure Vessel code and applicable Addenda as required by 10 CFR Part 50, Section 50.55a(g). This licensee-identified and corrected violation is being treated as a noncited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (498/96008-01).

The results of the April 24, 1996, inservice test and of a subsequent test performed on May 13, 1996, indicated Vibration Point 4H was within the acceptance range. No corrective maintenance had been performed on the pump between the test performed on February 1, 1996 and the subsequent April and May surveillance tests. Vibration spectral analysis did not support any indication of pump degradation. The Vibration Point 4H test result from the February 1, 1996 was determined to be inconsistent with other trending data and the pump was removed from increased testing frequency on May 21, 1996.

Inservice test results for Essential Chilled Water Pump 11A are typically recorded on a working copy of the test procedure in the field. The recorded results are compared with the acceptance values during test performance. After completion of the test, the results are transcribed to a controlled copy of the test procedure and then reviewed for approval. Although not conclusive, the Vibration Point 4H results may have been incorrectly transcribed to the controlled copy of the test procedure. Feedback from this event has been provided to the individuals involved. The lessons learned from this occurrence were provided to personnel associated with Section XI inservice testing. The lessons learned included reinforcement of expectations regarding documentation and review of testing results.

E8.3 (Statused Open) Inspection Followup Item 498;499/9612-01: Auxiliary Feedwater System Performance Impact

On November 14, 1996, NRC staff members held a telephone conference with the licensee to discuss the performance of the auxiliary feedwater system with regard to the criteria in the licensee's safety analysis report and TS. The staff had expressed concern that automatic actuation of the auxiliary feedwater system, following an uncomplicated reactor trip, could possibly result in failure to satisfy the design basis criteria of Section 4.4.1 of the safety analysis report. Further, the staff had expressed concern that the TS requirements for cooldown rate or shutdown margin could be violated for this condition. The concerns were predicated on the requirement of Section 10.4.9 of the safety analysis report which stated in part, "Under any condition, the AFWS is capable of starting and operating unattended for at least 10 minutes."

The licensee responded that the requirements of Section 10.4.9 of the safety analysis report were applicable only to Conditions III and IV events (infrequent, complicated, or severe events). Since the NRC staff's concerns were with Condition II events (uncomplicated trips), the 10 minutes of unattended operation did not apply. The licensee further stated that ANSI 58.8-1984, "Time Response Design Criteria for Nuclear Safety Related Operator Action," permitted optional operator action for Condition II events after the first 5 minutes. The licensee further indicated that operators were trained to take early manual control of the auxiliary feedwater system following an uncomplicated trip and, therefore, operator action would prevent exceeding cooldown rate limits and maintain minimum acceptable shutdown margin.

The staff pointed out that the emergency operating procedures that would be in use following an uncomplicated trip did not expressly direct the operators to reduce the auxiliary feedwater injection rate to control cooldown. The licensee remarked that the emergency operating procedure users guide provided latitude for taking manual control of the auxiliary feedwater system early in event response to limit cooldown. However, the licensee acknowledged that operators were not expected to reference the emergency operating procedure users guide as a part of emergency operating procedure implementation. The staff further pointed out that a significant plant cooldown due to auxiliary feedwater system actuation following an uncomplicated trip was expected plant behavior; however, the licensee relied on the "Response Not Obtained" actions of emergency operating procedures to cue the operators to manually reduce auxiliary feedwater flow. At that point the licensee participants to the conference stated that they lacked the expertise to address the staff's concerns regarding emergency operating procedure adequacy. They requested that the staff schedule a subsequent meeting with licensee personnel knowledgeable in emergency operating procedure content and use requirements.

The staff concluded that the licensee's operation of the auxiliary feedwater system following an uncomplicated trip did not conflict with the safety analysis report and

was adequate to maintain plant parameters within TS. However, the inspection followup item will remain open pending a review of the adequacy of the emergency operating procedures with respect to this expected plant behavior.

E8.4 (Closed) Violation 498;499/95001-02: Failure to Perform Operability Test of Fire Detection Instruments

The inspectors found the corrective actions described in the licensee's response letter, dated April 5, 1995, reasonable and complete. No similar problems were identified and the inspectors concluded that the licensee's corrective action should be effective.

E8.5 (Statused Open) Followup Item 498;499/95001-01: Concern on Effectiveness of Fire Watch Training Program

This item was previously opened pending an inspector review of changes to the fire watch training program to ensure that fire watch personnel were able to accurately identify the three classes of fires and the appropriate agents to extinguish them. The licensee informed the inspectors that the lesson plans and the associated training film had been revised to improve the retention of the training regarding the class of fires and the types of extinguishers that should be used for various types of fires.

During this inspection, the inspectors interviewed four fire watch personnel and none were able to describe a Class C fire nor the type of fire extinguisher that should be used to extinguish it. However, the fire watch personnel interviewed were cognizant of their station fire watch responsibilities and duties. On November 7, 1996, the licensee initiated Condition Report 96-13903 to evaluate and determine appropriate corrective actions to address this issue. The inspectors concluded that the revised lesson plan was not effective in resolving the apparent lack of retention in training regarding the class of fires.

This item will remain open pending inspector review of the effectiveness of the corrective actions taken when Condition Report 96-13903 is closed.

IV. PLANT SUPPORT

R1 **Radiological Protection and Chemistry Controls**

R1.1 Tours of Radiological Controlled Areas (RCAs)

a. Inspection Scope (71750)

The inspectors routinely toured the RCAs in Units 1 and 2. These tours included sampling of locked doors, observation of work and verification of proper radiological work permits, and observations of entrance and egress from the RCAs.

b. Observations and Findings

Work activities in radiologically controlled areas were appropriately controlled in accordance with the radiological work permits. Radiological housekeeping was very good and accessible contaminated areas were properly controlled. No discrepancies were found when checking locked doors. Entrance and egress from the RCAs was in accordance with radiation protection procedures. Hand carried tools were observed being frisked prior to removal from the RCAs.

c. Conclusions

Implementation of radiological controls continue to be good.

P1 Conduct of EP Activities (71750)

The inspector observed the activation and subsequent operations in the Unit 1 Technical Support Center during a graded exercise on October 30, 1996. As a member of the NRC evaluating team, the inspector observed and evaluated the technical support center staff as they performed tasks necessary to respond to the exercise scenario conditions. The results of the evaluation were documented in NRC Inspection Report 50-498/96-23; 50-499/96-23. Overall, the technical support staff's performance was very good, with only minor discrepancies identified.

S1 Conduct of Security and Safeguards Activities (71750)

On November 24, the inspector toured the protected area boundary. Isolation zones were free of obstructions, lighting was appropriate, and security officers were observed on routine patrols.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Berg, Manager, Mechanical Maintenance Manager, Unit 1
M. Berrens, Manager, Unit 1 Work Control
H. Butterworth, Operations Manager, Unit 2
T. Cloninger, Vice President, Nuclear Engineering
K. Coates, Maintenance Manager, Unit 2
W. Cottle, Executive Vice President and General Manager
D. Daniels, Manager, Operating Experience Group
A. Granger, Administrator
E. Halpin, Division Manager, Design Engineering Department
S. Head, Supervisor, Compliance
K. House, Supervisor, Design Engineering Department
C. Johnson, Manager, South Texas Project Activities
T. Jordan, Manager, Systems Engineering
M. Knavos, Manager, Mechanical/Fluid Systems
J. Lovell, Operations Manager, Unit 1
R. Masse, Plant Manager, Unit 2
M. McBurnett, Manager, Licensing
M. Meier, Manager, Nuclear Information Systems
G. Parkey, Plant Manager, Unit 1
D. Schulker, Compliance Engineer
J. Sheppard, Assistant to Executive Vice President
B. Taylor, Supervisor, Work Control

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
IP 61726: Surveillance Observations
IP 62707: Maintenance Observations
IP 71707: Plant Operations
IP 71750: Plant Support Activities
IP 92901: Followup - Plant Operations
IP 92903: Followup - Engineering
IP 93702: Prompt Onsite Response to Events at Operating Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

498/96008-01

*NCV

Failure to perform a required surveillance on increased frequency.

Closed

498/96008-01	*NCV	Failure to perform a required surveillance on increased frequency.
499/96001-01	VIO	Two Main Feedwater Isolation Valves Out of Service In Mode 3
499/96-001	LER	TS 3.0.3 Entry Due to Two Main Feedwater Isolation Valves Being Inoperable at the Same Time
498;499/9306-12	IFI	Pressure Locking and Thermal Binding of Gate Valves
498/96-002	LER	Failure to perform a required surveillance at an increased frequency
498;499/95001-02	VIO	Failure to Perform Operability Test of Fire Detection Instruments

Statused Open

498;499/96012-01	IFI	Auxiliary Feedwater System Performance Impact
498;499/95001-01	IFI	Concern on Effectiveness of Fire Watch Training Program

* The noncited violations identified in this report require no further NRC review and are considered both opened and closed in this inspection report.

LIST OF ACRONYMS USED

HVAC	heating, ventilation, and air conditioning
LER	Licensee Event Report
NRC	Nuclear Regulatory Commission
OPDT	over power differential temperature
QDPS	Qualified Display Processing System
RCA	Radiological Controlled Area