

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

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

Report No: 50-498/96-09; 50-499/96-09

Licensee: Houston Lighting & Power Company

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

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

Dates: December 1, 1996, through January 11, 1997

Inspectors: D. P. Loveless, Senior Resident Inspector
J. M. Keeton, Resident Inspector
W. C. Sifre, Resident Inspector
R. A. Kopriva, Project Engineer
C. A. Clark, Reactor Inspector
G. M. Good, Senior Emergency Preparedness Analyst

Approved by: J. I. Tapia, Chief, Project Branch A
Division of Reactor Projects

EXECUTIVE SUMMARY

South Texas Project, Units 1 and 2
NRC Inspection Report 50-498/96-09; 50-499/96-09

This resident inspection included aspects of licensee operations, engineering, maintenance, and plant support. In addition, inspections covering the areas of emergency preparedness dose assessment and engineering assessments were conducted by Region-based inspectors. The report covers a 6-week period of resident inspection.

Operations

- Control room operations reflected operator attention to detail, positive shift turnover activities, quality supervision, and formal communications (Section O1.1).
- Equipment material condition was excellent. Housekeeping was generally good. Management was actively involved in overseeing plant activities (Section O2.1).
- Licensed operators in Unit 2 failed to anticipate or respond to an inadvertent reactor coolant system boration until after reactor parameters were outside the stated management expectations for the evolution (Section O4.1).
- One Technical Specification interpretation contained an informal reference to NRC approval. The interpretation was reviewed by plant management and deleted (Section O8.1).

Maintenance

- Observed maintenance and surveillance activities were properly conducted and appropriately implemented Technical Specification requirements (Section M8.1).

Engineering

- Corrective measures to address issues raised by a contractor review of the setpoint program were not properly entered into the licensee's corrective action program (Section E2.1).

Plant Support

- Routine radiological controls observed were effective. Contamination control efforts for the Unit 2 spent fuel pool gate seal replacement were very good (Section R1.1).
- A commitment to perform on-shift dose assessment was clearly and appropriately described in the emergency plan and implementing procedures (Section P3.1).

Report Details

Summary of Plant Status

Unit 1 operated at essentially 100 percent reactor power throughout this inspection period.

Unit 2 began this inspection period at 100 percent reactor power. On December 24, reactor power was reduced to approximately 80 percent in response to a failure in the cooling system for main turbine lubricating oil. The cooling system was returned to service under manual control, and the reactor was returned to 100 percent power. On December 31, Unit 2 reactor power was inadvertently reduced to approximately 97.5 percent when operators inadvertently injected an excessive amount of boric acid into the reactor coolant system. The reactor was slowly returned to full power and remained at full power for the duration of the 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 the conduct of operations in the Units 1 and 2 control rooms. Frequent reviews of control board status, routine attendance at shift turnover meetings, observations of operator performance, and reviews of control room logs and documentation were performed.

b. Observations and Findings

During routine observations and interviews, the inspectors determined that the control room operators were continually aware of existing plant conditions. Operators responded to annunciator alarms in accordance with approved procedures. Annunciator alarms were promptly announced to the control room staff who, in turn, acknowledged by restating the announcement. The unit supervisors remained cognizant of ongoing activities.

The inspectors routinely attended shift turnover meetings. The on-shift operators provided clear and concise information to the oncoming operators. Oncoming operators routinely reviewed the control room logs, discussed current plant conditions, and verified major equipment status. Plant managers and operations department managers were often observed attending shift turnover meetings.

c. Conclusions

The inspectors concluded that licensed operators in the control room performed in a professional manner, with an appropriate focus on safety. Shift turnover meetings were thorough and routinely attended by management personnel.

O2 Operational Status of Facilities and Equipment

O2.1 Plant Tours (Units 1 and 2)

a. Inspection Scope (71707)

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

- Unit 1 Standby Diesel Generators
- Unit 1 Isolation Valve Cubicles
- Units 1 and 2 Turbine Generator Buildings
- Unit 1 Essential Cooling Water Pump Cubicles
- Units 1 and 2 Fuel Handling Buildings
- Units 1 and 2 Mechanical Auxiliary Buildings

The inspectors found that plant equipment was maintained in excellent material condition. Plant housekeeping was good. However, several minor deficiencies were noted, including unsecured equipment and a failed fire door latch. All deficiencies were communicated with the appropriate shift supervisor and were corrected. Licensee management was routinely observed in the plant monitoring plant equipment and work activities.

c. Conclusions

The inspectors concluded that equipment material condition, plant cleanliness, and equipment availability were excellent. Licensee management was actively involved in monitoring ongoing work activities and the material condition of the plant.

O4 Operator Knowledge and Performance

O4.1 Inadvertent Boration of the Reactor Coolant System

a. Inspection Scope (71707)

On December 31, the inspectors observed Unit 2 licensed operators preparing to place the boron thermal regeneration system in service. The system was to be utilized for end-of-life reductions in reactor coolant system boron concentrations. The inspectors reviewed the procedural guidance and management expectations governing the evolution. In addition, the inspectors reviewed the circumstances surrounding an inadvertent boration of the reactor coolant system during the conduct of the evolution.

b. Observations and Findings

A preevolution briefing was conducted that detailed the potential consequences of misoperation of the system and clearly delineated management expectations for its safe operation. During the preparations for initiating the system, licensed operators realigned the boron concentration monitoring system to the alternate sample point in accordance with Plant Operating Procedure OPOP02-CV-0002, "Boron Thermal Regeneration System." Following the realignment, the monitor indicated boron concentrations more than 30 times the known reactor coolant system concentration.

Operators stated that a small amount of highly borated water may have flushed through the sample line. This water came from a portion of the system sample lines normally isolated during plant operations. Although operators had an indication of the concentration of the water and the approximate volume of the line flushed, no clear actions were taken to counteract or mitigate the consequences of such a boration. The system engineer noted that a low flow alarm was locally present at the boron concentration monitor. This was assumed to be the reason that the monitor had indicated such high concentration levels. Operators continued to align the boron thermal regenerator system for operation.

Approximately 20 minutes after the realignment of the boron monitor, decreasing reactor coolant system temperatures indicated that a larger than anticipated amount of highly borated water had entered the reactor coolant system. Operators began a series of controlled dilutions in an attempt to stabilize reactor coolant system temperatures. Several small turbine load reductions were also initiated.

Approximately 1 hour later, reactor power was stabilized at 3715 MWth, with reactor coolant system average temperature 0.9°F below the reference temperature. This was well below management's stated expectation of maintaining reactor thermal power between 3795 and 3800 MWth at the reference temperature during boron thermal regeneration system operations. Operators continued to dilute the reactor coolant system and eventually returned the reactor to 100 percent rated thermal power.

c. Conclusions

The inspectors concluded that Unit 2 operators had not properly anticipated the introduction of highly borated water into the reactor coolant system while realigning the boron concentration monitoring system. In addition, operators failed to take action or to prepare for the reactivity change despite indications of the magnitude of the boration. The resulting reactivity change in the reactor clearly failed to meet management expectations for the evolution.

O8 Miscellaneous Operations Issues (92901)

- O8.1 The inspectors conducted a survey of the licensee's Technical Specification interpretations and determined that the following document contained informal references to NRC review and/or approval without formal NRC documentation:

Technical Specification Interpretation 0012, "Interpretation of the Scope of Inspections Required by Technical Specification 3.4.10."

The inspectors informed the Licensing Supervisor that this form of NRC involvement in Technical Specification interpretations is not recognized by the Commission and is not an acceptable practice. The inspectors requested that the licensee remove any informal references to NRC review and/or approval from their interpretations. After an appropriate review of the subject document, licensee management deleted Technical Specification Interpretation 0012.

- O8.2 (Closed) Violation 50-498/96004-01: failure to identify plastic bags left inside containment at Mode 1 during a Technical Specification required containment closeout surveillance. The inspector verified that the corrective actions described in the licensee's response letter, dated July 17, 1996, were reasonable and complete. No similar problems were identified.
- O8.3 (Closed) Licensee Event Report 50-498/96-003: failure to identify plastic bags left inside containment at Mode 1 during a Technical Specification required containment closeout surveillance. This event was discussed in NRC Inspection Report 50-498/96-04; 50-499/96-04. No new issues were revealed by this report.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments on Field Maintenance Activities

a. Inspection Scope (62707)

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

Unit 1:

- 98161 Inspect and Adjust Brushes on Standby Diesel Generator 11
- 45732 Inspect, Trend, and Diagnostic Test on Low Head Safety Injection Pump 1A

Unit 2:

- 98340 Instrument Air Compressor 21 Pressure Switch Replacement
- 06834 Spent Fuel Pool Inner Gate to Cask Handling Area Seal Replacement

b. Observations and Findings

The inspectors found the work performed during these activities to be thorough and conducted in a professional manner. The work was performed by knowledgeable, qualified technicians utilizing approved procedures. Supervisors were observed providing an appropriate level of oversight. System engineers were observed providing quality technical support as needed. Prejob briefings were thorough and radiological controls were in place where applicable.

c. Conclusions

The observed maintenance activities were conducted in a professional manner. Personnel involved were thorough and met management's expectations for the implementation of the maintenance program.

M1.2 General Comments on Surveillance Testing

a. Inspection Scope (61726)

The inspectors observed portions of the following surveillance activities:

Unit 1:

- Plant Surveillance Procedure OPSP03-SP-0009C, Revision 6, "SSPS Actuation Train C Slave Relay Test."

Unit 2:

- Plant Surveillance Procedure OPSP05-NI-0032, Revision 3, "Source Range Neutron Flux Channel II Calibration."

b. Observations and Findings

The inspectors found that the observed surveillance activities were performed in accordance with approved procedures. The inspectors reviewed the surveillance procedures and determined that they properly implemented the associated Technical Specifications requirements. The inspectors verified that test instruments and operating systems were within current calibration cycles. Expected alarms were communicated to the control room operators prior to initiation.

c. Conclusions

Observed surveillance activities were performed in accordance with Technical Specifications requirements with no observed discrepancies.

M8 Miscellaneous Maintenance Issues (92700)

- M8.1 (Closed) Licensee Event Report 50-498/95-012: residual heat removal pump impeller cracks caused by improper manufacturing processes. When maintenance personnel replaced gaskets on Residual Heat Removal System Pump 1C, cracks were noted on the pump impeller.

This issue had been previously reviewed, in detail, as documented in NRC Inspection Reports 50-498/95-23; 50-499/95-23, 50-498/95-24; 50-499/95-24, and 50-498/96-17; 50-499/96-17. Licensee personnel and the vendor conducted a detailed engineering evaluation of the cracks in the impeller and determined that the cause of this event was improper manufacturing of the impeller. The inappropriate manufacturing processes included improper flange hardening of the wear ring, incorrect weld material utilized in weld repairs, and over-machining of the radius region. The Residual Heat Removal System Pump 1C impeller was replaced with a spare impeller. The inspectors verified that appropriate engineering hold points had been developed to ensure quality manufacturing for future purchases of spare pump impellers and that further visual inspections of emergency core cooling system pump impellers would be conducted as opportunities arise during other corrective/preventive maintenance activities.

The inspectors reviewed the licensee's cause determination and corrective actions for this voluntary licensee event report and determined them to be thorough and appropriate.

III. Engineering

E2 Engineering Support of Facilities and Equipment

- E2.1 Review of Final Safety Analysis Report (FSAR) Commitments

A recent discovery of a licensee operating their facility in a manner contrary to the FSAR description highlighted the need for a special focused review that compares plant practices, procedures, and parameters to the FSAR description.

While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the FSAR that related to the areas inspected. The inspectors verified that the FSAR working was consistent with the observed plant practices, procedures, and/or parameters.

E2.2 Evaluation of South Texas Project Engineering Activities

a. Inspection Scope (37551)

The inspectors reviewed the licensee's controls and self-assessments of engineering activities conducted on site. Engineering followup activities associated with a contractor's assessment of the South Texas Project Setpoint Program were reviewed. This evaluation was performed to determine whether there were strengths or weaknesses in the controls governing the identification and resolution of the reviewed issues that could enhance or degrade plant operations or safety.

b. Observations and Findings

The inspectors reviewed the results of two assessments performed by a contractor of the South Texas Project Setpoint Program. The results of these assessments were provided to the licensee in the following letters:

- Letter ST-5W-HS-090229, dated April 18, 1995, "Submittal of Task 2 of South Texas Project Setpoint Program assessment (Identification of existing setpoint calculations and the detail of revision needed)." This letter identified that there were Technical Specification/safety-related setpoint calculations that, in the contractor's opinion, required minimal, nominal, or major revision.
- Letter ST-5W-HS-090237, dated June 2, 1995, "Submittal of Task 3 of South Texas Project Setpoint Program assessment (Identification of setpoints with and without calculations)." This letter identified that there appeared to be Technical Specification/safety-related setpoints that did not have a calculation to document their bases.

During discussions with licensee representatives, the inspectors requested copies of any formal documented corrective measures that had been established to assure that the conditions noted in the two assessments were promptly corrected. The inspectors were notified during these discussions that, while the results of the two assessments were discussed in engineering department meetings and other licensee meetings, there was no formal documentation. It appeared that the issues raised in these letters should have been tracked in the licensee's corrective action program and documented as a condition not adverse to quality. The letters did raise questions concerning the status of the setpoint calculations. However, licensee management had determined, at that time, that these questions did not in themselves constitute a condition adverse to quality because the ongoing program to review each setpoint calculation would incorporate the contractor's general observations and provide appropriate corrective action program implementation.

Engineering management informed the inspectors that the contractor's reports had been commissioned by the licensee to provide the scope for a setpoint program upgrade initiated in 1994. Review of the setpoint calculations had been delayed in

1995 while an ongoing review of instrument scaling could be completed. Following the inspectors' questions, engineers documented the issues raised in the contractor's letters as a condition not adverse to quality in Condition Report 96-16020. Plans for addressing these issues included conducting a self-assessment of the setpoint calculation issues scheduled for February 1997.

c. Conclusions

The inspectors determined that, although a condition report should have been written in April 1995 to address these issues, no violation had occurred. The inspectors will conduct a review of the licensee's self-assessment and follow the actions taken to evaluate the apparent discrepancies in the setpoint program. These reviews will be tracked as Inspection Followup Item 498;499/96009-01.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 Tours of Radiological Controlled Areas (71750)

- a. The inspectors routinely toured the mechanical auxiliary and fuel handling buildings in Units 1 and 2. These tours included observation of work, verification of proper radiological work permits, sampling of locked doors, and observations of personnel entrance and egress from the radiological controlled areas.
- b. Radiological housekeeping in the areas toured was very good. Doors required to be locked in accordance with Technical Specification 6.12.2 and the licensee's radiological program were properly secured. No entrance/egress discrepancies were identified.

On January 9, 1997, the inspector observed the radiological control efforts during the replacement of a spent fuel pool gate seal in Unit 2. The task was performed with the continuous coverage and support of a health physics technician. A contaminated area boundary was established around the area where the gate was placed upon removal from the spent fuel pool. Additional contamination control efforts included hosing down the gate as it was lifted from the spent fuel pool and the performance of a radiological survey of the gate surface prior to transport to the work area.

c. Conclusions

Contamination control efforts for the Unit 2 spent fuel pool gate seal replacement were very good. Routine radiological controls observed were effective.

P3 Emergency Preparedness Procedures and Documentation

P3.1 Licensee On-shift Dose Assessment Capabilities (TI 2515/134)

a. Inspection Scope

Using Temporary Instruction 2515/134, the inspectors gathered information regarding:

- Dose assessment commitment in emergency plan
- On-shift dose assessment emergency plan implementing procedure
- On-shift dose assessment training

b. Observations and Findings

On November 17, 1996, the inspectors conducted an in-office review of the emergency plan and implementing procedures to obtain the information requested by the temporary instruction. The inspectors also conducted a telephone interview with the licensee on November 17, 1996, to verify the results of the review. Based on the documentation review and licensee interview, the inspectors determined that the licensee had the capability to perform on-shift dose assessments using real-time effluent monitor and meteorological data and that the commitment was clearly described in the emergency plan and implementing procedures. The inspectors identified those implementing procedures that initiated on-shift dose assessment upon indication of a release of radioactive materials. These documents are listed in the attachment to this inspection report.

c. Conclusion

The commitment to perform on-shift dose assessment was clearly described in the emergency plan and implementing procedures.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Berrens, Manager, Unit 1 Work Control
H. Butterworth, Manager, Operations Unit 2
T. Cloninger, Vice President, Nuclear Engineering
W. Cottle, Executive Vice President and General Manager Nuclear
A. Granger, Administrator, Nuclear Safety Evaluation
J. Groth, Vice President Nuclear Generation
S. Head, Licensing Supervisor
T. Jordan, Manager, Systems Engineering Department
M. Kanavos, Manager, Mechanical Fluid Systems Engineering
F. Mangan, General Manager, Plant Services
B. Masse, Plant Manager, Unit 2
G. Parkey, Plant Manager, Unit 1
D. Prator, Specialist, Quality Assurance
D. Rencurrel, Manager, Electrical/Instrumentation and Control
D. Schulker, Compliance Engineer
J. Sheppard, Assistant to Executive Vice President and General Manager
S. Thomas, Manager, Design Engineering Department
T. Waddell, Manager, Maintenance
F. Wagar, General Manager, Human Resources
G. Weldon, Manager, Staff Training

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
IP 61726: Surveillance Observation
IP 62707: Maintenance Observation
IP 71707: Plant Operations
IP 71750: Plant Support Activities
IP 92700: Onsite Follow-up of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92901: Followup - Plant Operations
TI 2515/134 Licensee On-shift Dose Assessment Capabilities

LIST OF DOCUMENTS REVIEWED

Emergency Plan Implementing Procedures

OERP01-ZV-SH01 Shift Supervisor
OERP01-ZV-SH02 Acting Radiological Manager
OERP01-ZV-TP01 Offsite Dose Calculation

Revision 10
Revision 2
Revision 5

Other Documents

South Texas Project Electric Generating Station Emergency Plan

Revision 1

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

498;499/96009-01	IFI	Review the self-assessment and actions taken to evaluate the apparent discrepancies in the licensee's setpoint program (Section E2.1)
------------------	-----	---

Closed

498/95-012	LER	Residual heat removal pump impeller cracks caused by improper manufacturing processes (Section M8.1).
------------	-----	---

498/96004-01	VIO	Failure to identify plastic bags left inside containment at Mode 1 during a Technical Specification required containment closeout surveillance (Section O8.2).
--------------	-----	--

498/96-003	LER	Failure to identify plastic bags left inside containment at Mode 1 during a Technical Specification required containment closeout surveillance (Section O8.3).
------------	-----	--