APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report No.: 50-498/93-48
50-499/93-48

Licenses: NPF-76
NPF-80

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

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

Inspection At: Region IV office, Arlington, Texas

Inspection Conducted: October 12, 1993, through March 18, 1994

Inspectors: M. A. Satorius, Project Engineer, Project Branch A
Division of Reactor Projects

W. C. Sifre, Reactor Engineer, Technical Support Staff
Division of Reactor Projects

Approved: W. D. Johnson 3/29/94
W. D. Johnson, Chief, Project Branch A Date

Inspection Summary

Areas Inspected: Routine in-office inspection of the Operations issues contained in the Diagnostic Evaluation Team (DET) Report.

Results:

- The Operations section of the DET report was reviewed. Based on this review, issues that the NRC considers necessary to be addressed which do not pertain to the restart of either unit were identified.

- Items identified in the review of the DET report related to nonrestart issues were assigned as inspection followup items (IFI) in order to facilitate tracking and eventual closure.

- Items related to Restart Issues identified in NRC Inspection Report 50-498/93-31; 50-499/93-31 that remained open were reviewed. Those items that had been adquately addressed during Restart Issue inspections were closed.

Summary of Inspection Findings:

- The following IFIs were opened:

  498;499/9348-16, -17, and -24.

- The following IFIs were opened and subsequently closed by referencing other NRC inspection reports:

  498;499/9348-01, -02, -03, -04, -05, -06, -07, -08, -09, -10, -11, -12, -13, -14, -15, -18, -19, -20, -21, -22, and -23.

- The following IFIs were closed:

  498;499/9331-10, -12, -13, -23, -26, -27, -30, -41, and -42.

Attachment:

- Persons Contacted and Exit Meeting

DETAILS

1 BACKGROUND

Both units at STP were shut down in early February 1993 and remained shut down as a result of numerous broad scope problems identified by the NRC and the licensee. Unit 1 was restarted in February 1994 after the conditions of the Confirmatory Action Letter were satisfied.

The NRC Office for Analysis and Evaluation of Operational Data conducted a Diagnostic Evaluation of STP during the period March 29 to April 30, 1993. The findings of this evaluation were forwarded to the licensee on June 10, 1993. Numerous items were documented in this report, including a number of issues that NRC considered of sufficient scope and safety significance to require resolution prior to either unit being restarted.

In an effort to identify the Operations issues that NRC did not consider necessary to address prior to restart, a review was conducted of the DET report. As a result of this review, the issues in the following sections were identified.

2 DIAGNOSTIC EVALUATION TEAM NONRESTART ITEMS RELATED TO OPERATIONS

This section was structured to address the issues in Section 2.1, "Operations," of the DET Report. The introductory section was not addressed because the issues addressed in the introduction were also determined to be identified in the detailed portion of the corresponding section of the report. In addition, the positive observations and Restart Issues were not addressed because these issues were determined to be not applicable or addressed in other NRC inspections.

2.1 IFIs Identified in Paragraph 2.1.1 of the DET Inspection Report

2.1.1 (Closed) IFI 498;499/9348-01: To accommodate the outage workload, the number of operating crews were reduced from five to four for each unit.

This item was closed based on the actions taken by the licensee to increase the number of operating crews to six, as documented in NRC Inspection Report 50-498/93-41; 50-499/93-41.

2.1.2 (Closed) IFI 498;499/9348-02: Operator training was reduced in scope and was often deferred to help compensate for marginal staffing levels.

This item was closed based on the action taken by the licensee to increase operator training and staffing levels as documented in NRC Inspection Reports 50-498/93-40; 50-499/93-40 and 50-498/93-41; 50-499/93-41.

2.1.3 (Closed) IFI 498;499/9348-03: The surveillance test program was also a significant resource burden on the control room staff in general and the senior reactor operators in particular.

This item was closed based on the action taken by the licensee to remove many of the administrative burdens placed on the control room staff and the senior reactor operators as documented in NRC Inspection Reports 50-498/93-40; 50-499/93-40, 50-498/93-41; 50-499/93-41, and 50-498/93-53; 50-499/93-53.

2.1.4 (Closed) IFI 498;499/9348-04: Operations, in lieu of the Instrumentation and Control Department, conducted the solid state protection system logic surveillances that essentially consumed the entire control room staff.

This item was closed based on the action taken by the licensee to reduce other administrative burdens on the control room staff. These reductions were accomplished by the implementation of the Operations Work Control Group (OWCG), establishing a six crew rotation of control room shift standers, and adding additional reactor plant operators (RPOs). These actions were documented in NRC Inspection Reports 50-498/93-40; 50-499/93-40, 50-498/93-41; 50-499/93-41, 50-498/93-53; 50-499/93-53, and 50-498/94-06; 50-499/94-06.

2.1.5 (Closed) IFI 498;499/9348-05: The work control program, including postmaintenance testing (PMT) and equipment clearance orders, had evolved to become cumbersome and labor-intensive.

This item was closed based on the action taken by the licensee in the establishment of the OWCG and the improvements made to the PMT reference manual for identification of PMT requirements as documented in NRC Inspection Reports 50-498/93-46; 50-499/93-46, 50-498/93-53; 50-499/93-53, 50-498/93-54; 50-499/93-54, and 50-498/94-08; 50-499/94-08.

2.1.6 (Closed) IFI 498;499/9348-06: The limited operational experience throughout the site organization placed an excessive reliance on the shift supervisor to screen work packages for safety impact and selection of appropriate PMT.

This item was closed based on the action taken by the licensee to remove the burden on the shift supervisor concerning the selection of appropriate PMTs and the screening of work packages for safety impact. This responsibility currently rests with the OWGC and was documented in NRC Inspection Reports 50-498/93-41; 50-499/93-41, 50-498/93-46; 50-499/93-46, 50-498/93-53; 50-499/93-53, and 50-498/93-54; 50-499/93-54.

2.1.7 (Closed) IFI 498;499/9348-07: The shift supervisor spent considerable time reviewing work packages to determine the appropriate PMT requirements because the PMT requirements recommended by the work planners were often vague and unusable.

This item was closed based on the action taken by the licensee to remove the burden on the shift supervisor concerning the selection of appropriate PMTs and the screening of work packages for safety impact. This responsibility currently rests with the OWGC and was documented in NRC Inspection Reports 50-498/93-41; 50-499/93-41, 50-498/93-46; 50-499/93-46, 50-498/93-53; 50-499/93-53, and 50-498/93-54; 50-499/93-54.

2.1.8 (Closed) IFI 498;499/9348-08: The licensee further strained staffing levels for the nonlicensed RPOs by implementing 12-hour shifts without margin above the administrative staffing limit of four each shift.

This item was closed based on the action taken by the licensee to increase the numbers of RPOs assigned per shift, as documented in NRC Inspection Reports 50-498/93-40; 50-499/93-40 and 50-498/93-41; 50-499/93-41.

2.1.9 (Closed) IFI 498;499/9348-09: The RPOs were significantly affected by degraded equipment and balance-of-plant workarounds.

This item was closed based on the action taken by the licensee to improve the material condition of the station, reducing the previous high levels of degraded equipment and balance-of-plant workarounds, as documented in NRC Inspection Reports 50-498/93-53; 50-499/93-53 and 50-498/94-08; 50-499/94-08.

2.1.10 (Closed) IFI 498;499/9348-10: The shortage of RPOs resulted from the decisions management made in 1991 and 1992 to reduce the operator training pipeline size and frequency, as well as to staff an Operations support activity with reactor operators and RPOs in lieu of outside contractors.

This item was closed based on the action taken by the licensee to increase the numbers of RPOs assigned per shift, as documented in NRC Inspection Reports 50-498/93-40; 50-499/93-40 and 50-498/93-41; 50-499/93-41.

2.1.11 (Closed) IFI 498;499/9348-11: The additional workload associated with the dual unit outages had forced the licensee to defer operator training and reduce the shift rotation from five to four crews.

This item was closed based on the action taken by the licensee to accelerate operator training and increase the shift rotation to six crews, as documented in NRC Inspection Reports 50-498/93-40; 50-499/93-40 and 50-498/93-41; 50-499/93-41.

2.1.12 (Closed) IFI 498;499/9348-12: The team reviewed the staffing required to mitigate a resource-intensive accident (reactor shutdown outside the control room) and concluded that the existing staffing would be significantly strained to handle such a scenario. Strained staffing resources also contributed to several plant events.

This item was closed based on the action taken by the licensee to increase the staffing of the operators, as documented in NRC Inspection Reports 50-498/93-40; 50-499/93-40 and 50-498/93-41; 50-499/93-41. In

addition, successful performance of an alternate shutdown drill was documented in NRC Inspection Report 50-498/93-202; 50-499/93-202.

2.2 IFIs Identified in Paragraph 2.1.2 of the DET Inspection Report

2.2.1 (Closed) IFI 498;499/9348-13: The absence of permanently-installed flow measuring devices required the use of temporary test instrumentation to support routine pump flow surveillances in safety-related systems such as the essential chilled water, auxiliary feedwater, residual heat removal, and spent fuel cooling systems. Extended surveillance setup times had been necessary to obtain accurate and meaningful surveillance results.

This item was closed based on the action taken by the licensee to install permanent test instrumentation to support surveillances, as documented in NRC Inspection Reports 50-498/93-38; 50-499/93-38, 50-498/93-45; 50-499/93-45, and 50-498/94-04; 50-499/93-04.

2.2.2 (Closed) IFI 498;499/9348-14: Numerous Target Rock solenoid-operated valves (SOVs) exhibited problems due in part to installation in high temperature applications. Some of the problems resulted in the SOVs being out of their required position or without proper remote indication. Operators obtained local readings and measurements to compensate for these inadequacies and performed contingency actions to operate these valves properly. Systems where these SOVs were installed included the primary sample system, the steam generator bulk water sample system, the chemical volume and control system, and the reactor vessel head vent system.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Report 50-498/93-45; 50-499/93-45.

2.2.3 (Closed) IFI 498;499/9348-15: Numerous automatic controls, such as temperature control valves (TCVs), had been inoperable for a significant period. Examples included the TCVs in the balance-of-plant lube oil coolers, the seal oil coolers, and the hydrogen coolers on the turbine generator. These TCVs were oversized and had to be manually throttled, along with the associated bypass valves, in order to control cooling for the various systems.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-46; 50-499/93-46, 50-498/93-53; 50-499/93-53, and 50-498/94-08; 50-499/94-08.

2.2.4 (Open) IFI 498;499/9348-16: Support to Operations was inadequate regarding computer information systems and software programs. The Information Resources Organization supplied the Operations staff with programs, such as a Technical Specification (TS) Action Statement Program, which it could not use because they did not perform the required tasks and were difficult to use. Computer systems were initially developed without appropriate quality assurance controls and procedural guidance. Problems resulted from operators using uncontrolled computer information systems.

2.2.5 (Open) IFI 498;499/9348-17: The licensee had not aggressively pursued TS revisions to resolve the numerous inconsistencies within the TS at STP. The licensee has written approximately 150 Technical Specification interpretations (TSIs) and clarifications to help clarify some of these TS inconsistencies.

2.3 IFI Identified in Paragraph 2.1.3 of the DET Inspection Report

2.3.1 (Closed) IFI 498;499/9348-18: A station problem report (SPR) and quality assurance audit of Operations in 1991 stated that hundreds of memoranda on various subjects, such as TSIs and Operations policies, were issued each year and that many of them conflicted with procedures or with each other. Most of these memoranda were not controlled documents because they had not been reviewed formally.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Report 50-498/94-06; 50-499/94-06.

2.4 IFIs Identified in Paragraph 2.1.4 of the DET Inspection Report

2.4.1 (Closed) IFI 498;499/9348-19: Poor communications, marginal staffing levels, and excessive operator distractions and tasks contributed to inconsistent operator performance.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-40; 50-499/93-40, 50-498/93-41; 50-499/93-41, 50-498/93-53; 50-499/93-53, and 50-498/94-08; 50-499/94-08.

2.4.2 (Closed) IFI 498;499/9348-20: Work schedule, practices, and staffing were significant contributors to performance problems in Operations.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-40; 50-499/93-40, 50-498/93-41; 50-499/93-41, 50-498/93-53; 50-499/93-53, and 50-498/94-08; 50-499/94-08.

2.4.3 (Closed) IFI 498;499/9348-21: Weaknesses in the PMT program, such as difficulties in understanding the PMT reference manual, have resulted in confusion and differing interpretations by the various users. As a result, the PMT recommendations from the planners were often very broad and vague. This contributed to the performance of incorrect postmaintenance testing following painting activities on Standby Diesel Generator 13.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-44; 50-499/93-44, 50-498/93-46; 50-499/93-46, and 50-498/93-54; 50-499/93-54.

2.4.4 (Closed) IFI 498;499/9348-22: The team considered that work schedules, work practices, and staffing issues have been significant contributors to poor operator performance.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-40; 50-499/93-40, 50-498/93-41; 50-499/93-41, 50-498/93-45; 50-499/93-45, 50-498/93-53; 50-499/93-53, and 50-498/94-08; 50-499/94-08.

2.5 IFIs Identified in Paragraph 2.1.5 of the DET Inspection Report

2.5.1 (Closed) IFI 498;499/9348-23: The operators continually faced challenges such as poor plant labeling, a weak locked valve program, and difficulty in controlling plant cooldown after a reactor trip.

The portion of this IFI related to the locked valve program was closed in NRC Inspection Report 50-498/93-54; 50-499/93-54. The portion related to the difficulty in controlling plant cooldown following a reactor trip was closed in as documented in NRC Inspection Reports 50-498/94-06; 50-499/94-06. The plant labeling upgrade program was addressed in the licensee's Business Plan.

2.5.2 (Open) IFI 498;499/9348-24: To reduce waterhammer in the auxiliary feedwater system, the operators had to control auxiliary feedwater flow to the steam generators with a stop check valve. Management did not properly address this problem until after the thermal cycles on the steam generator nozzles from this method of flow control became an issue.

3 CLOSURE OF ITEMS RELATED TO RESTART ISSUES

The inspectors reviewed the items related to Restart Issues, identified in NRC Inspection Report 50-498/93-31; 50-499/93-31, that remained opened following the Restart Issue inspections conducted October 1993 to January 1994. Those items related to Restart Issues that had been adequately resolved by the cumulative results of the Restart Issue inspections were closed.

3.1 (Closed) IFI 498;499/9331-10: Surveillance and postmaintenance testing did not always verify equipment operability.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-38; 50-499/93-38, 50-498/93-44; 50-499/93-44, 50-498/93-46; 50-499/93-46, and 50-498/94-06; 50-499/94-06.

3.2 (Closed) IFI 498;499/9331-12: Several SDG failures resulted from broken fuel oil injector pump hold down studs, many of which were installed using a deficient stud driver tool designed by the system engineer. The system engineer failed to consult design engineering or the SDG vendor while designing the tool.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Report 50-498/93-44; 50-499/93-44.

3.3 (Closed) IFI 498;499/9331-13: Numerous weaknesses in the implementation and programmatic requirements for postmaintenance testing reduced assurance that equipment was operable upon return to service.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-38; 50-499/93-38, 50-498/93-39; 50-499/93-39, 50-498/93-44; 50-499/93-44, 50-498/93-46; 50-499/93-46, and 50-498/94-06; 50-499/94-06.

3.4 (Closed) IFI 498;499/9331-23: The team concluded that the licensee's ineffective corrective action processes were major obstacles to improving plant equipment and human performance. Ineffective problem identification, shallow root cause analyses, inadequate safety evaluations, and lack of aggressive problem resolution resulted in short-term rather than long-term solutions.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-54; 50-499/93-54 and 50-498/93-202; 50-499/93-202.

3.5 (Closed) IFI 498;499/9331-26: The team concluded that the licensee's ineffective corrective action process was a major obstacle to plant equipment and human performance improvement.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-54; 50-499/93-54 and 50-498/93-202; 50-499/93-202.

3.6 (Closed) IFI 498;499/9331-27: Confusion and lack of training resulted in SPRs not being issued in a timely manner on safety-related equipment.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-54; 50-499/93-54 and 50-498/93-202; 50-499/93-202.

3.7 (Closed) IFI 498;499/9331-30: Additional backlog reduction goals for resumption of power operation established for engineering evaluations are:

- Demonstrate progress on completing a general backlog reduction from a peak value of approximately 1400 items down to 600 items by the end of 1993.

- No Operating Experience Reports, SPRS, Design Change Requests, Document Change Notices, or nondesign change Plant Change Forms (PCFs) greater than 1 year old without an engineering evaluation.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-45; 50-499/93-45 and 50-498/93-55; 50-499/93-55.

3.8 (Closed) IFI 498;499/9331-41: Additional backlog reduction goals for resumption of power operations established for design/physical changes were:

- Reduction in the number of undispositioned nonconforming PCFs to less than 50 that are greater than 30 days old.

- Reduction to 15 Temporary Modifications from the current level of 24 installed for greater than 6 months for Unit 1 and Common.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-45; 50-499/93-45 and 50-498/93-55; 50-499/93-55.

3.9 (Closed) IFI 498;499/9331-42: The additional backlog reduction goal established for carryover items from past programs was to either complete the engineering work product or convert the item to a current work program.

This item was closed based on the action taken by the licensee and documented in NRC Inspection Reports 50-498/93-45; 50-499/93-45 and 50-498/93-55; 50-499/93-55.

ATTACHMENT

1 PERSONS CONTACTED

1.1 Licensee Personnel

J. Sheppard, General Manager, Nuclear Licensing
M. Coughlin, Senior Licensing Engineer
other members of the licensee's staff

1.2 NRC Personnel

W. Johnson, Chief, Project Branch A, Division of Reactor Projects
M. Satorius, Project Engineer, Project Branch A, Division of Reactor Projects

2 EXIT MEETING

A telephonic exit meeting was conducted on February 22, 1994. During this meeting, the inspectors reviewed the scope and findings of this report. The licensee did not take exception to any of the inspection findings nor identify as proprietary any information provided to, or reviewed by, the inspectors.