APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report Nos. 50-498/92-18
50-499/92-18

Operating License Nos. NPF-76
NPF-80

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

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

Inspection At: STP, Matagorda County, Texas

Inspection Conducted June 29 through July 2, 1992

Inspector: R. C. Stewart, Reactor Inspector, Materials and Quality Programs Section, Division of Reactor Safety

Approved: I. Barnes 8-17-92
I. Barnes, Chief, Materials and Quality Programs Section, Division of Reactor Safety — Date

Inspection Summary

Inspection Conducted June 29 through July 2, 1992 (Report Nos. 50-498/92-18; 50-499/92-18)

Areas Inspected: Routine, announced inspection of the licensee's boric acid corrosion prevention program, procedures, and implementation. In addition, a followup review of a previously identified inspection finding was conducted.

Results: Within the areas inspected, no violations or deviations were identified. In general, the licensee's boric acid corrosion prevention program appeared to meet the intent of Generic Letter (GL) 88-05. It was noted, however, that the principal boric acid program procedure lacked specificity in regard to the examination methodology to be used, and was also unclear with respect to the required scope of inspection at the 19 foo' elevation. The comprehensive manner in which the licensee had defined applicable components and criteria, for performance of the reactor coolant system leakage pressure test and associated VT-2 visual examinations, were considered a boric acid corrosion prevention program strength.

The following previously identified inspection finding was dispositioned as indicated.

- Inspection Followup Item 499/9124-01 (CLOSED)

DETAILS

1. PERSONS CONTACTED

STP

C. Ayala, Supervising Engineer, Licensing
*M. Charkravorty, Executive Director, Nuclear Safety Review Board
*J. Cook, Nuclear Steam Supply System Section Supervisor
R. Dally, Engineering Specialist, Licensing
*R. Gangluff, Chemical Operations and Analysis Manager
*D. Hall, Group Vice President, Nuclear
J. Heil, System Engineer
*R. Hernandez, Manager, Design Engineering
*J. Johnson, Supervisor, Nuclear Assurance
W. Jump, Manager, Nuclear Licensing
*W. Kinsey, Vice President, Nuclear Generation
D. Lazar, Manager, Plant Engineering
*M. McBurnett, Manager, Integrated Planning and Scheduling
*M. Monteith, Quality Assurance Surveillance Supervisor
*G. Parker, Plant Manager
*K. Richards, Division Manager, Electrical Maintenance
*B. Scott, Reactor Coolant System Engineer
T. Underwood, Manager, Independent Safety Engineering Group

NRC

*I. Barnes, Chief, Materials and Quality Programs Section, Division of Reactor Safety
*R. Evans, Resident Inspector
*G. Guerra, Jr., Radiation Specialist

Other licensee technical and administrative personnel were contacted during the inspection.

*Denotes the individuals attending the exit interview on July 2, 1992.

2. LICENSEE ACTION ON PREVIOUS INSPECTION FINDINGS (92701)

(Closed) Inspection Followup Item (499/9124-01): Review of metallurgical analysis of cracked weld in Unit 2 essential cooling water system.

The inspector reviewed Materials Technology Report MT-3512B, "Evaluation of Cracked Aluminum Bronze Pipe-to-Pipe Weld From South Texas Project Unit 2 Essential Cooling Water System," dated January 8, 1992, which documented the results of the metallurgical analysis of the crack in Weld FW3099, Line No. 30" EW-2205-WT3. The metallurgical analysis identified that the crack initiated at pre-existing weld root defects and propagated by a combination of progressive dealloying at the crack tip and crack growth through the dealloyed

material. An environment conducive to dealloying of the weld metal was believed to have been created by the crevice between the weld joint backing ring and the piping material. Confirmation of the corrosion role of the crevice was the observation of minor pitting and localized intergranular penetration of the piping base material beneath the backing ring. This inspection followup item is considered closed.

3. BORIC ACID CORROSION PREVENTION PROGRAM (62001)

The objectives of this inspection were to verify that the licensee had a documented program for prevention of corrosion caused by boric acid solution leaking out from boric acid containing systems, as required by GL 88-05. Additional objectives were to verify that the licensee had prepared procedures which provide clear guidance for performing the activities required by the program and verify that the licensee had implemented the program in accordance with its written procedures.

3.1 GL 88-05 Recommendations

In summary, GL 88-05 recommends that the licensee: (1) determine the principal locations where leaks, smaller than the allowable Technical Specification limit, can cause degradation of the primary pressure boundary by boric acid corrosion. Particular consideration should be given to identifying those locations where conditions exist that could cause high concentrations of boric acid on pressure boundary surfaces; (2) include procedures for locating small coolant leaks (i.e., leakage rates at less than Technical Specification limits) that establish the potential path of the leaking coolant and the reactor pressure boundary components that it is likely to contact; (3) establish methods for conducting examinations and performing engineering evaluations to establish the impact on the reactor coolant pressure boundary when leakage is located; and (4) establish corrective actions to prevent recurrences of this type of corrosion.

3.2 STP Boric Acid Corrosion Prevention Program

The principal STP procedure developed by the licensee in response to GL 88-05 was ascertained to be Procedure OPGP03-ZE-0033, "RCS Pressure Boundary Inspection for Boric Acid Leaks," Revision 3. Additional program requirements were included in five other procedures (see listing in the Attachment to this report). The inspector noted from review of the procedures that the program requirements were generally consistent with the recommendations of GL 88-05.

Procedure OPGP03-ZE-0033, Revision 3, included in its inspection scope the following locations: (a) reactor vessel - head instrumentation penetration areas, vent lines and valves, studs, and bottom mounted instrument penetrations; (b) pressurizer - valves, manway cover and bolts, instrument and sample ports, and immersion heater penetration area; (c) steam generators - primary side manway covers and fasteners, and primary side drain; and (d) reactor coolant pumps - closure bolts and seals. The inspector noted, however, that the procedure lacked specificity with respect to the examination

methodology to be employed, and was also unclear with respect to the required scope of inspection in one of the defined inspection areas (i.e., Area 16 was defined as "Elevation 19 ft systems in proximity to RCS"). In response to questions concerning the bases for the limited scope of reactor coolant system pressure boundary valves that were included in the inspection program, the inspector was informed that the excluded valves were constructed of materials that were not susceptible to boric acid corrosion. The inspector performed a limited review of valve materials and ascertained that certain valves (e.g., drain valves) did contain susceptible carbon steel materials, although the materials were not specifically used in the pressure boundary portions of the valves. Inspection of these valves for boric acid leakage was, however, as noted below a part of the VT-2 inspection requirements for the system leakage pressure test.

During review of the supporting procedures to Procedure OPGP03-ZE-0033, Revision 3, the inspector found that Procedure OPSP15-RC-0001, "RCS Leakage Pressure Test," Revision 0, to be both comprehensive and well developed. This procedure, which was prepared to address the requirements of IWA-5200 in the ASME Section XI Code, included the identity and physical location of each component within the testing boundary. It was additionally noted that Procedure NDEP-9.1, "NDE Visual Examination for Leakage VT-2," Revision 0, included requirements for the VT-2 inspectors to examine for boric acid leakage during the system leakage pressure test. These two procedures were considered a strength in the boric acid corrosion prevention program, and addressed the weakness perceived in Procedure OPGP03-ZE-0033, Revision 3, regarding the limited number of reactor coolant pressure boundary valves that were identified as being in the inspection program.

3.3 Program Implementation

The results of the visual examinations conducted under Procedure OPGP03-ZE-0033 during plant outages on March 29, 1990 (Unit 1); March 14, 1991 (Unit 2); September 10, 1990 (Unit 1); and September 6, 1991 (Unit 1) were reviewed. It was observed by the inspector that the procedures contained the identity of all components examined during the walkdown. When leakage was found, the nature of the leak was well described, including an estimate of the quantity of leakage. The inspector also verified that for each leak identified corrective action documentation had been written to repair and/or evaluate the cause of the leak. It was further observed by the inspector that procedural requirements were adhered to and that the program requirements were being satisfactorily performed and documented.

4. EXIT INTERVIEW

An exit interview was conducted on July 2, 1992, with those personnel denoted in paragraph 1 in which the inspection findings were summarized. The licensee did not identify as proprietary any of the materials provided to, or reviewed by, the inspector during this inspection.

ATTACHMENT

PROCEDURES

OPGP03-ZE-0033, "RCS Pressure Boundary Inspection for Boric Acid Leaks," Revision 3

OPSP03-RC-0006, "Reactor Coolant Inventory," Revision 7

OPOP01-ZQ-0022, "Plant Operations Shift Routines," Revision 1

1POP03-ZG-0007, "Plant Cool Down," Revision 11

OPSP15-RC-0001, "RCS Leakage Pressure Test," Revision 0

NDEP-9.1, "NDE Visual Examination for Leakage VT-2," Revision 0

DRAWINGS

5R149F05001-1, "Piping and Instrument Diagram RCS Primary Coolant Loop," Revision 19

STP-D-9909X02, "Z 1529 Series Y Type Globe Valve," Revision 3

8373D89, "Motor Operated Gate Valve," Revision 3

8374D04, "Swing Check Valve," Revision 3

INSPECTION DATA RESULTS

RCS Inspection for Boric Acid Leaks, Forms OPGP03-ZE-0033-1 & 2, dated March 29, 1990, September 10, 1990, and September 6, 1991