

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 50-498/88-02  
50-499/88-02

Operating License: NPF-71  
Construction Permit: CPPR-129

Dockets: 50-498  
50-499

Licensee: Houston Lighting & Power Company (HL&P)  
P.O. Box 1700  
Houston, Texas 77001

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

Inspection At: STP, Matagorda County, Texas

Inspection Conducted: January 4-29, 1988

Inspectors: *A. Barnes* 3/9/88  
for L. D. Gilbert, Reactor Inspector, Materials  
and Quality Programs Section, Division of  
Reactor Safety Date

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for R. B. Vickrey, Reactor Inspector, Operational  
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D. M. Hunnicutt, Senior Project Engineer  
Project Section D, Division of Reactor  
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Approved:

I. Barnes  
I. Barnes, Chief, Materials and Quality  
Programs Section, Division of Reactor Safety

3/9/88  
Date

Inspection SummaryInspection Conducted January 4-29, 1988 (Report 50-498/88-02)

Areas Inspected: Routine, unannounced inspection of allegations; heating, ventilation, and air conditioning (HVAC) duct sealant material; nuclear steam system supplier (NSSS) equipment in Unit 1; electric cable; battery room modifications; and Unit 1 reactor vessel pressure transient protection.

Results: Within the six areas inspected, no violations or deviations were identified. Two unresolved items are identified in paragraphs 6 and 7.

Inspection Conducted January 4-29, 1988 (Report 50-499/88-02)

Areas Inspected: Routine, unannounced inspection of allegations; heating, ventilation, and air conditioning sealant materials; nuclear welding; electric cable; and battery room modifications.

Results: Within the five areas inspected, no violations were identified. An unresolved item is identified in paragraph 7.

DETAILS1. Persons ContactedPrincipal Licensee Personnel

- \*G. E. Vaughn, Vice President, Nuclear Operations
- \*J. T. Westermeier, Project Manager
- \*J. E. Geiger, Nuclear Assurance Manager
- \*T. J. Jordan, Project Quality Assurance (QA) Manager
- \*M. A. McBurnett, Operations Support and Licensing Manager
- \*J. S. Phelps, Licensing Supervisory Engineer
- \*D. C. King, Construction Manager
- \*S. M. Head, Licensing
  - C. M. Turner, Consulting Engineer
  - K. Jolley, Construction Coordinator
  - J. Bombard, QA Technical Specialist
  - W. Evans, Licensing
  - J. Johnson, Project QA
  - D. Thompson, Project QA

Bechtel Energy Corporation

- \*R. W. Miller, Project QA Manager
- \*R. D. Bryan, Construction Manager
  - R. Randels, Mechanical Engineering Group Supervisor
  - C. F. O'Neil, Engineering Manager (Unit 2)

Ebasco Services, Inc.

- \*D. D. White, Construction Manager
- \*A. M. Cutrona, Quality Program Site Manager
  - F. G. Miller, Welding Superintendent

NRC

- \*A. B. Beach, Deputy Director, Division of Reactor Projects
- \*J. P. Jaudon, Deputy Director, Division of Reactor Safety
- \*C. E. Johnson, Senior Resident Inspector
- \*D. L. Garrison, Resident Inspector
- \*D. R. Carpenter, Senior Resident Inspector

The NRC inspectors also interviewed other licensee and contractor employees during the inspection.

\*Denotes those personnel attending the exit meeting.

## 2. Allegation Review

### a. (Technically Closed) Allegation RIV-87-A-0088

The NRC inspector reviewed the results of the allegation investigations performed by the onsite SAFETeam. Allegation RIV-87-A-0088 involved an anonymous letter listing 25 separate concerns involving theft, falsification, waste, security, harassment, intimidation, favoritism, conspiracy, drugs, and fitness-for-duty issues. These 25 concerns lacked substantive detail. The NRC and HL&P received identical copies of this letter from an anonymous source (or sources).

The SAFETeam personnel investigated and evaluated each of the 25 concerns. All of the concerns were classified as nonsafety-related. The NRC inspector found that the SAFETeam investigation and evaluation had determined that 22 of these concerns were not substantiated either in total or in part.

The following three allegations, considered substantiated by SAFETeam, are described below:

1. This concern declared that two named employees were operating an illegal raffle on the job. This concern was partially substantiated and appropriately handled by the licensee.
2. This concern involved a racially motivated "prank" between three individuals. This concern was appropriately dispositioned by Ebasco, HL&P, and the Sheetmetal Workers' International Association (SMWIA).
3. This concern related to an alleged sale of drugs to a named site employee. STP records show that this employee successfully passed three fitness-for-duty examinations during calendar year 1987. This allegation is considered substantiated by SAFETeam in that the named individual was found on site, however, the allegation that this employee may have used drugs was not substantiated.

The NRC inspectors' findings agreed with the SAFETeam classification of "nonsafety-related" for each of these 25 identified concerns. These allegations are technically closed.

### b. (Technically Closed) Allegation RIV-87-A-0044

Allegation RIV-87-A-0044 involved an alleege whose allegation was forwarded to the Department of Labor (DOL). This concern declared that the alleege's contractor had harassed him and terminated his employment because of his attempts to do quality work and his complaints to a SAFETeam investigator. The NRC inspector reviewed the results of the SAFETeam evaluation and investigation of this concern. The SAFETeam records and discussions with SAFETeam personnel determined that the alleege was terminated on September 25,

1986, via a mailgram. The documented cause for the employee's termination was excessive absenteeism in violation of Job Rule No. 11. The SAFETEM investigation records indicated that the employee had failed to report for work on the following dates: August 4, 6, 17, 18, and 29; and the entire week ending on September 21, 1986. The SAFETEM records indicated that the employee had never exited through the SAFETEM nor reported a concern to the SAFETEM. SAFETEM personnel could not recall a failure of SAFETEM personnel to document an entrance or exit meeting with this alleged. Although the alleged claimed that he had received permission on September 14, 1986 to take leave, there are no records of this request to support the alleged's claim. This allegation was not substantiated by the SAFETEM investigation.

The NRC inspector's review and evaluation of the SAFETEM records for these two allegations indicated that the SAFETEM had investigated and evaluated these allegations and concerns appropriately. The NRC inspector agreed with the SAFETEM conclusions related to these allegations. These allegations are considered resolved and are technically closed.

c. (Technically Closed) Allegation 4-87-A-087

Essential cooling water (ECW) power cables, in Unit 1, were alleged to be located in an area (manhole No. 5) which could become flooded. Furthermore, it was alleged that these cables were not qualified for submergence.

The NRC inspector reviewed the cable installation cards for cables AIEWAACIGA, BIEWABCIGA, and CIEWACCIGA. These cables are the power supply cables to ECW pumps 1A, 1B, and 1C, respectively. The receiving and inspection records for the associated cables, RIP No. 6942, were reviewed. The records were found to contain certification that the cables met the requirements for gravimetric water absorption and accelerated water absorption and thus the safety-related cables were qualified for submergence. The cables were tested in accordance with Insulated Cable Engineers Association (ICEA) methods, as specified in IEEE Standards 383 and 500.

The NRC inspector inspected the power cables at the essential cooling intake structure for proper identification and routing to the underground conduit. Manholes AOXYABKEM51, BOXYABKEM51, and COXYABKEM51 were inspected to verify that the cables were properly routed in accordance with the cable cards. There was no evidence of flooding in the manholes or deterioration of any cables therein.

Nonsafety Manhole NOXYABKHM05 (Manhole No. 5) was inspected and found to be substantially flooded with most of the cables therein either totally or partially submerged. The NRC inspectors visual inspection of this



manhole found no evidence that any safety-related cables were present.

During the course of the NRC inspector's review, he also inspected five Unit 2 safety-related manholes related to ECW Pump 2A power cable and found no evidence of flooding or cable damage.

Although Manhole No. 5 was flooded, it did not contain safety-related cables. This allegation is technically closed.

### 3. Tremco Type 440-A Inspection and Review

#### a. Inspection and Review Discussion

This inspection was performed to evaluate the installation of Tremco 440 or 440-A in the heating, ventilation, and air conditioning (HVAC) systems for Units 1 and 2.

Tremco Type 440 is a nondrying, permanently elastic, and preformed sealant made of 100 percent solid polyisobutylene-butyl material. The material has desired adhesion and compressibility characteristics. The difference between Tremco 440 and 440-A is that the Type 440-A has an EPDM core (a hard synthetic rubber material). The Type 440 does not have an EPDM core.

The 440-A material exhibits heat resistance in the temperature range of -40°F to 200°F with no loss of oil, surface blistering, or loss of adhesion during long-term service. The fire resistance is in accordance with ASTM E-84.

The Tremco gasket material was evaluated as a combustible material from two perspectives. First, it was determined whether the Tremco material was relied upon to prevent the spread of fire or to ensure duct integrity during a fire. Second, the effect of adding Tremco material to the combustible fire loading calculations was considered. Each of these issues was considered in the licensee's fire hazard analysis (FHA). The NRC inspectors verified that the STP FHA does not rely upon Tremco material gaskets to prevent the spread of a fire or to ensure the HVAC systems operability during a fire. In cases where duct integrity was not assumed, fire dampers are provided to prevent the spread of fire. The NRC inspectors did not identify any exceptions to this approach by STP. The licensee performed fire hazard analysis for fire area 32, zone 122, which is located in the mechanical equipment auxiliary building (MEAB) at elevation 60 feet. This zone contains the maximum concentration of Tremco Type 440-A. The analysis showed a very insignificant increase in the total combustible loading. The flame spread is reported as a value of 20, which is conservative with respect to the STP FSAR commitment for a value of 50.

The HVAC ducts inside the reactor containment building (RCB) are sealed with EPDM gasket material. Tremco is not used for applications within the RCB. Tremco material used at the STP facility is used only to seal joints in the safety and nonsafety-related HVAC ductwork outside the RCB.

The NRC inspectors examined HVAC ductwork at the following plant locations in Units 1 and 2:

- control rooms;
- electrical equipment rooms;
- cable spread rooms;
- rooms and corridors above the control rooms and adjacent to the control rooms;
- battery rooms;
- MEABs;
- radwaste control room (room 217);
- switchgear rooms; and
- other safety and nonsafety-related rooms and areas.

The NRC inspectors reviewed the following HVAC drawings and related documentation:

Drawing 5-V-11-2-V-0055-A-10, Revision 5, dated December 2, 1987, and Revision 4, dated October 11, 1985

Drawing 5-V-2-V-0056-A-10, Revision 5, dated January 13, 1987

Drawing 5-V-11-2-V-0056-B-10, Revision 5, dated January 13, 1987

Standard Site Procedure SSP-38, Revision 1, dated December 11, 1987

During the walkdown of the plant, the NRC inspectors verified that Tremco materials were installed as a sealant between more than 50 percent of the bolted joints in the HVAC ductwork; however, Tremco materials were not installed on removable duct sections, duct heaters, fire dampers, or on electric or pneumatic sealant surfaces. Further, the NRC inspectors review of drawings and standard site Procedure SSP-38, Revision 1, verified that the Tremco materials were installed in accordance with the appropriate procedures.

The NRC inspectors concluded that the use of Tremco 440 and 440-A as an HVAC joint sealant at STP Units 1 and 2 was supported by engineering analyses, that the material was properly installed, and that its presence was taken into account properly in fire hazards analyses.

No violations or deviations were identified.

b. Nonconformance Report (NCR) Review

The NRC inspector reviewed the NCR files for HVAC system air in-leakage to the control room air recirculation system. The NRC inspector did not identify any NCR that would indicate in-leakage or excessive leakage from the HVAC system control room air recirculation system. The following NCR files were reviewed:

CH-00001 through 00882, dated May 5, 1983, through July 2, 1984

BH-00001 through 00090, dated March 6, 1984, through January 22, 1986

BH-030000 through CH-03396, dated September 19, 1985, through January 22, 1988

CH-00864, "Gasket for Removable Duct," dated August 14, 1985

CH-00450, "HVAC Duct," dated January 17, 1985

CH-00445, "Tremco 440," dated January 17, 1985, and letter Tremco to Bechtel, "Tremco 440 Tape Vehicle Extrusion in Metal Ductwork Laps," dated January 22, 1985

CH-00408, "Tremco 440A Shim Gasket," dated December 17, 1984

CH-03004, "Duct Pc, #1-1-0087-114," dated September 3, 1985

No violations or deviations were identified.

4. NSSS Equipment Installation Followup in Unit 1

The following items were reviewed in support of the NRR Safety Significance Assessment Team effort:

a. Primary System Components

The NRC inspector completed a followup inspection to review an item discussed in NRC Inspection Report 50-498/83-06, paragraph 7, dated May 4, 1983. Out-of-plumb (out-of-vertical) anomalies were originally discovered in the position of the steam generators (SG) in Unit 1. Documentation indicated that SG No. 1 was 0.78 degrees



out-of-plumb and SG No. 4 was 0.75 degrees out-of-plumb. These anomalies were identified during an optical survey. Subsequent to this optical survey, HL&P completed a review and evaluation of the as-installed condition of all NSSS equipment in Unit 1. The NSSS had determined that the out-of-plumb condition, as measured, was not a concern because the out-of-plumb condition would not adversely affect the stress analysis, seismic considerations, or operability of these SGs. The final disposition was to use the SGs "as-is".

HL&P, in conjunction with the NSSS, performed analyses of the effects of the out-of-plumb condition of the SG on other components, including the vertical supports; the SG lateral restraints; the SG piping; reactor coolant pump (RCP) vertical restraints; and the pressurizer seismic lug. It was demonstrated that the SG misalignment would not adversely affect the stress analysis, seismic considerations, or operability of these components. The calculations indicated that, for the worst case, stresses would be increased from 35 percent of allowable to 50 percent of allowable. The final disposition was to use these components in the "as-in" condition.

The NRC inspector reviewed these evaluations, analyses, and calculations and determined that the values reported by HL&P and the NSSS were technically sound and that HL&P's decision to use the components in the "as-is" condition will not constitute a safety or an operability problem. This item is closed.

b. Reactor Pressure Vessel

HL&P documentation indicated that the reactor pressure vessel was set in place using erection tolerances stated in Brown & Root Quality Construction Procedure AO4OKPM-P-10, "Setting the Reactor Vessel." The suspected out-of-tolerance condition was resolved by Westinghouse Letter S: WN-YB-629, dated October 4, 1983. Based on the calculations and evaluations contained in this letter, the out-of-levelness condition on the reactor pressure vessel support ledge and the mating surface, does not constitute a safety concern. The NRC inspector reviewed the calculations and evaluations and determined that the basis for acceptance was technically sound and that the decision to use the Primary System "as-is" will not constitute a safety or an operability problem. This item is closed.

No violations or deviations were identified.

5. Nuclear Welding (55050)

The NRC inspector selectively reviewed 62 completed documentation packages for safety-related welds; these consisted of 22 ASME Section III Code Class 1 welds, 20 ASME Section III Code Class 3 welds, and 20 ASME Section III Code Class MC welds. The Class 1 welds were selected from the reactor coolant and residual heat removal piping systems, the control rod

drive mechanism, the bottom mounted instrumentation tubes, and the degassing pipecap on the reactor vessel head. The Class 3 welds were selected from the reactor makeup, the component cooling, the essential service water, and the chemical, and volume control piping systems. The Class MC welds were selected from the feedwater, auxiliary feedwater, chemical and volume control, safety injection, containment spray, main steam, and steam generator blowdown piping systems. The review included all containment piping penetration welds that required postweld heat treatment.

In areas reviewed, the weld records were complete, accurate, and retrievable. Since the observation of work inspection for nuclear welding was performed in a previous inspection which is documented in Inspection Report 50-499/86-01, this inspection was limited to a record review.

No violations or deviations were identified.

## 6. Electrical Cables

The purpose of this inspection was to determine whether activities relative to safety-related electric cable systems are being controlled and accomplished in accordance with safety analysis report commitments and licensee procedures. The inspection included direct observation of work in-process and of completed work.

### a. Work Observation, Unit 2

The NRC inspector reviewed the cable pull cards, termination cards, and receiving inspection records (RIP) associated with the electrical cables listed below:

<u>Cable No.</u>	<u>Code No.</u>	<u>RIP No.</u>
C2MB03C1SM	XCCTK	8400
A2PK04C4SL	CA712	3381
A2PNAEC1SA	RA306	2414
B2PK02C2WB	CBB12	4944
B2PL05C2SA	1B3P6	3968
A2PL01J1WR	SA114	11816
A2RC05C1WK	CA512	12597
B2RCADC1LA	RB310	11046
B2RCADC1LC	RB310	11046
C2CV06C1SA	CC712	10034
B2RC10C8PA	XB2WA	
D2RC10C8PB	1D3P6	3968
B2SPACC1SA	RB302	453
C2SPADC1SA	RB302	5193

A2S1AAC1EB	3PA125	8654
A2S105C1SA	CAB12	2014
A2S129C1XC	1A5Q6	4431
B2S1ALC1LB	RB304	13164
A2S122C3WD	XA8LB	15041
B2SP21CC5C	CB312	9900
A2SP22CSSA	1A3P6	6280
B2SP16CGSD	CB212	9900
B2SP22CXSA	1B3P6	3968
C2SP22CUSA	1C9P6	3650
A2EWAAC1GA	3PA125	8654

The NRC inspector verified that the above cable terminations agreed with the termination cards. Each termination was checked back to the last raceway or beyond to determine whether:

- o raceway and conduit conditions were adequate for the cables installed;
- o cable routing was correct;
- o separation was maintained;
- o cable identification was preserved;
- o proper bending radius was maintained; and
- o cable entry to the terminal point was acceptable.

Each Raychem splice was verified on the termination cards, and all termination points were verified by color code and proper wire and cable markings. All terminations were found to be properly located and acceptable.

The NRC inspector examined the RIPs for each cable for proper documentation and cable certification records. All RIPs were found to be acceptable and cross checked with the cable cards for proper cable code and cable reel numbers.

The NRC inspector observed one cable pull operation, Cable No. C2CHACC1LB, in which the following determinations were made:

- o the cable was as specified and identified;
- o cable routing was correct;
- o proper bending radius was maintained;
- o coiled cables were properly secured and protected;

- o installation and inspection activities were being documented during the activity; and
- o electricians were adequately qualified and trained.

Three in-process terminations (i.e., for a motor, an instrument, and a relay panel) were observed which included Raychem splicing. The NRC inspector determined from his observation that:

- o proper procedures were being followed;
- o qualified field engineers and electricians were being used;
- o the required tools were being used and they had current calibration;
- o qualified inspectors were observing and documenting the activities;
- o terminations were properly made up; and
- o equipment was as specified.

During the course of observing these terminations and the above cable pull, the NRC inspector observed that the personnel exhibited a good attitude toward quality work and that there was apparent cooperation between craft and inspection personnel.

The NRC inspector observed one cable cutting operation in the cable shed to evaluate proper operations involving the following:

- o selection of the proper reel;
- o proper documentation;
- o cable inspection;
- o in-place storage; and
- o cable identification.

In the above areas of inspection, the NRC inspector noted one discrepancy in a vendor-supplied termination boot modification. The licensee has taken action on NCR SE-07198 to address the problem. The NRC inspector inspected several identical boots in other termination locations. No other discrepancies were noted and this was determined by the NRC inspector to be an isolated case.

No violations or deviations were identified.

b. Raychem Splice Followup, Unit 1

The NRC inspector followed up on Surveillance Report SH-1186 conducted by the utility on January 21 and 22, 1988, on sampling of engineering splice review log. The NRC inspector examined the

Raychem splice on Cable End BIDJ10C2SV-1 that had not been reinspected during the Raychem reinspection program. The NRC inspector also looked at other Raychem splices selected at random in the Unit 1 relay room. During the inspection of a Raychem splice on Cable C1XE3CRH001 in the reactor vessel water level indicating (RVLIS) cabinet, the NRC inspector noted that the top north cutout access cover plate was not fastened down. The licensee has taken action on Maintenance Work Request (MWR) AM-58843 and completed the work on the RVLIS satisfactorily. The licensee indicated to the NRC inspector that they still had not determined why this work item had not been completed and what their corrective actions would be. This item will remain an unresolved item pending a review by the NRC inspector of the cause of the cabinet being open. (498/8802-01)

With regard to Raychem splicing, no violations or deviations were identified.

7. Battery Room Modifications (Units 1 and 2)

The NRC inspector had noted in October 1987, that there was a berm which did not extend to the wall for the 1800 AH safety-related batteries. The licensee had issued an engineering support request on October 7, 1987, to extend the berm. On October 21, 1987, the licensee informed the NRC inspector that the berm was unnecessary. The NRC inspector requested that the licensee explain why the berm was part of the original design but was no longer needed.

This item is considered unresolved pending receipt of the analysis from the licensee. (498/8802-02 and 499/8802-01)

8. Inspection of Licensee's Actions Taken to Implement Unresolved Safety Issue A-26: Reactor Vessel Pressure Transient Protection

During this inspection period, an inspection was performed to verify that the licensee has an effective mitigation system for low-temperature overpressure transient conditions in accordance with their commitments concerning Unresolved Safety Issue A-26.

This inspection consisted of a review of the following documents:

Station Procedure No. 1POP03-ZG-0008, dated July 27, 1987

Station Procedure No. 1POP03-ZG-0001, dated January 21, 1988

Station Procedure No. 1POP03-ZG-0007, dated January 21, 1988

Plant Procedure No. OPGP03-ZA-0002, Revision 7, dated January 24, 1988



Piping and Instrumentation Diagram RCS Pressurizer Diagram  
No. 5R149F05003, Revision 4, dated June 17, 1987

Reactor Coolant Pressurizer Power Relief Valves Logic Diagram,  
SR-14-9-Z-42160

The NRC inspector performed an inspection to determine that STP, Unit 1 has installed and demonstrated controls and procedures to mitigate a postulated low-temperature overpressure conditions at Unit 1. The NRC inspector reviewed the procedures and administrative controls which are in place to aid the operator in controlling the reactor coolant system pressure during low-temperature operation. The documentation reviewed showed that an overpressure protection system at STP, Unit 1 is designed and installed to prevent exceeding the applicable technical specification and 10 CFR Part 50, Appendix G, limits for the reactor pressure during plant cooldown or startup. A redundant protection against a low temperature overpressure event is provided through the use of two pressurizer power operated relief valves (PORVs) to mitigate potential pressure transients. The STP PORVs are safety-related and Class IE powered.

The actions and commitments established by the licensee in response to USI A-26, "Reactor Vessel Transient Protection for Pressurized Water Reactors, appeared to ensure that an effective mitigation system has been established for low-temperature overpressure conditions.

No violations or deviations were identified.

9. Exit Interview

The NRC inspectors met with licensee representatives, denoted in paragraph 1, on January 29, 1988, and summarized the scope and findings of the inspection.