

The Light company

Houston Lighting & Power P.O. Box 1700 Houston, Texas 77001 (713) 228-9211

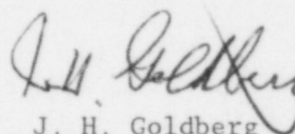
May 29, 1987
ST-HL-AE-2200
File No.: G12.364, G2.2
10CFR50.55(e)

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Third Interim Report Concerning
Electrical Splices Using Raychem Heat Shrink

On February 19, 1987, Houston Lighting & Power Company notified your office pursuant to 10CFR50.55(e) of an item concerning electrical splices using Raychem heat shrink insulation material. Enclosed is our Third Interim Report on this item. Our next report will be submitted on June 10, 1987.

If you should have any questions on this matter, please contact Mr. C. A. Ayala at (512) 972-8628.



J. H. Goldberg
Group Vice President, Nuclear

CAA/hg

Attachment: Third Interim Report Concerning Electrical
Splices Using Raychem Heat Shrink

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cc:

Regional Administrator, Region IV
Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

M.B. Lee/J.E. Malaski
City of Austin
P.O. Box 1088
Austin, TX 78767-8814

N. Prasad Kadambi, Project Manager
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, MD 20814

M.T. Hardt/A. von Rosenberg
City Public Service Board
P.O. Box 1771
San Antonio, TX 78296

Robert L. Perch, Project Manager
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, MD 20814

Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
1717 H Street
Washington, DC 20555

Dan R. Carpenter
Senior Resident Inspector/Operations
c/o U.S. Nuclear Regulatory
Commission
P.O. Box 910
Bay City, TX 77414

Claude E. Johnson
Senior Resident Inspector/Construction
c/o U.S. Nuclear Regulatory
Commission
P.O. Box 910
Bay City, TX 77414

M.D. Schwarz, Jr., Esquire
Baker & Botts
One Shell Plaza
Houston, TX 77002

J.R. Newman, Esquire
Newman & Holtzinger, P.C.
1615 L Street, N.W.
Washington, DC 20036

T.V. Shockley/R.L. Range
Central Power & Light Company
P. O. Box 2121
Corpus Christi, TX 78403

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Third Interim Report Concerning
Electrical Splices Using Raychem Heat Shrink

I. Summary

On February 19, 1987, Houston Lighting & Power (HL&P) notified NRC Region IV, pursuant to 10CFR50.55(e), of a reportable item concerning safety related electrical splices using incorrectly installed Raychem heat shrink insulation material. This deficiency affects various safety related circuits. If left uncorrected, the safe operation of the plant could have been affected.

II. Description of Deficiency

During an NRC Electrical Audit, Raychem heat shrink material used for in-line splices was discovered to have been installed incorrectly. Shims required by existing procedures which are necessary to assure proper installations were omitted. Installations did not consistently follow vendor instructions. Additionally, site procedures did not require Raychem installations to be inspected for conformance with vendor instructions. Also Raychem's requirement for installing the heat shrink material with a "maximum bend radius of five times the outside diameter" of the cable was not included in the installation requirements. The only bend radius requirement included was that the cable bend radius could not be violated. As a result, there are some splices with deficiencies. A review of the Class 1E termination cards to determine the location and acceptability of safety related splices was conducted which identified numerous Raychem deficiencies which required further evaluation to determine acceptability. During this evaluation discrepancies were found between the as-built condition and the termination cards. In addition, configurations were identified where non qualified Raychem kits were installed in Class 1E applications.

III. Corrective Action

An inspection is in progress to determine the total number of incorrectly installed splices as reported to the NRC in our letter, ST-HL-AE-2103 dated May 8, 1987. There are 2007 termination ends (2007 single cables with multiple conductors) which have Raychem heat shrink material applied. As of May 29, 1987, 1445 of those ends have been verified to be satisfactory. There are 15 ends which require additional inspection and evaluation. There were 510 ends which did not meet installation requirements. These are being evaluated for acceptability based on test data from Commonwealth Edison (Wyle Test Reports #17859-02B & 02P) Toledo Edison (NTS Test Report #22414-87N), and the Tennessee Valley Authority (CCL Test Report 86-1995).

Thirty-seven (37) termination ends within the 2007 will not be physically inspected. There are thirty-six (36) termination ends which have been spliced between an environmental seal (Electrical Conduit Seal Assembly-ECSA) and the instrument being sealed. These heat shrink installations are sealed from the environment such that the heat shrink material's only function is to provide electrical insulation for the splices. Additionally, there is one (1) cable which is spliced to a solenoid operated damper which is not accessible due to its location. This cable is located in a mild environment, and, as such, the heat shrink material's only required function is to provide electrical insulation. Based on inspection records and test data, these termination ends has been dispositioned as acceptable as-is.

Based on evaluations to date we expect approximately 10% of the termination ends to require rework. The inspections and rework are targeted for completion by fuel load.

As a result of the bend radius portion of the deficiency, a review of installation instructions for other commodities is in progress to determine whether the vendors instructions were properly included in project documents. This review includes the following:

- A) I & C -Flex Hoses, Tube Fittings (Parker Hannifin)
- B) Civil -Cadwelds, Maxi Bolts, Hilti Bolts,
& Coatings
- C) Electrical-Crimped Terminations, Electrical Connectors

This review and quality assurance verification is ongoing and will be completed by June 5, 1987.

IV. Recurrence Control

- 1) Craft, Field Engineers, and Field Quality Control (FQC) personnel have been reinstructed on the use of Raychem material in accordance with project procedures and drawings.
- 2) Site Standard Procedure 26 "Termination of Electrical Cable" has been revised to require that Class 1E Raychem splices be installed and inspected to approved engineering details.

V. Safety Analysis

The deficient splices are in circuits for various safety related systems. The potential exists that circuit malfunctions (shorts, grounds, or opens) could occur in a harsh environment and cause associated equipment or instrumentation failure. For example, a failure of the Raychem heat shrink insulation to maintain the electrical integrity of the cables could result in malfunction of associated motor operated valves (MOV's). Had these deficiencies remained uncorrected, failure of MOV's to operate properly could have affected safe operations of the plant. Therefore, HL&P has determined that this item is reportable pursuant to 10CFR50.55(e).