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

April 12, 1985 ST-HL-AE-1222 File No.: G12.232

Mr. Robert D. Martin Regional Administrator, Region IV Nuclear Regulatory Commission 611 Ryan Plaza Drive, Suite 1000 Arlington, Texas 76011



South Texas Project Units 1 & 2 Docket Nos. STN 50-498, STN 50-499 Final Report Concerning An Electrical Penetration Assembly with Cut Cable Insulation

Dear Mr. Martin:

**The Light** 

On March 13, 1985, Houston Lighting & Power Company (HL&P) notified your office, pursuant to 10CFR50.55(e), of an item concerning an electrical penetration assembly with cut cable insulation. Enclosed, please find our Final Report on this item.

If you should have any questions on this matter, please contact Mr. Michael E. Powell at (713) 993-1328.

PDR

Very truly yours,

Electremin for

8. H. Goldberg Group Vice President, Nuclear

JSP/yd Attachment

Attachment: Final Report Concerning An Electrical Penetration Assembly with Cut Cable Insulation

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#### Houston Lighting & Power Company

#### cc:

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Docketing & Service Section Office of the Secretary U.S. Nuclear Regulatory Commission Washington, DC 20555

W2/NRC1/a

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# South Texas Project Units 1 & 2 Final Report Concerning An Electrical Penetration Assembly With Cut Cable Insulation

#### I. Summary

On March 13, 1985 Houston Lighting & Power (HL&P) notified the NRC Region IV of a potentially reportable deficiency pursuant to 10CFR50.55(e). A direct short to ground was found during installation testing of cables in an electrical penetration assembly (EPA). The insulation of the cable had been cut all the way through to the conductor apparently by the edge of a channel to which the cable bundle had been tie-wrapped. The weight of the cable bundle against the channel was judged to have caused the cut.

Inspection of six other penetration assemblies determined that cables in those assemblies were routed and tied in the same manner. Cables were found to have minor jacket indentions caused by the support channels but no actual cuts were found.

Although the cut cable found was in a non-Class 1E circuit, Class 1E cables are routed and tied in the same manner prior to and following installation. Grounded cables due to cut insulation could lead to the loss of a redundant train of safety related equipment.

### II. Description of Deficiency

On March 13, 1985, HL&P, pursuant to 10CFR50.55(e), notified NRC Region IV of a potentially reportable deficiency concerning cut cable insulation found in an electrical penetration assembly (EPA). Cable A-4 in EPA-16 was found to have insulation cut all the way through to the conductor causing a complete short circuit to ground. The cut insulation was found as a result of Ebasco's installation procedure for all EPA's, Construction Site Procedure-44 (CSP-44), which requires megger and continuity testing of all cables after the EPA is installed. Five hundred volts DC was applied between Cable A-4 and ground with a reading of zero ohms resistance. EPA-16 was provided by Westinghouse (W).

Six other W EPA's were selected at random and visually inspected by Bechtel Site Engineering personnel for similar damage. Two were installed and four were in the warehouse. It was found that other EPA's have cables routed and tied in the same manner as EPA-16. Cables were found to have minor jacket indentions caused by the terminal board vertical channel supports but no actual cuts were found. No cable bundles examined were as large and heavy as those of EPA-16.

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Since the tie wraps in EPA-16 were not tightened with excessive force it is judged that the weight of the bundle of cables caused the cut in Cable A-4. Although Ebasco procedure CSP-44 requires testing during EPA installation, the possibility exists that insulation could be cut subsequent to installation since the cables are to remain routed and tied. Cut insulation on a Class 1E cable could result in a loss of one train of safety-related equipment. Although STP utilizes a redundant train system, a loss of one train due to cut cable combined with an assumed single failure could result in insufficient capability to mitigate the consequences of an accident.

#### III. Corrective Action

The cut insulation will be repaired using heat shrink insulation and a  $\underline{W}$  repair procedure. During inspection of all  $\underline{W}$  EPA's of this type the edges of the support channels will be covered with Edge-Guard or EPR rubber to prevent further occurrences of cut insulation.

### IV. Recurrence Control

Covering the channel edges with Edge-Guard or EPR rubber will prevent further occurrences of cut cable insulation. All  $\underline{W}$  EPA's of this type will be examined for cut insulation.

# V. Safety Analysis

Although the cable cut in EPA-16 was a non-Class 1E circuit, the potential for cut insulation on Class 1E cable does exist. Additionally, Ebasco procedure CSP-44 only requires testing during EPA installation, thus the possibility exists that insulation could be cut subsequent to installation since the cables are to remain routed and tied. Cut insulation on a Class 1E cable could result in a loss of one train of safety-related equipment. Although STP utilizes a redundant train system, if this deficiency had remained uncorrected a loss of one train due to cut cable combined with an assumed single failure could have resulted in insufficient capability to mitigate the consequences of an accident. Therefore, a safety hazard was assumed to exist and corrective measures will be implemented.