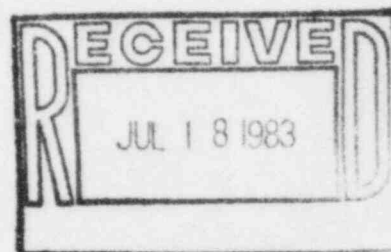


# The Light company

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

July 13, 1983  
ST-HL-AE-976  
File Number: G12.125

Mr. John T. Collins  
Regional Administrator, Region IV  
Nuclear Regulatory Commission  
611 Ryan Plaza Dr., Suite 1000  
Arlington, Texas 76012



Dear Mr. Collins:

South Texas Project  
Units 1 & 2  
Docket Nos. STN 50-498, STN 50-499  
Final Report Concerning  
Flashovers/Failures of  
Non Safety-Related Insulators

On June 16, 1983, pursuant to 10CFR50.55(e), Houston Lighting & Power Company (HL&P), notified your office of an item concerning flashovers/failures of insulators that are not safety-related at the South Texas Project (STP) site. Attached is the Final Report concerning this item.

If you should have any questions concerning this matter, please contact Mr. Michael E. Powell at (713) 877-3281.

Very truly yours,

*G. W. Oprea, Jr.*  
G. W. Oprea, Jr.  
Executive Vice President

MEP/mg  
Attachment

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PDR ADOCK 05000498  
S PDR

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Houston Lighting & Power Company

July 13, 1983

cc: G. W. Oprea, Jr.

ST-HL-AE-976

J. H. Goldberg

File Number: G12.135

J. G. Dewease

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Washington, D. C. 20555

Revision Date 07-05-83

Final Report Concerning  
Flashovers/Failures of  
Non Safety-Related Insulators

I. Summary

The South Texas Project (STP) 345kv substation has experienced several incidents of insulator flashover. One incident resulted in the loss of six of seven existing sources of offsite power to the switchyard. This incident represents the first indication of a common mode failure which potentially could result in the loss of all offsite power. The subject insulators will be replaced prior to operation of the STP.

II. Description of the Incident

On June 16, 1983, pursuant to 10CFR50.55(e), Houston Lighting & Power Company (HL&P), notified the NRC-Region IV of an item concerning flashovers of insulators at the STP 345kv substation.

Units 1 & 2 of the STP are served by a common 345kv switchyard. Eight 345kv transmission circuits (one of which is a future circuit) rated from 850 to 1,080 mva connect the STP 345kv switchyard to the owner's respective systems. These eight 345kv circuits provide the source of AC power to the 345kv switchyard. In addition, there is a 138kv line which supplies the STP. This 138kv line is connected directly to an emergency transformer which can supply power to the Class 1E loads of either unit.

Some of the insulators utilized at the STP are supplied by the Lapp Bethea Interpace Corporation (hereafter, Lapp) of LeRoy, New York. These Lapp insulators are utilized in a non safety-related application and are not purchased under a 10CFR50 Appendix B Quality Assurance Program.

Lapp hollow core insulators, catalogue numbers 97592-70 and 91260-70, have flashed over at STP on four separate occasions since 1978. Of these four incidents of flashover, only one is considered to be a serious concern with respect to the total loss of offsite power. On April 21, 1983, flashover of 22 insulators on the transmission lines terminating in the switchyard at the STP site resulted in tripping of five of seven independent power sources to the switchyard. Flashovers also resulted in intermittent operation of one of the two remaining transmission lines and deenergization of one of the two switchyard busses. During the flashover incidents, the 138kv line remained fully operational. On June 15, 1983, HL&P personnel became aware that Lapp hollow core insulators, catalogue number J-52591-PA70, were also being used on the 138kv line although no flashovers of the 138 kv line insulators have been identified. Random single flashovers have occurred in the past, however, the flashovers of April 21, 1983 represent the first indication of a common mode failure which potentially could result in the loss of all offsite power. The failure mode of the insulators causing flashover has yet to be identified with certainty. It is believed to be a

combination of environmental effects (i.e., heavy construction activity causing dust to build up on the surface of the insulators during relatively long periods of dry weather followed by a condition of extremely high humidity) and the characteristics of the Lapp insulators. There has been no conclusive evidence of an insulator design problem.

### III. Corrective Action

As an interim measure, the remaining Lapp insulators have either been coated with Dow-Corning Silicon grease (type SWS-295) or replaced with an insulator from a different manufacturer. The Dow-Corning grease appears to be effective since no greased insulators have flashed. The replacement insulators also have not experienced flashing. Although the grease appears effective in preventing flashover, it is not our preferred long-term solution. We will replace the current Lapp insulators with a different design (either from Lapp or another manufacturer).

### IV. Recurrence Control

See discussion in Section III.

### V. Safety Analysis

The plant engineered safety features have been designed to mitigate the consequences of design basis accidents concurrent with the total loss of all 345kv and 138kv transmission lines. However, the loss of offsite power is a severe challenge to the safety systems. NRC General Design Criteria (GDC) 17 states that the probability of loss of the offsite power should be minimized.

Although not quantifiable, the probability of a loss of offsite power has not been minimized if the current type Lapp insulators were to remain in service. Therefore, HL&P conservatively concludes that the failures of these insulators could "adversely affect the safety of operations of the plant" and considers this matter reportable pursuant to 10CFR50.55(e).