



LONG ISLAND LIGHTING COMPANY

SHOREHAM NUCLEAR POWER STATION

P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

November 16, 1981

Mr. Boyce H. Grier
Office of Inspection and Enforcement,
Region I
U. S. Nuclear Regulatory Commission
631 Park Avenue,
King of Prussia, Pa 19406



LONG ISLAND LIGHTING COMPANY
Shoreham Nuclear Power Station - unit 1
Docket No. 50-322

Dear Mr. Grier:

On May 14, 1981, in accordance with 10CFR50.55(e) we reported verbally to Region I a potential deficiency with 9/c, No. 14 AWG control cables manufactured by the Rockbestos Company. Although all electrical tests performed up to the time of this verbal report indicated this cable was suitable for QA Category I applications, verbal notification was made since the effects of long term aging and LOCA environments were not yet known and the results of this testing and associated engineering analysis may require the replacement of some installed cables. This letter serves as an update of our actions taken regarding this potential deficiency and of the testing being performed to qualify this cable for its design life.

Description of Deficiency

Construction electricians, while performing terminations of field run cables, discovered several lengths of cables which exhibited unusual physical characteristics. The cables, Rockbestos type NFP-25 (9/c No. 14), had indentations in the XLPE insulation which were caused by a binder thread which is spirally wrapped around the insulated conductors under the cable jacketing. In some cases, this binder thread indented the conductor insulation at the point of contact, reducing the insulation wall thickness below the minimum required by the purchase specification.

Investigations into this problem determined that the installation of a binder thread on this type of cable was a mis-application by the manufacturer. Other factors associated with the fabrication process determined how deeply the binder thread has indented (if at all) the conductor's insulation. A study performed by Rockbestos indicated that although 26 reels of this cable (NFP-25) were erroneously constructed using a binder thread, only those cables jacketed during a two-week period in late 1974 and early 1975, exhibited potentially significant indentations. Documentation and testing indicates that the greater degree of insulation indentation may have been caused by inadvertently allowing the cables jacketed during this two-week period to remain in the curing ovens longer than the specified 24-hour curing cycle.

Scope of Installed NFP-25

A review of cable traceability records has shown that the 26 reels of indented NFP-25 cable have been installed, however, none of this cable has been used in Shoreham's primary containment. It has, however, been used in both safety-related and non-safety-related applications in other plant areas. Extensive field measurements and statistical analysis of the insulation wall thickness for this cable have been performed to verify the study performed by Rockbestos. These measurements indicate that only the cables taken from 7 of the 26 reels experienced a significant degree of indentation. Correlation of the field measurements and the results of Rockbestos' study confirm that only the cables jacketed between December 29, 1974 and January 11, 1975 are subject to potentially significant indentation.

Status of Qualification Testing

Electrical tests (megger, hi-pot and high voltage dielectric stress) performed by Rockbestos have proven that unaged samples of even the significantly indented cable (indentations of greater than 10 mils) are satisfactory from an electrical standpoint to perform in 600V 90°C service. Accelerated aging is currently being performed on samples of this cable in accordance with IEEE Standard 383-1974 to thermally age them to simulate 40 years of life. One of these samples has been aged to simulate 40 years at 60°C and has also successfully passed the initial days of a 100 day LOCA Environment test for secondary containment areas. Additional samples are currently undergoing thermal aging to simulate 40 years at 70°C and 75°C. These samples will also be subject to a full 100-day LOCA for secondary containment areas. It is expected that this testing will be completed and results will be available by March of 1982.

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Intended Course of Action

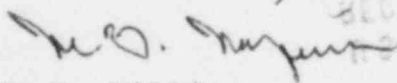
NFP-25 cables used in safety-related services at Shoreham have been categorized into two groups: (Group #1) those which have only minor indentations, and (Group #2) those which have potentially significant indentations. The qualification tests on cables with minor indentations are expected to prove them suitable for 40 years life in all areas except the primary containment. The indentations on these cables do not lower the insulation wall thickness to less than what is acceptable for No. 16 AWG cable.

This NFP-25 cable is 600V control cable and the conductor size is determined by voltage drop because of control circuit length and not determined by current capacity; therefore, the internal heat generated is not the governing factor in cable design. Industry standards require insulation thicknesses based on conductor size, i.e. average insulation thickness for #14 AWG is 30 mils insulation, and for #16 AWG 25 mils, with the minimum thickness at any given point not less than 90 percent. Therefore, the minimum thickness for #14 AWG is 27 mils and for #16 AWG 22.5 mils.

The applications where NFP-25 has been used would usually be serviced with 9/c, No. 16 AWG cable and have been upgraded to 9/c, No. 14 AWG to improve voltage drops caused by long cable runs. Although tests performed to date on the cables exhibiting the greater degree of indentations indicate no significant differences in electrical properties, its ability to resist long term aging and LOCA will not be known until March of 1982. The impact on the construction and startup schedule presented by the failure of the group #2 cables has necessitated that we replace them at this time. Those cables in group #1 which exhibit only minor indentations (jacketed outside of the two-week period previously described) will be left installed as it is fully expected that the results of the qualification testing will demonstrate its acceptability.

You will be advised in March, 1982 of the result of this testing.

Very truly yours,


M. H. Milligan
Project Engineer
Shoreham Nuclear Power Station
TJS/gmm

cc: Mr. Victor Stello, Director
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Enforcement
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