



Pennsylvania Power & Light Company

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Norman W. Curtis
Vice President-Engineering & Construction-Nuclear
215 / 770-5381

October 16, 1981

Mr. R. C. Haynes
Director, Region I
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

SUSQUEHANNA STEAM ELECTRIC STATION
INTERIM REPORT OF A DEFICIENCY IN AMERICAN
INSULATED WIRE 600 VOLT CABLE
ERs 100450/100508 FILES 840-4/821-10
PLA-945



Dear Mr. Haynes:

This letter serves to provide the Commission with an interim report of a deficiency involving the failure of American Insulated Wire to pass qualification testing. The problem was originally reported under the provisions of 10 CFR 50.55(e) in a telephone conversation between Mr. A. Sabol of PP&L and Mr. E. McCabe of NRC Region I on September 1, 1981. The information contained in this report is submitted pursuant to the requirements of 10 CFR 50.55(e).

The attachment to this letter contains a description of the problem, its cause, safety implications and the corrective action planned. Since the details of this report provide information relevant to the reporting requirement of 10 CFR 21, this correspondence is considered to also discharge any formal responsibility PP&L may have in compliance thereto.

We expect to issue a final report on the deficiency in December, 1981.

Very truly yours,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

FLW:sab

Attachment

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Mr. R. C. Haynes

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October 16, 1981

cc: Mr. Victor Stello (15)
Director-Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. G. McDonald, Director (1)
Office of Management Information & Program Control
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Gary Rhoads
U. S. Nuclear Regulatory Commission
P.O. Box 52
Shickshinny, PA 18655

Subject

Failure of American Insulated Wire Corporation (AIW) 600 volt cable to pass a sequential mechanical and IEEE-383-1974 100 day environmental qualification test.

Description of Deficiency

Four of six AIW 600 volt cables which were subjected to 100 day environmental qualification testing per IEEE-383-1974 failed to pass the post-LOCA insulation resistance and/or dielectric strength tests.

The testing was undertaken to determine if AIW cable known to have jacket manufacturing defects such as scrapes, pinholes, skips and bumps could withstand the most severe environmental conditions postulated inside and outside containment at Susquehanna SES and retain suitable electrical characteristics.

Cable samples with known jacket defects were pulled through conduit to simulate as installed conditions (mechanical test) and then subjected to a 100 day environmental test.

On the seventh day of the 100 day test, the cables were removed from the LOCA chamber and subjected to dielectric strength and insulation resistance tests. The cables tested successfully passed this part of the test.

Since the most severe environmental conditions outside of primary containment are postulated to be less severe than the seven day LOCA profile to which the cable was tested, the AIW cable was determined to be acceptable for use outside containment.

Upon completion of the 100 day environmental test, a non-destructive insulation resistance and dielectric strength test was performed on the cable. Four of the six cables tested failed the insulation resistance and/or the dielectric strength test. This sixty seven percent failure rate after the 100 day environmental test is considered to be unacceptable.

Cause of Failure

The cause of the failure is attributed to the gradual breakdown of the insulating material after sequential mechanical and environmental testing leading to overall failure of the insulation during a post-LOCA insulation resistance and/or dielectric strength test.

The insulation breakdown during the post LOCA dielectric strength and insulation resistance tests could not be attributed specifically to the jacket defects, as the insulation breakdown occurred at numerous locations throughout the cable length.

Analysis of Safety Implications

The AIW 600 volt cable is used in Class 1E, safety related power and control circuits inside primary containment at Susquehanna SES.

Failure of this cable on a Class 1E circuit inside primary containment could adversely affect safe shutdown of the plant. Therefore, PP&L has concluded that the failure of AIW 600 volt cable to successfully withstand the simulated LOCA environment is a significant deficiency, reportable under 10 CFR 50.55(e).

Corrective Action

On September 4, 1981 PP&L NPE directed Bechtel to replace all AIW cable used on Class 1E circuits inside primary containment with qualified cable supplied by Boston Insulated Wire. AIW cable used on Class 1E and non-Class 1E circuits outside of primary containment will not be replaced.

Following the present schedule, all AIW cable used on Class 1E circuits inside Unit #1 primary containment will be replaced by November 4, 1981. Only a small amount of the AIW cable scheduled for use on Class 1E circuits inside Unit #2 primary containment has been installed. This cable will be replaced and the balance of Class 1E cables will be installed following the Unit #2 cable installation schedule.

A final report on the deficiency and the corrective action undertaken will be provided in December, 1981.