



Pennsylvania Power & Light Company

Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

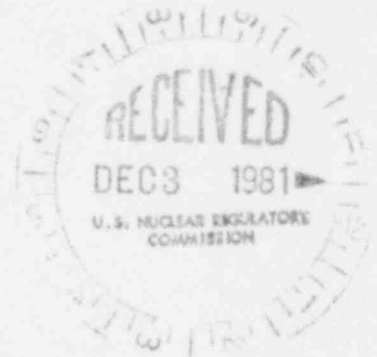
Norman W. Curtis
Vice President-Engineering & Construction-Nuclear
215 / 770-5381

November 18, 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
FINAL REPORT OF A DEFICIENCY INVOLVING
IMPROPERLY GROUNDED FLEXIBLE CONDUIT
ERS 100450/100508 FILE 840-4/821-10
PLA-966

Reference: PLA-613 (1/14/81)



Dear Mr. Haynes:

This letter serves to provide the Commission with a final report on a deficiency involving improperly grounded flexible conduit. The deficiency was originally described in the referenced PLA-613.

The attachment to this letter contains a description of the deficiency, its cause, an analysis of safety implications and the corrective action taken and planned. This information is furnished pursuant to the provisions of 10 CFR 50.55(e).

We trust the Commission will find this report to be satisfactory.

Very truly yours,

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

FLW:sab

Attachment

8112040585 811118
PDR ADOCK 05000387
S PDR

1E27
5
11

Mr. R. C. Haynes

- 2 -

November 18, 1981

cc: Mr. Victor Stello (15 copies)
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

FINAL REPORT

SUBJECT: IMPROPERLY GROUNDED METALLIC RACEWAYS ON SAFETY-RELATED FAIL
SAFE CIRCUITS

DESCRIPTION:

Metallic conduit is utilized to enclose electrical conductors in various fail-safe (deenergized to perform the safety function) safety related circuits. These fail-safe circuits, are part of the Reactor Protection System (RPS), Nuclear Steam Supply Shut-Off System (NSSSS) and Neutron Monitoring System (NMS) logics. The fail-safe design requires that the metallic conduit provide a low resistance path to ground to prevent external voltage sources, that could occur from certain short circuits, from defeating the fail-safe mode of these safety related circuits. The positive ground path assures that the upstream protective devices will sense and interrupt a short circuit, thereby eliminating the possibility of an external voltage source defeating the safety function.

Flexible metallic conduit is utilized for fail-safe circuits within the GE-supplied Power Generation Control Complex (PGCC). Typically the flexible conduit is routed through the PGCC floor sections from the termination cabinets to panels or from panel to panel.

The defect being reported is the lack of positive metallic grounding for the flexible conduit either at the termination cabinet or at the panel. In a typical termination cabinet installation, the conduit is attached with a locking ring to a termination module. This is an acceptable ground connection; however, the termination module has been mounted on painted (high electrical resistance) surface, thus interrupting the ground path circuit.

CAUSE:

During the manufacturing process, there was no procedure to assure that the paint was removed prior to mounting the termination modules. Hence, a positive ground path was not provided. There was no procedure requiring a check that the termination module mounting provided a low-resistance connection to the panel steel.

ANALYSIS OF SAFETY IMPLICATIONS:

The design basis, for safety-related fail-safe circuits of the RPS, NSSSS and NMS systems requires protection against the possibility of loss of protective functions from external voltage sources. Installation of these circuits in solidly grounded metallic conduit is required to meet this design basis.

GE has reported this defect to the NRC under 10 CFR, Part 21. (See GE letter MFN212-80 dated 12/8/80).

PP&L Engineering considers the omission of a positive ground on the GE supplied flexible metallic conduit to be a significant deficiency in design and construction of the PGCC that, were it to have remained uncorrected, could have adversely affected the safety of operation of the plant. Therefore, the lack of grounding on flexible metallic conduit containing safety-related fail-safe circuits within the PGCC is considered a significant deficiency, reportable under 10 CFR 50.55(e).

CORRECTIVE ACTION

GE has issued FDDR KR1-607 and FDI WJKP for Unit 1 and FDDR KR2-531 and FDI MDFQ for Unit 2 as instructions to field investigate PGCC installations of fail-safe circuits in flexible conduit for adequate grounding. Where grounding is found to be unacceptable, positive grounding is being installed.

Bechtel was instructed to assure that installations of safety-related RPS, NSSSS and NMS fail-safe circuits within their design scope met GE requirements. GE and Bechtel developed a list of fail-safe circuits requiring grounding in Bechtel raceways.

Bechtel has prepared Design Change Package (DCP) 393.1 to check and insure that fail-safe circuits have adequate conduit grounding. The DCP is presently on hold pending reconciliation of the design with raceway fill requirements. Once the latter problem has been resolved, the proper grounding of conduit will be verified and corrections completed as found necessary.