

FINAL REPORT  
ON  
ELECTRICAL RACEWAY SEPARATION  
DEFICIENCY  
AT  
LIMERICK GENERATING STATION  
UNITS 1 and 2

PHILADELPHIA ELECTRIC COMPANY  
APRIL, 1980

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## 1.0 INTRODUCTION

- 1.1 The Limerick Project design documents and drawings for installation of seismic Class I raceway, conduit and junction boxes reflect the requirements of Regulatory Guide 1.75.
- 1.2 Certain violations of the project requirements regarding separation of raceways have been identified and it has been determined that plant safety could have been compromised had these separation violations gone unidentified.
- 1.3 In compliance with 10CFR50.55 (e), this Final Report is issued to describe the deficiencies, analyze the safety implications of the deficiencies, and describe the action taken to correct the deficiencies and prevent their recurrence.
- 1.4 This significant deficiency was reported via telecon to the USNRC, Region I on March 26, 1980.

## 2.0 DESCRIPTION OF PROBLEM

- 2.1 Field construction identified exposed seismic Class I raceway, conduit and junction box installations in noncompliance with project Drawing E-1406 which reflects the requirements of Regulatory Guide 1.75 relative to maintaining one inch (1") separation criteria. A total of one hundred and eighty-seven non conforming raceways were documented on nonconformance reports.
- 2.2 Separation at the Limerick jobsite is required between all Engineering Safeguard, Reactor Protection and Balance of Plant raceways. Electrical Drawing E-1406 which defines the separation criteria for raceway installation had stated "The minimum distance between redundant enclosed raceways and between barriers and raceways shall be one inch". The definition of "redundant" is a critical item, since jobsite experience prior to Limerick has been that redundant is channel A to C, channel B to D, channel W to Y, and channel X to Z raceway. A Design Change Notice (DCN88) was issued 1/80 and provided clarification by stating, "The minimum distance between redundant divisional enclosed raceways, between divisional enclosed raceways and non-divisional enclosed raceways, and between barriers and raceways, shall be one inch".
- 2.3 Quality Control error was attributed to inadequately prepared Project Quality Control Instructions which provided for in-process inspection to verify separation as a surveillance function, but did not provide in the final inspection verification that required separation was maintained.
- 2.4 Because of the method of work scoping (area and elevation to electrical layout drawings), the in-process QC inspections were not adequate to assure separation criteria compliance.

### 3.0 ANALYSIS OF SAFETY IMPLICATIONS

- 3.1 Cables scheduled for installation in the raceways identified as not in compliance with the separation requirements of Regulatory Guide 1.75 involve essentially all of the safeguard systems.
- 3.2 Because of the multiplicity of cables, systems, and possible failure modes it is not feasible to identify individual safety implications. It can be said that safety could have been compromised if these conditions had gone undetected.

### 4.0 Corrective Action Taken

- 4.1 Q-listed exposed raceways installed to date have been inspected for separation criteria compliance to design Drawing E-1406 Those that had been accepted by Quality Control and did not meet the design requirements were identified on nonconformance reports. These NCR's are being dispositioned at the present time. All rework, repair or rationale to justify "accept as is", is expected to be complete by June 30, 1980. Cable will not be installed in the raceways identified as nonconforming until the dispositions are completed.
- 4.2 Field construction requested project clarification of Drawing E1406. This has been achieved through DCN 88 and incorporated in Revision 28 to Drawing E-1406. Job Rule 8031-E-2, Revision 4 was revised to state, "Raceway separations shall be in accordance with E-1406 criteria prior to being accepted by Field Engineering".
- 4.3 Project Quality Control Inspection E-2.0 has been revised to include a final acceptance inspection to verify that separation requirements have been maintained. In addition, General Instruction No. 10 states, "Additional separation verifications are performed in conjunction with the installation of raceway barriers and seals in accordance with PQCI E-2.0".
- 4.4 A training class was held on 12/19/79 to indoctrinate all Electrical QC Engineers to the required separation criteria. A meeting between Electrical Field Engineers and Superintendents, Electrical QC Engineers, a Project Engineering Representative, and a Resident Engineering Representative will be held on 5/7/80 to discuss the separation criteria and resolve any remaining questions.

### 5.0 CONCLUSIONS

It is concluded that the corrective actions described above will correct and preclude separation violations involving seismic Class I raceway, conduit and junction boxes.