Attachment to PLA-506

FINAL REPORT ON PGCC/ACR PANEL CONNECTORS

DESCRIPTION

While implementing FDDR-KR1-506 (rework of termination cabinets), damaged insulation (cuts, knicks, shield solder connections, etc.) was discovered on the jumper wires connecting the field wiring terminal board to the cable connector in GE's T-Mods. This was reported in NCR-3030.

Subsequently, similar insulation damage and deficient pin crimps were discovered in the PGCC/ACR panel connectors. This was reported in NCR-3403.

A sample inspection program was implemented to determine the extent of insulation damage and deficient pin crimps. A visual inspection (extracting all pins) and pull test of all conductors and pins was performed within each of 250 sample panel connectors. 125 connectors in the ACR inner ring panels and 125 connectors in the relay and back row panels of Unit 1 were randomly selected for the sample.

The sample sizes identified were based on MIL-STD-105D, 29 April 1963, Table I General Inspection Level II and Table IIA Single Sampling Plans for Normal Inspection. The sample plan was based on a 0.65 percent AQL acceptance rate.

The sample inspection determined that the Unit 1 ACR inner ring/relay/back row panel connectors did not meet a 0.65 percent QAL for insulation damage and deficient crimps.

CAUSE

The causes of the problems could not be positively identified. However, it is believed that the damage to the insulation, consisting of nicks, cuts and abrasions, was caused during the pin insertion process. The edge of the insertion tool can impact the conductor insulation and cause damage under the high forces required to insert pins into the connector dielectric.

The deficient pin crimps could have been caused by a combination of manfuacturing personnel error and crimping tool malfunction. General Electric said that their QA program at the time did not provide for verifying the adequacy of the crimping tool prior to use each day.

ANALYSIS OF SAFETY IMPLICATIONS

The PGCC/ACR panel connectors do have safety-related control and instrumentation circuits. It is conceivable that improperly crimped pins could prevent circuits from performing their design safety-related functions. Also, damaged insulation, if uncorrected, could permit shorting or introduction of external voltage sources into safety-related circuits which could prevent the circuits from performing the designed safety function.

Since damaged panel connectors are a random occurrence and could occur in any safety-related circuit, the possibility of a failure exists. The simultaneous degradation and loss of safety-related circuits could result in a safety hazard to the operation of the plant.

Project Engineering has determined the PGCC/ACR panel connector deficiencies to be reportable under 10 CFR 50.55(e).

CORRECTIVE ACTION

GE issued FDI WJIQ, Rev. 0 to initiate a 100 percent visual inspection and pull test of all Unit 1 inner ring/relay/back row panel connectors with No. 20 AWG wire. FDI WJIQ, Rev. 1 was later issued and expanded the 100 percent inspection to all Unit 1 inner ring/relay/back row panel connectors.

The inspection, repair/rework and testing for Unit 1 are 95 percent complete. The remaining five percent will be completed and tracked by NCR-3403.

Unit 2, will utilize a sampling plan similar to that used for Unit 1.

CONCLUSIONS

Upon completion of the inspection program, the Unit 1 inner ring/relay/back row panel connectors will have been subjected to inspection, repair/rework, and testing to assure their functionability and the detection and repair of defects.

Project Engineering has authorized a sampling plan for Unit 2, and Bechtel Construction and QC will document results and generate an NCR for any discrepancies.