

FINAL REPORT ON
INSULATION DAMAGE DEFICIENCY IN
CONTROL ROOM INSERTS 72C AND 73C

Subject

Panel OC653 Inserts 72C and 73C

Description

While attempting to perform the tasks delineated on GE's field work instruction, on insert modules 72C and 73C from plant Operating Benchboard OC653 (GE HL2-P853), Bechtel noted that internal wiring (14AWG) paralleling conduit numbers 15, 18, 19, 20 and 21 (4, 2, 1, 2 and 2 conductors, respectively) were damaged on insert 73C.

The above stated nonconformance was documented in NCR 3760.

The subject inserts were returned to GE - San Jose manufacturing facility for inspection, repair/rework and check out. Insulation damage was also discovered in insert 72C. The inspection findings are documented by the GE Evaluation of Susquehanna I HL2-P853 Inserts 72C and 73C dated May 15, 1979.

Cause

It appears that the wire insulation damage occurred because the wiring was routed over the sharp edge of a steel barrier, and the metal flexible conduit locknuts were, in some instances, installed in a manner which caused crimping and severing of the conductor insulation. These defects went undetected during GE-QA's in-process and pre-shipment inspection for damage and manufacturing defects.

Analysis of Safety Implications

The system design was reviewed on the basis of the damages documented in the GE Evaluation of Susquehanna I HL2-P853 (OC653) Insert 72C and 73C dated May 15, 1979.

The damaged wiring is part of the two off-site power system feeder 4.16 kV circuit breaker controls and the four standby AC Diesel Generator 4.16 kV feeder breaker controls.

The offsite power feeder breakers are required to trip upon loss of voltage at each of the four 4.16 kV standby AC buses. Simultaneously, the undervoltage condition of each bus starts the respective standby AC Diesel Generator. When rated speed and voltage are reached, each Diesel Generator circuit breaker is automatically closed into its dead bus that has been disconnected from both offsite power sources. These buses serve redundant emergency core cooling pumps and related equipment (i.e., RHR, Core Spray, etc.), and are required for emergency shutdown. The four Diesel Generators are considered redundant to each other and separated accordingly.

Inserts 72C and 73C contain the two offsite power supply feeder breaker control switches and synchronizing switches to each of the four 4.16 kV buses. Additionally, they contain the four Diesel Generator breaker controls and related synchronizing switches. Other non-safety related components are present.

The deficiencies reported identify a condition where the negative of the 125 V DC control power of the Diesel Generator breaker control closing circuit and the positive of the tripping circuit could have been damaged and shorted to panel steel.

The closing and tripping circuits are independently fused but supplied from the same 125 V DC power source. The resulting short would have blown the positive tripping circuit fuse and the negative closing circuit fuse.

The closing circuit fuse, if blown, would disable the closing circuit of the Diesel Generator feeder breaker including the automatic close signal.

The deficiency described above, if uncorrected, could permit shorting and failure of redundant Standby AC Diesel Generator 4.16kV feeder breaker controls which could prevent the circuits from performing the designed safety function. Since the occurrence of damaged wiring is random and could occur in any and all Diesel Generator feeder breaker control circuits, the possibility of a failure exists. The simultaneous degradation and loss of the Standby AC Diesel Generator power supplies could result in a safety hazard to the operation of the plant.

It has been concluded that the Insert 72C and 73C wire insulation damage is reportable under 10CFR 50.55(e).

Corrective Action

Inserts 72C and 73C were returned to GE-San Jose, the manufacturer, for repair/rework. GE disassembled both inserts down to bare metal. The insert steel was stripped, repainted and devices were checked, replaced/reinstalled and rewired. Manufacturing and QA procedures were in place to assure wiring did not come in contact with sharp edges of steel barriers and conduit fittings. The inserts were 100% visually inspected and functionally checked by GE-QA to verify circuit continuity, operation and condition. The inserts have been returned to the site and reinstalled.

ATTACHMENT 2

JUL 9 '79 106536

GENERAL  ELECTRIC

GENERAL ELECTRIC COMPANY, 175 CURTNER AVE., SAN JOSE, CALIFORNIA 95125
MC 394, (408) 925-3005

July 6, 1979
Responds to: N/A
GP-79-92

Mr. R. J. Shovlin, Assistant Project
Director - Susquehanna
Pennsylvania Power & Light Company
Two North Ninth Street
Allentown, PA 18101

Dear Bob:

SUBJECT: SUSQUEHANNA 1 & 2
INSERTS 72C AND 73C - POTENTIAL REPORTABLE CONDITION

JULY 9 1979
CMS HSB RHM HKF
QUALITY ENGINEERING

Proj. Mgr.	
Proj. Engy.	
SAC	
JAW	
ROB	
OC	
ADM	
ARCH	
CIVIL	
JD	
ELECT	
MECH	
PD	
UDMS	
PROG. MGR	
PURCH	
EXP	
INSPEC	
SAFETY	
QA	
COST	
FIELD	
PL	
ADM	
DRIVE	
IN P.W.	

Following a review of the conditions existing on the subject inserts as determined by a detailed inspection in San Jose and discussions with Bechtel on circuit implications, General Electric has concluded that the deviations would not prevent or degrade any safety function. Thus, these deviations do not constitute a potential reportable condition within the context of 10CFR, Part 21.

A review of the list of deviations in the 72C and 73C inserts with Bechtel has determined that regardless of the deviations, the diesel generators would automatically be switched to the emergency bus.

The possibility of wires with frayed or cut insulation grounding against the frame was also investigated. The manual control for the 4.16KV distribution system is 125 volt DC and is not grounded (the ground is floating). Therefore, any contact with the frame would not short the system and blow fuses or circuit breakers rendering the diesel generator inoperative.

Please contact me if you have any questions.

Very truly yours,

~~S. W. Willard~~
Project Manager
Susquehanna Project

JHM:bjr/1001

cc: E. A. Gustafson

J. R. Schriener

File: 7.7