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ILLINOIS POWER COMPANY



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U-10194

CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

August 17, 1984

Docket No. 50-461

Mr. James G. Keppler
Regional Administrator
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Subject: 10CFR50.55(e) Deficiency 55-84-10
Debris in NSPS Panels

Dear Mr. Keppler:

On April 3, 1984, Illinois Power notified Mr. F. Jablonski, NRC Region III (Ref: IP memorandum Y-20521, dated April 3, 1984) of a potentially reportable deficiency under the provisions of 10CFR50.55(e), concerning the identification of loose debris found in the power supplies of the NSPS panels at Clinton Power Station (CPS). This initial notification was followed by one (1) interim report (Ref: IP letter U-10152, D. P. Hall to J. G. Keppler dated May 4, 1984). Illinois Power's investigation of the above issue is complete and has determined that this issue represents a reportable deficiency under the provisions of 10CFR50.55(e). This letter is submitted as a final report regarding this reportable deficiency.

Statement of Reportable Deficiency

Various types of metallic debris were found in the NSPS power supplies and could conceivably, under certain conditions, cause an electrical fault, resulting in the loss of a power supply. Loss of a power supply may potentially degrade the level of redundancy within the NSPS circuits. We have reviewed this concern for possible adverse impact on the safety of operation of CPS.

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Background

Illinois Power's maintenance instructions for control room equipment require cleaning of panels and equipment prior to placing in service. While performing the required cleaning, maintenance personnel discovered some loose debris in a power supply for the neutron monitoring equipment. As a result, eight (8) similar power supplies with perforated type enclosures for the NSPS panels were inspected and various types of debris, consisting of small pieces of wire, metal washers, metal chips, and pieces of plastic, were found. The debris could have originated at the GE fabrication facility in San Jose, or possibly, from work performed at CPS by the construction contractor, Baldwin Associates.

Investigation Results/Corrective Action

Illinois Power prepared and implemented an investigation plan to determine the extent of this problem at CPS. The investigation plan included:

1. A review of General Electric's (GE), Illinois Power's (IP) and Baldwin Associates' (BA) procedures was performed to determine the adequacy of these procedures with respect to the inspection and cleaning requirements for electronic equipment.
2. A review of this problem was performed with respect to the effects on other similar type equipment and perforated enclosures.
3. A review for adequacy of General Electric's cleaning, inspection, and shipping preparation procedures at the San Jose fabrication facility was performed.
4. A review of Baldwin Associates' procedures for protecting equipment during installation was performed.

All CPS work is performed in accordance with applicable IP procedures and necessary precautions are taken when performing work inside panels by placing protective covers over the equipment immediately below the work area. This procedure prevents debris from falling inside equipment cases. Illinois Power's instructions also provide the necessary guidance to clean instrument panels containing static sensitive devices. The cleaning is required prior to the initial energization of vendor supplied panels or after the performance of repair maintenance and/or modification rework inside the instrument panels at CPS. There are no requirements to clean inside enclosures of panel mounted equipment except in cases where an instrument is removed from the panel for maintenance in the shop.

General Electric's San Jose procedures for final inspection of panel shop products requires a check for cleanliness; i.e., bottom of panel cleaned out, outer sides of panel washed down etc. The procedures did not include or note the detection of loose debris.

The power supplies utilized in the Neutron Monitoring System panels are very similar to those in the NSPS with perforated enclosures. Investigation into this aspect of the problem revealed that a failure of a power supply in the Neutron Monitoring System occurred on February 21, 1984, after initial energization as a result of shorting due to a metal screw found inside the power supply enclosure. The failed power supply was removed from the panel for repair and other power supplies were subsequently removed from the other neutron monitoring panels for cleaning in the maintenance shop. No other loose debris was found. Since the metal screw found in the failed power supply enclosure was identical to those used by GE in the fabrication of the panels, it was concluded that the screw was too large to fall through the perforations in the enclosure, and therefore, must have originated at the GE fabrication facility in San Jose. The discovery of debris in the Neutron Monitoring System power supplies prompted the removal of the NSPS power supplies for inspection and cleaning where more debris was found.

A review of other safety related equipment has not identified any other similar component enclosures where hidden debris could be a problem.

As a means of preventing future occurrences of this problem, GE has indicated they believe their procedures to be adequate, but that emphasis will be given to training courses in housekeeping for future work involving electronic panels.

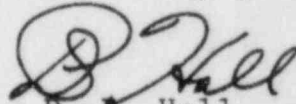
Safety Implications/Significance

Illinois Power has determined that the existence of debris in the power supplies in all NSPS divisions represents a potential for common mode failures that are not considered in the single failure analysis, and therefore, are not included in the design basis. The design basis for systems important to safety includes the appropriate combinations of the affects of normal and accident conditions with the affects of natural phenomena, and not those that can result from manufacturing errors. It is Illinois Power's contention that the NSPS equipment is designed and qualified (seismically and environmentally) to provide high reliability against failures, which could prevent the performance of its intended safety functions, due to the effects of postulated design basis events.

Without the performance of a failure mode and effects analysis and/or qualitative fault tree analysis of the debris found in the Neutron Monitoring System power supply and all NSPS power supplies, Illinois Power must conclude that the condition represents a significant safety concern which, were it to have remained uncorrected, could have adversely affected the safe operation of CPS. On this basis, the issue is considered to be reportable under the provisions of 10CFR50.55(e).

We trust that this final report provides you sufficient information to perform a general assessment of this reportable deficiency and adequately describes our overall approach to resolve the problem.

Sincerely yours,



D. P. Hall
Vice President

RLC/cah(NRC)

cc: NRC Resident Office, V-690
Director, Office of I&E, US NRC, Washington DC 20555
Illinois Department of Nuclear Safety
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