

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/88010(DRS)

Docket No. 50-461

Operating License No. NPF-62

Licensee: Illinois Power Company
500 South 27th Street
Decatur, IL 62525

Facility Name: Clinton Nuclear Station

Inspection At: Glen Ellyn, Illinois

Inspection Conducted: February 25 through March 31, 1988

Inspector: *Anil S. Gautam*
Anil S. Gautam
Reactor Inspector, Region III

4/19/88

Date

Also participating in the inspection and contributing to the report was:

M. Kopp

Approved By: *Ronald N. Gardner*
Ronald N. Gardner, Chief
Plant Systems Section, Region III

4/19/88
Date

Inspection Summary

Inspection on February 25 through March 31, 1988 (Report No. 50-461/88010(DRS))

Areas Inspected: Special safety inspection of the environmental qualification (EQ) of electric equipment within the scope of 10 CFR 50.49. The inspection included a review of licensee action on previously identified findings.

Results: Previously identified EQ deficiencies were determined to be potential violations of 10 CFR 50.49.

DETAILS

1. Persons Contacted

a. Illinois Power Company (IPCo)

W. C. Gerstner, Executive Vice President
F. A. Spangenberg, Manager, Licensing and Safety
R. D. Freeman, Manager, NSED
R. E. Campbell, Manager, QA
J. D. Weaver, Director, Licensing
M. E. D'Haem, Supervising specialist, EQ
S. A. Zabel, Attorney
W. E. Baer, Attorney

b. Nuclear Regulatory Commission (NRC)

C. J. Paperiello, Deputy Regional Administrator
H. J. Miller, Director, Division of Reactor Safety
J. A. Grobe, Director, Enforcement Staff
R. C. Knop, Chief, Reactor Projects Branch 3
R. N. Gardner, Chief, Plant Systems Section
R. W. Cooper, Chief, Reactor Projects Section 3B
S. P. Ray, Resident Inspector, Clinton
M. J. Kopp, Reactor Inspector, Plant Systems Section
C. D. Anderson, Enforcement Specialist
Z. Falevits, Reactor Inspector, Plant Systems Section

2. Previously Identified Findings

a. (Closed) Unresolved Item (50-461/87026-02(DRS))

This item addressed AMP KYNAR splices used in Limitorque actuators. During examination of Limitorque Actuator E51-F010 in the auxiliary building, the inspectors observed the use of AMP KYNAR (Polyvinylidene Fluoride) butt splices on 480V motor leads. The licensee confirmed that these splices had been used in various instances inside and outside the containment in instrument, control, and power circuits, and that plant specification K-2999 allowed the use of these splices when leads were found too short to terminate. The licensee's EQ files, however, did not have adequate documentation to qualify these splices, in that plant specific configurations were not tested in postulated accident environments.

Subsequent to the inspection, the licensee conducted two tests at Wyle Laboratories, Report No. 17955-1, dated January 29, 1988, to demonstrate that the KYNAR AMP butt splices were qualifiable to postulated accident environments at the Clinton Station. During the first test, six specimens were irradiated and thermally aged for a 40 year qualified life to simulate an ambient temperature of 125°F.

The specimens were then exposed to a loss of coolant accident (LOCA) environment of elevated temperature, pressure, steam, and demineralized water spray. During the LOCA portion of the test, five of the six specimens energized by 528VAC, 132VAC, and 132VDC circuits shorted to ground; thereby failing the test. Failures were attributed to insulation degradation due to aging.

The licensee performed a second test on samples aged for an eight year qualified life. Six samples were exposed to a LOCA environment without any spray. One of the six specimens failed during the first six minutes of the LOCA exposure. Two other specimens failed after 17 and 24 hours of testing, respectively. The licensee discontinued the test and concluded that the splices had failed to perform under conditions tested.

Subsequent to this test the licensee reviewed appropriate equipment and identified 196 AMP butt splices in valve actuators, solenoid valve leads, and in one junction box. These splices have since been replaced at the Clinton Station with qualified tape or Raychem tubing.

This item was previously identified as a Potentially Enforceable Unresolved item, and has now been determined to be an apparent violation of 10 CFR 50.49 (50-461/88010-01(DRS)).

b. Licensee Event Report 87-066

During the EQ inspection, junction Box 1JB673 was observed to have a top conduit entry and contain a Marathon terminal block; however, there were no provisions for moisture removal during an accident (no weep holes). The licensee confirmed the box was in a high energy line break (HELB) environment and issued Condition Report No. 1-87-08-081 to install weep holes in the box. The licensee also stated that ASCO Solenoid Valve 1E12-F065B, which is energized from this terminal block, would have failed to an accident safe position if the terminal block was compromised during an accident. At the conclusion of the inspection, the licensee indicated that this was an isolated deficiency. Based on this information, this item was cited as part of a Severity Level V violation in the NRC EQ Inspection Report 50-461/87026(DRS).

Subsequent to the EQ inspection, Nuclear Station Engineering Department (NSED) received a copy of a letter written by General Electric (GE) to Sargent and Lundy (S&L) discussing electrical boxes that failed EQ testing. Based on this letter, NSED re-reviewed a Nonconforming Material Report (NCMR) written on September 16, 1986, dealing with standing liquid in a 1E junction box causing corrosion of terminals. Previously identified remedial corrective action for the NCMR had failed to identify the lack of the required drainage opening. No generic corrective action was specified for the NCMR as the condition was identified during a generic walkdown for a class 1E cable splice insulation deficiency.

NSED also re-reviewed the Condition Report written on the junction box deficiency identified during the EQ inspection. Based on all of this information, a limited plant inspection was performed by the licensee on November 5, 1987. During this inspection one hundred fifty-six junction boxes were identified as lacking the required drainage openings. These boxes were subsequently reworked by drilling a drain hole in each box. The rework was completed in the field by November 13, 1987, prior to starting up from the outage. Licensee Event Report 87-066 was initiated to report this event in accordance with 10 CFR 50.73(a)(2)(ii) and 10 CFR 50.73(a)(2)(v).

This deficiency is considered an apparent violation of 10 CFR 50.49 (50-461/88010-02(DRS)).

c. (Closed) Unresolved Item (50-461/87026-01(DRS))

This item addressed the use of nylon wire caps in Limitorque actuators. Limitorque Actuator 10C072 was examined by the inspectors in the auxiliary building. The inspectors noted the use of three nylon wire caps to terminate six of the nine 480V motor leads and subsequently confirmed that nylon wire caps had been installed in approximately ninety dual voltage 10 CFR 50.49 designated Limitorque actuators in the auxiliary and fu buildings.

The licensee stated that Limitorque Test Reports No. 600376A and No. B003 demonstrated equipment qualification, and that a Limitorque letter dated August 20, 1987, confirmed that the suspect caps were used during these tests. The inspectors, however, found no evidence in the reports of the wire caps being tested. The licensee could not provide additional information. The inspectors informed the licensee that Limitorque actuators containing these wire caps were unqualified based on inadequate qualification documentation.

Subsequent to the inspection, the licensee conducted two tests at Wyle Laboratories, Report No. 17955-1, dated January 29, 1988, to demonstrate that the nylon wire caps were qualifiable to postulated accident environments at the Clinton Station. During the first test, six specimens were irradiated and thermally aged to simulate an eight year qualified life at 125°F ambient temperature and exposed to a LOCA environment of elevated temperature and steam. Specimens were mounted in appropriate configurations with an applied phase to phase voltage of 537 VAC, thereby simulating plant applications. No failures were observed.

The licensee performed a second test where twelve specimens were irradiated and thermally aged. Six specimens were aged to simulate 125°F for a 40 year life, and six specimens were aged to simulate 150°F for an eight year life. At the 22 hour point of the test, three specimens aged to simulate 125°F and two specimens aged to simulate 150°F failed and were found shorted to ground. The test was discontinued.

The licensee has re-evaluated the environmental zones in which these wire caps are installed and has determined that the wire caps will be exposed to an ambient temperature of 122°F. EQ files are being revised accordingly. The licensee concluded that the nylon caps were qualified for at least a 9.9 year qualified life (as opposed to the 40 year life documented in the EQ files) based on the success of the first test. The nylon wire caps will be replaced prior to the end of their qualified life.

This item was previously identified as a Potentially Enforceable Unresolved Item, and has now been determined to be an apparent violation of 10 CFR 50.49 (50-461/88010-03(DRS)).

3. Enforcement Conference on EQ Findings

On March 31, 1988, an enforcement conference was held in Region III in regard to NRC findings identified during the August 17 through October 13, 1987 and February 25 through March 31, 1988 10 CFR 50.49 EQ inspections. The licensee acknowledged and agreed with the NRC findings, and presented the following arguments:

- a. With regard to the use of nylon wire caps in Limatorque valve actuators, the licensee stated that it had been their understanding that Limatorque had tested these caps during the qualification testing of the actuators. The NRC, however, determined that the licensee had no evidence to substantiate this claim, and that any licensee communications with Limatorque regarding these caps took place after the NRC finding. The licensee also stated that failures in the field would have been prevented, as the licensee found no contact of the wire caps to the metal enclosures in the field. The NRC rejected this argument as the numerous wire leads having wire caps were not, and are not required to be secured in the field, and may easily touch each other or the enclosure during operation or maintenance.
- b. With regard to the KYNAR AMP splices, the licensee stated that even though they had not originally tested the splices in a configuration consistent with the plant application, their original testing had been consistent with industry practices. The NRC rejected this response as the Clinton Station is required to meet the latest industry standards for testing as outlined in NUREG 0588, Category I and in IEEE 323-1974. Both documents refer to the use of proper configuration and mounting of tested components. In addition, IE Information Notice No. 85-39 addresses the need for a similarity of the tested configuration of equipment to the configuration installed in the plant.
- c. With regard to the lack of junction box weep holes, the licensee stated that based on their review of plant engineering specifications no other such installation deficiency was found for installed equipment. As a basis for enforcement of this item, the NRC has noted that IE Information Notice 84-57 did address the need for weep holes in junction boxes to prevent failures due to moisture intrusion.

The licensee did not provide any new or revised information during the enforcement conference to mitigate the findings but confirmed that adequate corrective and remedial action had been implemented. A review of the licensee's corrective action will be performed during a followup NRC inspection.

4. Exit Interview

The Region III inspectors met with the licensee's representatives (denoted under Paragraph 1) during an enforcement conference on March 31, 1988 and discussed their findings. The inspectors summarized the purpose and findings of the inspection and the licensee acknowledged this information.