

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-295/89016(DRS); 50-304/89016(DRS)

Docket Nos. 50-295; 50-304

Licenses No. DPR-39; DPR-48

Licensee: Commonwealth Edison Company
Post Office Box 767
Chicago, IL 60690

Facility Name: Zion Nuclear Power Station, Units 1 and 2 ; .

Inspection At: Zion Site, Zion, Illinois

Inspection Conducted: May 15-31, 1989

Inspector: *R. W. Cooper, Jr.*
M. J. Kopp *For*

6/16/89
Date

Also participating in the inspection and
contributing to the report: T. Humphrey, EG&G

R. W. Cooper, Jr. *For*
Approved By: R. Gardner, Chief
Plant Systems Section

6/16/89
Date

Inspection Summary

Inspection on May 15-31, 1989 (Reports No. 50-295/89016(DRS); 50-304/89016(DRS))

Areas Inspected: Routine announced safety inspection of previously identified findings regarding environmental qualification of electrical equipment within the scope of 10 CFR 50.49, Limiting Part 21, terminal blocks in instrument/control circuits, motor operated valves, and junction boxes (Modules 30703, 62705, 92702).

Results: Within the five areas inspected, no violations or deviations were identified. One unresolved item was identified regarding EQ control circuits landed on terminal blocks in containment and in High Energy Line Break (HELB) areas (Paragraph 4).

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DETAILS

1. Persons Contacted

a. Commonwealth Edison Company (CECo)

- +T. Joyce, Station Manager
- +W. Kurth, Production Superintendent
- +T. Rieck, Technical Staff Superintendent
 - J. Gilmore, Assistant Superintendent, Planning
 - R. Johnson, Assistant Superintendent, Maintenance
 - R. Cascarano, Technical Staff Supervisor
- +T. Printz, Assistant Supervisor, Technical Staff
- +G. Trzyna, Nuclear Licensing Administrator
- +T. Saksefski, Staff Assistant, Regulatory Assurance
- °K. Ainger, Project Engineer
- °S. Hunsader, Regulatory Assurance
- °T. Ulinski, Engineer
- +J. Rohde, Electrical Group Leader, Technical Staff
- °P. Pawlak, EQ Coordinator, Technical Staff
- +W. Grundnan, Quality Assurance Engineer
- +J. Anderson, Quality Inspector
- +K. Depperschmidt, Electrical Maintenance

b. U.S. Nuclear Regulatory Commission (USNRC)

- +M. Holzmer, Senior Resident Inspector

+Denotes those participating in interim site exit on May 19, 1989.

°Denotes those participating in final exit in Glen Ellyn, Illinois on May 31, 1989.

2. Licensee Action on Previously Identified Findings

- a. (Closed) Open Item (304/85-06-07): This item addressed incomplete EQ documentation packages. References identifying plant equipment, maintenance and surveillance requirements, and documentation demonstrating acceptability of reduced operating time for certain EQ transmitters were not included in the EQ files.

During this inspection, the inspectors reviewed selected EQ documentation packages. The packages appeared to be complete with references and requirements incorporated into the EQ file. The licensee stated that a complete review and revision of Zion EQ documentation was recently performed to ensure that the EQ files were complete.

No further concerns were identified.

- b. (Closed) Violation (295/86016-01(DRS); 304/86015-01(DRS)): This violation addressed Raychem heat shrinkable tubing (HST) used in 10 CFR 50.49 designated applications that were found to be installed in unqualified configurations. Deficiencies included: (a) improper seal lengths; (b) fiberglass braid material not stripped back from under the splice; and (c) the HST found exceeding specified minimum bend radius.

During this inspection, the inspector reviewed the corrective actions taken by the licensee to resolve the noted deficiencies. Sample splices that were unqualified due to improper seal lengths, excessive bend radius, or lack of fiberglass stripping were tested at Wyle Laboratories under the direction of CECO. The test conditions enveloped the required environmental conditions as referenced in 10 CFR 50.49. The test results were acceptable and were documented in Wyle Test Report No. 17859-02P.

No further concerns were identified.

- c. (Closed) Open Item (295/86016-02(DRS); 304/86015-02(DRS)): This item addressed the licensee's corrective actions concerning the testing and replacement of Raychem splice configurations found to be unqualifiable. As previously indicated in Paragraph 2.b. of this report, the licensee tested splice configurations determined to be unqualified. All test results were reported to be acceptable.

The licensee performed visual inspections of EQ splices in Units 1 and 2 that were specified as Raychem HST. Splices that were originally considered to be unqualified and were not subsequently qualified by the testing program described in Paragraph 2.b. were replaced in both units. All Commonwealth Edison personnel involved in the installation of Raychem HST splices at the Zion Station were trained in splice installation by the Raychem certified representative. In addition, the licensee implemented procedure QCAI-18 for the installation and inspection of EQ splices.

No further concerns were identified.

- d. (Closed) Open Item (295/86016-03(DRS); 04/86016-03(DRS)): This item concerned the installation of Raychem splices without adequate site quality control (QC) inspections. The inspector noted that EQ splices required several components to be installed and was concerned that a lack of QC inspection hold points could lead to unqualified splice configurations. The licensee established a checklist, QC inspection hold points, and documentation of QC inspections on all EQ splices.

During this inspection, the inspector reviewed QC Procedure QCAI-18. The procedure implemented a checklist and QC inspection hold points for Raychem splice installations. In addition, the licensee's plant maintenance procedures were revised to require QC inspections of Raychem splices.

No further concerns were identified.

- e. (Open) Violation 295/86030-01(DRS); 304/86030-01(DRS)): This violation addressed a licensee identified deficiency concerning cubicle fan cooler motor leads and splices used in 10 CFR 50.49 designated applications. The splices were made with various types of unqualified tapes. The motor leads were unqualified PVC cables. The licensee stated that based on industry data regarding radiation and aging tests performed on PVC cable, the splices and motor leads were qualifiable. The licensee also reported that a program was initiated to replace the splice and cable assemblies.

During this inspection, the inspector requested the licensee to provide documented evidence that the unqualified splices and cables were replaced with EQ splices and cables. The licensee provided evidence that the splices were replaced; however, evidence that the PVC cables were replaced could not be provided. The licensee committed to perform an inspection of cubicle fan cooler motors for the RHR, SI and CVCS systems to ensure that the motors leads were qualified. Pending completion of the licensee's inspections, this violation remains open.

- f. (Open) Open Item (295/86030-02(DRS); 304/86030-02(DRS)): This item addressed the licensee's corrective action regarding the schedule for replacement of unqualified splices and cables on cubicle fan cooler motors in Units 1 and 2. As discussed in Paragraph 2.e. of this report, the licensee could not demonstrate that the PVC motor leads were replaced. Pending further inspection by the licensee, this item remains open.

3. Limitorque Part 21 Regarding Melamine Torque Switches

On November 3, 1988, the Limitorque Corporation issued a 10 CFR Part 21 concerning failures of Melamine torque switches supplied in SMB-000 and SMB-00 actuators. It was reported that Melamine torque switch failures were attributed to post mold shrinkage which could result in either breakage or binding of the cam and consequently, failure of the torque switch. Limitorque recommended that licensees develop and implement a plan to replace the Melamine torque switches with environmentally qualified Fibrite switches. Limitorque further recommended that licensees test inaccessible motor operated valves (MOVs) to ensure that the subject torque switches are not binding.

During this inspection, the inspector requested the licensee to provide the list of affected EQ actuators, and the schedule for replacement or testing of the MOVs as recommended by Limitorque. The licensee informed the inspector that Melamine torque switches in EQ actuators at Zion had been replaced prior to the issuance of the Limitorque 10 CFR Part 21. The inspector reviewed Nuclear Work Request Z37552 that documented replacement of the Melamine torque switch in MOV CC9438 with an environmentally qualified replacement. The licensee reported that all EQ Limitorques were inspected per nuclear work requests and Melamine torque switches were replaced.

No further concerns were identified.

4. Use of Terminal Blocks in EQ Instrument/Control Circuits

Due to concerns regarding terminal block leakage currents, the inspectors reviewed the licensee's use of terminal blocks in instrument and control circuit applications located inside containment and in high energy line break (HELB) areas. The licensee reported that in response to a previous NRC Violation (304/85-06-05), a walkdown of junction boxes that contained terminal blocks was performed to determine if top entry conduits were a source of spray impingement on the terminal blocks. Circuits determined to be susceptible to spray conditions were relocated within the terminal box such that direct spray would not affect the circuits. The licensee also reported that EQ instrument circuits inside containment were either spliced with Raychem HST, or routed directly to the penetrations. EQ instrument circuits located outside containment were not spliced, except for qualified Fisher Porter Steam Generator pressure transmitters. Regarding control circuits, the licensee reported that EQ Pressure Operated Relief Valves (PORVs) and containment isolation valves are landed on terminal blocks inside containment and in HELB areas. The inspectors reviewed an analysis written by the licensee which stated that the PORVs are not required to operate until after chemical spray, when leakage currents are low, and that containment isolation valves would fail to the safe position. The inspectors were concerned that the containment isolation valves could remain energized due to the development of leakage paths between the positive side of the solenoid and the plant ground, as noted in NRC Information Notice No. 88-86, Supplement 1. The licensee stated that their review of the subject information notice would not be complete until July, 1989. Pending completion of the licensee's review concerning inadvertent operation of solenoids used for containment isolation, this is considered an Unresolved Item (50-295/89016-01(DRS); 50-304/89016-01(DRS)).

5. Plant Physical Inspection

a. Limitorque Motor Operated Valves (MOVs)

The inspectors performed a physical inspection of Limitorque Motor Operated Valves and noted the following concerns:

- (1) The inspectors observed water dripping onto the motor and limit switch compartment of MOV 2MS0018. Limitorque Test Report B0058, Section 2.3, tested the MOV for spray impingement. The MOV passed the test therefore concerns regarding the effect of water getting into the motor were mitigated. The licensee initiated Zion Work Request Z81951 to correct the valve packing leak which resulted in the water dripping on MOV 2MS0018. No further concerns were identified.
- (2) The inspectors noted that MOVs 1MS0019, 2MS0019, and 2MS0017 had limit switch compartment heaters installed. The licensee stated that the heaters are normally energized during plant operations. The inspectors were concerned that the additional temperature rise inside the limit switch compartment could affect the

qualified life of the internal wiring in the limit switch compartment. The licensee performed an analysis of the affect of the temperature increase and stated that the energized heaters would result in a 10°C temperature rise and an overall environment of approximately 60°C. Since the limit switch internals are qualified for 40 years at 90°C, the analysis resolved the inspectors' concern.

The inspectors were also concerned that the heaters were powered from a non-safety power source and that electrical separation was not maintained. The licensee reviewed the electrical drawings and determined that electrical power for the heaters is provided from a separate source of the same safety-related division that provides power and control to the MOV.

The licensee also provided the inspectors with the response to NRC Information Notice No. 86-71 which stated that the Zion MOV inspection procedures require inspection of internal MOV wiring for damage, and ensure that all wiring is trained to avoid heater contact. No burn damage due to MOV space heaters has been identified to date at the Zion Station.

No further concerns were identified.

b. Junction Boxes

During this inspection, the inspectors performed a walkdown of selected junction boxes that contained terminal blocks located in HELB areas. The boxes had weep holes installed. Conduits were installed such that they would not be a source of direct spray on the terminal blocks. The inspectors also noted that spare conductors were not properly dedicated in the field as spares per the CECO standard. The licensee initiated work requests to properly terminate the spare conductors in junction boxes 2AB-0077, 2AB-0104 and 2AB-0182. The licensee has also committed to perform a sample walkdown of EQ junction boxes to determine if spare conductors have been terminated per the CECO standard.

No further concerns were identified.

6. Unresolved Item

An unresolved item is a matter about which more information is required in order to ascertain whether it is an acceptable item, a deviation, or a violation. An Unresolved Item is discussed in Paragraph 4.

7. Exit Interview

The Region III inspector met with the licensee's representatives (denoted under Paragraph 1) during the interim exit on May 19, 1989, and discussed the findings at the conclusion of the inspection on May 31, 1989. The inspectors summarized the purpose and findings of the inspection and the licensee acknowledged this information. The licensee did not identify any documents/processes reviewed during the inspection as proprietary.