

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/86032(DRS)

Docket No. 50-255

License No. DPR-20

Licensee: Consumers Power Company
212 West Michigan Avenue
Jackson, MI 49201

Facility Name: Palisades Nuclear Generating Plant

Inspection At: Covert, Michigan
Glen Ellyn, Illinois

Inspection Conducted: December 8, 1986 through January 13, 1987

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

2/12/87
Date

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2/17/87
Date

Inspection Summary

Inspection on December 8, 1986 through January 13, 1987 (Report
No. 50-255/86032(DRS))

Areas Inspected: Special announced safety inspection of the Environmental Qualification (EQ) of electric equipment within the scope of 10 CFR 50.49. The inspection included licensee action on previous EQ inspection findings; action on SER/TER commitments; EQ program compliance to 10 CFR 50.49; adequacy of EQ documentation; and a plant physical inspection of EQ equipment (Modules No. 30703 and No. 25176).

Results: The licensee has implemented a program to meet the requirements of 10 CFR 50.49. Certain deficiencies were identified in the areas inspected and are summarized below:

Potentially Enforceable/Unresolved Items

| <u>Item Numbers</u> | <u>Description</u> | <u>Report Section</u> |
|---------------------|--|-----------------------|
| 50-255/86032-01 | Unqualified grease found in Limitorque Actuators. | 2c |
| 50-255/86032-05 | ASCO solenoid valves found installed without seals to prevent moisture intrusion. | 5a |
| 50-255/8603-06 | Certain EQ files found not auditable due to incorrect acceptance criteria, and missing information. | 5b(1)(2)(3) |
| 50-255/86032-07 | Rockbestos Firewall III EQ files did not establish qualification of appropriate cables. | 5c |
| 50-255/86032-09 | Effects of low IRs during LOCA testing not addressed in General Electric Cable EQ files. | 5d(3) |
| 50-255/86032-10 | Plant installed Viking potted connectors found unqualified for instrumentation circuits. | 5e |
| 50-255/86032-11 | Rosemount transmitter EQ files did not justify demonstrated accuracy of these instruments for plant accident conditions. | 5f |
| 50-255/86032-12 | Limitorque Actuators determined to be unqualified due to blocked T drains. | 6 |

Open Items

| | | |
|-----------------|--|-------|
| 50-255/86032-08 | GE Cable 1 and 2 EQ files had discrepancies in the qualification requirements for radiation. | 5d(1) |
|-----------------|--|-------|

| <u>Item Numbers</u> | <u>Description</u> | <u>Report Section</u> |
|---------------------|---|-----------------------|
| 50-255/86032-04 | Lack of a controlled procedure for replacement of "O" rings and torquing of transmitters. | 4c(4) |
| 50-255/86032-02 | Deficiencies in the PACS listing of maintenance activities for containment air coolers, position limit switches, and the motor oil in EQ pumps. | 4c(1) |
| 50-255/86032-03 | Lack of instructions for replacement of CELMARK connector "O" rings. | 4c(3) |

DETAILS

1. Persons Contacted

a. Consumers Power Company

- *J. J. Firlit, Plant Manager
- *F. W. Buckman, Vice President, Nuclear Operations
- *J. Lewis, Plant Technical Director
- *R. D. Orosz, E&M Manager
- +*K. E. Osborne, Projects Superintendent
- *T. J. Palmisano, System Engineering Supervisor
- +*K. Toner, Supervisory Engineer
- +*B. Meridith, Senior Engineer, Plant Projects
- *G. Sleeper, Senior Engineer, Plant Projects
- *D. J. Malone, Licensing
- *B. Johnson, NLD
- *C. S. Kozup, Technical Engineer
- *J. C. Petro, Quality Engineer

b. Consultants to the Licensee

- P. A. DiBenedetto, DiBenedetto Associates
- *E. Olfier, Jackson, Michigan

c. USNRC

- +*E. R. Swanson, Senior Resident Inspector
- *C. Anderson, Resident Inspector

*Denotes those present during the interim site exit meeting on December 12, 1986.

+*Denotes those attending the exit interview on January 13, 1987.

2. Licensee Action on Previously Identified EQ Findings

On May 19, 1986, a reactor trip occurred at the Palisades Plant due to an overpressure condition caused by a failure in the turbine EHC system. Based on numerous subsequent NRC concerns regarding equipment failures, the licensee formed a task force to review all applicable plant equipment, design and maintenance. The following potential EQ concerns were identified:

- a. The licensee investigated "spurious" alarms on the safety injection pump seal and bearing coolers. These alarms had been considered spurious for several years. Investigation by the licensee revealed that the Component Cooling Water (CCW) Heat Exchangers were undersized by up to 1600 gpm relative to design flow requirements in the FSAR. This design discrepancy was later traced to procurement errors.

As a result of this finding, corrective action has been taken by the licensee to revise the plant containment temperature and pressure EQ profiles, and during this review the revised profiles were reviewed by the NRC inspectors. Details are noted below:

- (1) The objective of the revised temperature profile analysis was to evaluate the Palisades Containment Temperature Plots at various Safety Injection Refueling Water (SIRW) tank injection valves against the EQ temperature test profiles. The licensee's temperature assessment methodology consisted of identifying all equipment in containment; obtaining test profiles from qualification reports; superimposing test profiles to develop a minimum EQ test profile; comparing the minimum test profile to the revised containment profile; and resolving and documenting identified deficiencies.

The results of the licensee's analysis EA-PAL-86-083-01 indicated that the minimum temperature test profile drops below the containment temperature profile at approximately 10,000 seconds. For example, in the 10^4 second region of the LOCA profile, the tested temperature of the Trans-America Level Element (EQ-File Misc LE-1) was approximately 7°F below the required 237°F temperature. The analysis, however, also indicated that the thermal degradation threshold of the equipment materials was greater than the peak containment temperature in the 10^4 region, so that the seven degree difference in the test versus the actual plant profile should have no effect on the qualification of this equipment. The NRC inspectors determined that the revised Palisades Containment Temperature Analysis demonstrated that the required plant accident profiles had been enveloped by the test profiles or that sufficient analyses had been provided to demonstrate that variations in the profile did not affect the qualified equipment.

- (2) The objective of the licensee's revised pressure profile analysis EA-PAL-86-083-02 was to evaluate the Combustion Engineering LOCA pressure profile having a 53 psig peak, against the Palisades in containment tested equipment pressure profiles for equipment qualification. The profile (pressure) assessment methodology consisted of identifying the test peak pressure for all in containment equipment; comparing the peak from each test to the revised containment pressure peak, and identifying, resolving and documenting identified deficiencies. The results of the analysis showed that all LOCA-tested equipment withstood test pressures in excess of the revised containment peak pressure, with the exception of a Bendix potting compound used in Viking penetration connectors. This compound has been tested to 52 psig which is considered acceptable since the compound is cured rigid and is not affected by pressure. The NRC inspectors determined that the equipment installed inside the Palisades containment could withstand the peak pressure of 53 psig and perform their required safety related functions.

- b. The licensee's task force identified significant deficiencies in the four containment fan coolers. A damper was found shut (due to missing bolts) causing the overheating and failure of one motor and an inspection access door was found fallen off (due to bad welds) causing air to bypass the coolers. The fan coolers were fed by the Service Water Pumps; however, the task force determined that these pumps provided a 7% lower design flow due to installation deficiencies. The NRC determined that the above discrepancies rendered the appropriate fans inoperable, which in turn affected the qualification of equipment in the containment. During this review the NRC inspectors confirmed that the repair of the applicable containment fan cooling units had been completed and that the fans were considered by the licensee to be operable.
- c. The NRC identified the use of unqualified lubricants by the licensee in Limitorque valve actuators both outside of and inside containment. Hardened grease was found in some actuators which could have prevented these actuators from performing their safety function during a DBA. The licensee had committed to replacing all lubricants with qualified Nebula EP and Becon 325 prior to startup. During this review the inspectors determined that adequate corrective action had been completed relative to installing qualified grease in affected Limitorque actuators. The licensee was informed that enforcement action may be taken, in that the installed lubricants were unqualified past the EQ deadline. Pending further review of this item, this is a Potentially Enforceable/Unresolved Item (50-255/86032-01(DRS)).
- d. The licensee reported that during a review of the effectiveness of containment air coolers in 1984 they discovered that the ambient containment temperature was actually thirty-four degrees higher than what had been assumed in all EQ calculations. This finding resulted in a complete revision of EQ data on the remaining qualified life of all EQ equipment in the containment, and the licensee stated that appropriate revisions to their EQ files had been completed.

During this audit the NRC inspectors reviewed the licensee's analysis, EA-E-PAL-84-098F, which evaluated the environmentally qualified electrical equipment inside containment, to determine if the equipment qualified life had been exceeded due to the new realistic normal operating temperatures used in aging calculations. The initial ambient containment temperature had been raised from 104°F to 138°F, and based on their review, the inspectors concluded that the electrical equipment located inside the containment was qualified for use at the increased temperature.

No violations to NRC requirements were identified.

3. Licensee Action on SER/TER Commitments

The NRC inspection team evaluated the implementation of the licensee's EQ corrective action commitments made as a result of EQ deficiencies identified by the NRC in the December 30, 1982 FRC/TER; April 25, 1983 SER; and January 31, 1985 final SER.

The majority of deficiencies identified in the FRC/TER and SERs addressed documentation, similarity, aging, qualified life, and replacement schedules. All open items identified in the FRC/TER and the April 25, 1985 SER were discussed with the NRC staff, and the licensee's proposed resolutions to these items were found acceptable by the NRC, as stated in their January 31, 1985 SER. The primary objective of the Region III EQ audit in this area was to verify that the appropriate analyses and necessary documentation to support the licensee's proposed and accepted resolutions to NRR were contained in the licensee's EQ files.

During this review the NRC inspection team reviewed EQ documentation relevant to prior discrepancies identified in SERs, including licensee corrective action on Honeywell limit switches, Fisher and Porter transmitters, Victoreen radiation monitors, Johnson Control temperature switches, Rosemount RTDs, and Foxboro level transmitters.

No violations of NRC requirements were identified.

4. EQ Program Compliance to 10 CFR 50.49

The inspectors reviewed selected areas of the licensee's EQ program to verify compliance to 10 CFR 50.49. The licensee's EQ program was found to identify methods for equipment qualification; provide for evaluation and maintenance of auditable EQ documentation, including maintenance records; provide for upgrading of replacement equipment and control of plant modifications. Based on the above review the inspectors determined that the licensee had established an adequate EQ program in compliance with the requirements of 10 CFR 50.49. The licensee's methods for establishing and maintaining the environmental qualification of electrical equipment were reviewed in the following areas:

a. EQ Program Procedures

The inspectors examined the adequacy of the licensee's policies and procedures for establishing and maintaining the environmental qualification of equipment within the scope of 10 CFR 50.49. The licensee's EQ program was reviewed for procurement of qualified equipment; maintenance of qualified equipment; modifications to plant that could affect qualified equipment; updating of the EQ master list, and review and approval of EQ documentation. Procedures reviewed included the following documents:

- Procedure No. NADP XIX-3, "Nuclear Operating Experience Review (NOER) Program," Revision 7, dated October 22, 1986
- Procedure No. NLD-08, "Documentation and Distribution of Nuclear Regulatory Commission Correspondence (Nonsecurity)," Revision 3, dated August 27, 1986
- Procedure No. 5.01, "Processing Work Orders," Revision 7, dated October 30, 1986
- Procedure No. 5.03, "Preventive Maintenance Program," Revision 3, dated October 27, 1985.

- Procedure No. 5.04, "Control of Installed Plant Instrumentation (IPI)," Revision 3, dated February 13, 1986
- Procedure No. 9.02, "Plant Modifications-Major," Revision 3, dated February 11, 1986
- Procedure No. 9.03, "Facility Change Minor," Revision 3, dated October 2, 1986
- Procedure No. 9.04, "Equipment Specification and Minor Field Changes," Revision 2, dated February 11, 1985
- Procedure No. 9.12, "Environmental Qualification of Electrical Equipment," Revision 0, dated December 11, 1986
- Procedure No. 10.02, "Procurement Process-General," Revision 2, dated July 30, 1986
- Procedure No. 10.03, "Procurement of Material," Revision 2, dated July 30, 1986

Specific areas reviewed in these procedures included definitions of harsh and mild environments, equipment qualified life, service conditions, periodic testing, maintenance and surveillance, and upgrading of replacement equipment purchased after February 22, 1983. Certain procedures were being revised to add new references and more clearly identify the EQ program responsibilities. These revisions were scheduled for release prior to December 31, 1986.

No violation of NRC requirements were identified.

b. 10 CFR 50.49 Master Equipment List (MEL) of EQ Equipment

IE Bulletin No. 79-01B required licensees of all power reactor facilities with an operating license to provide a master list that identified each Class IE electrical equipment item relied upon to perform a safety function during a design basis event. 10 CFR 50.49 Paragraph (d) required licensees to prepare a list of electric equipment important to safety and within the scope of the rule. The NRC inspectors reviewed the Palisades MEL for compliance to 10 CFR 50.49. Areas reviewed included adequacy of the MEL, technical justifications for removal of items from the MEL, and licensee reviews of the MEL for changes due to field modifications.

The inspectors verified the completeness/adequacy of the list in terms of equipment needed under accident conditions through review of Piping and Instrumentation Drawings, Emergency Procedures, Technical Specifications, and FSARs. For example, the inspectors reviewed the deletion of Position Switch Pos-26 from the MEL, and found adequate technical justifications for the items removed from the list documented in Safety Evaluation No. EA-BDM-86-04. Items removed were verified not to initiate any automatic spray functions or require any subsequent safety actions by the operator. Additions or deletions to the list due to field modifications were found acceptable and adequate reviews had been performed. The licensee identified no other additions or deletions to the MEL due to field modifications.

The inspectors reviewed equipment needed to function under accident conditions, as listed in the Palisades Emergency Operating Procedures. Equipment needed during a LOCA and MSLB accident were identified in the Plant Emergency Procedures EOP 5.1, Revision 11, and EOP 6.0, Revision 17 respectively. All applicable equipment in the procedure was reviewed for applicability and inclusion in the MEL. The MEL was found accurate for all items sampled.

No violations of NRC requirements were identified.

c. EQ Maintenance Program

The inspectors reviewed specific maintenance, replacement, surveillance tests and inspections necessary to preserve the environmental qualification of EQ equipment listed on the MEL. The licensee's Periodic Activity Control Sheet (PACS) which listed appropriate maintenance activities to be performed on each piece of EQ equipment, was reviewed for specific maintenance activities and intervals between specific activities. The inspectors reviewed implementation of specific maintenance activities on 35 EQ items including Viking Penetrations, 2400 Volt Motors, 480 Volt Motors, Limitorque Motor Operated Valves, Electrical Pneumatic Converters, ASCO Solenoid Valves, NAMCO and Honeywell Position Limit Switches, Rosemount Transmitters, United Electric Pressure Switches, and Fenwall Temperature Switches. The inspectors found the following deficiencies in the licensee's methods for scheduling maintenance and surveillance:

(1) Discrepancies in the PACS Listings for Position Limit Switches and Motors.

(a) Position Limit Switches (POS)

The inspectors observed that the PACS for the Position Limit Switches (POS) had not been fully implemented at the time of the inspection, in that all appropriate EQ maintenance activities had not yet been identified. The inspector had no immediate concerns as the licensee stated that new qualified Limit switches had just been installed. NRC review of the implementation of these PACS will be tracked as part of Open Item (255/86032-02(DRS)).

(b) 2400 Volt Motors

The EQ of these motors was maintained by a combination of PACS and surveillance testing. The inspectors observed that the EQ file recommended the sleeve bearings be inspected, and the oil analyzed whenever the oil was found discolored. PACS X-OPS309 and X-OPS310; however, required no such maintenance activity to address oil discoloration. Plant auxiliary Operators indicated that they requested oil analyses only if the oil was gritty. The inspectors

determined that the apparent lack of control of the above activities had not compromised the EQ of the motors. The licensee agreed to revise the appropriate PACS and EQ files to provide steps to analyze the oil and inspect the sleeve bearings when the oil drained from the motor appeared discolored. Pending NRC review of revisions to appropriate documents this item will be tracked as part of Open Item (50-255/86032-02(DRS)).

(c) 480 Volt Motors (EMB-1, 2, 4)

The EQ of these motors was maintained by a combination of PACS, maintenance and surveillance procedures. The inspectors observed that maintenance activities had been adequately performed in the past on these motors; however, the current PACS listing VAS080 and VAS090 for EQ maintenance on the Containment Air Coolers (EMB-1) were on hold for final approval. The licensee stated that these PACS would be issued after vendor resolution of correct greasing practices for the motors. Pending licensee approval and NRC review of these PACS, this item will be tracked as part of Open Item (50-255/8632-02(DRS)).

(2) Celmark Connectors on Viking Penetrations

Celmark connectors used on penetrations inside the containment require an O-Ring to maintain containment integrity. These O-Rings are qualified for a 40-year life; however, the EQ package specifies O-Ring replacement anytime a connector is disconnected.

The inspectors observed that maintenance Procedure No. MSE-E-6, "Disconnecting and Connecting Celmark Cable Connectors," did not address O-Ring replacement. Review of maintenance records however, indicated that these O-rings had been replaced in the past so that the qualification of the penetrations had not been compromised. The licensee agreed to revise Procedure No. MSE-E-6 to incorporate the requirement for O-ring replacement. Pending NRC review of this revised procedure this is an Open Item (50-255/86032-03(DRS)).

(3) ASCO Solenoid Valves

During review of separate PACS listings for each solenoid valve the inspectors observed that ASCO Solenoid valve SV-0944A was missing from the PACS for maintenance on ASCO coils. The licensee took immediate corrective action and submitted a PACS change sheet to include the Solenoid Valve No. SV 0944A in the PACS. No further concerns were identified.

(4) Rosemount Transmitters

During review of the implementation of maintenance activities for Rosemount Transmitters, the inspectors observed that there were no controlled procedures for the replacement of O-rings and the torquing of the transmitter housing. The inspectors reviewed past maintenance records and found that despite the lack of a current procedure, these activities had been performed in the past. The licensee agreed to implement a controlled procedure for these activities. Pending review of this procedure, this is an Open Item (50-255/86032-04(DRS)).

d. Plant Procurement and Upgrading of Replacement Equipment

Licensee procedures were found to adequately address upgrading of replacement equipment purchases after February 22, 1983. Procurement procedures and documents were found to adequately address appropriate quality and regulatory requirements regarding the environmental qualification of equipment within the scope of 10 CFR 50.49. Checklists were observed to have been used to provide evidence of reviews and approvals. For example, procurement packages for replacement Limitorque valve motor operators, Rosemount transmitters, NAMCO limit switches and General Atomic radiation monitoring equipment, were found to properly address upgrading of replacement equipment to requirements of IEEE 323-1974.

No violations of NRC requirements were identified.

e. Quality Assurance (QA) and Training Program

During this review the inspectors determined that the licensee had implemented a significant effort in monitoring the quality of EQ activities through surveillance, audits, and review of plant modification records and procurement files. NRC inspectors reviewed QA audits QA-85-13 (October 1985), QA-86-08 (March and April 1986) and QA surveillance S-QG-85-4 (May 1985). The inspectors found the methodology and results of these QA audits and surveillance acceptable.

The NRC inspectors also reviewed the licensee's staff training program and associated training records relative to the performance of EQ activities. These records indicated that the licensee had implemented a well defined training program for key personnel responsible for EQ activities, including management and operations personnel. The training program was found to address key aspects of 10 CFR 50.49 requirements.

No violations of NRC requirements were identified.

5. Detailed Review of Qualification Files

IE Bulletin No. 79-01B required licensees of all power reactor facilities with an operating license to provide written evidence of the environmental qualification of each piece of electrical equipment listed on their MEL. 10 CFR 50.49 Paragraph (f) requires records of qualification of equipment on the MEL to be maintained in an auditable form for the entire period during which the equipment is installed in the plant or stored for future use, to permit verification of qualification and specified performance for accident conditions.

The inspectors reviewed over 60 equipment qualification files for evidence of the environmental qualification of equipment within the scope of 10 CFR 50.49 and evidence of equipment qualification to the DOR Guidelines. Files were found to include a full description of the equipment; similarity analysis of tested equipment to that installed in the plant; allowed mounting methods and orientation; qualification of interfaces (conduit housing, seal etc.); evaluation of aging effects on equipment; performance/acceptance criteria for the qualification of equipment; description of test sequence and methodology; environmental conditions for the equipment during an accident; qualification for submergence of applicable equipment; resolution of test anomalies, and maintenance/surveillance criteria for the preservation of the qualified status of the equipment. The inspectors selectively reviewed the above areas, as applicable, including special reviews for the required duration of operability of equipment; licensee evaluation of tested materials and configurations relative to actual plant installations; adequacy of test conditions; aging calculations for qualified life and replacement intervals; effects of decreases in insulation resistance on equipment performance; adequacy of demonstrated equipment accuracy; and licensee evaluations of discrepancies identified in IE Information Notices and Bulletins.

EQ files were reviewed for Electrical Cables, Cable Splices, Connectors Terminal Blocks, Motor Operated Valve Actuators, Electric Motors, Solenoid Valves, Electrical Penetrations, Seals, Lubricants, Transmitters, Radiation Monitors, Transducers, Control and Indication Switches. The files and additional data provided by the licensee allowed verification of equipment qualification to a specified performance for accident conditions. Several deficiencies were identified and are noted below:

a. ASCO Solenoid Valves

During review of EQ files for the ASCO solenoid valves, the inspectors noted that certain ASCO test specimens identified in the report failed due to moisture intrusion into the coils of the solenoid valves. ASCO test report AQR-67368, Revision 0 in the EQ file states, "ASCO has further concluded that installation of ASCO Catalog NP-1 valves using a properly sealed vented conduit/junction box system, as described in ASCO Catalog NP-1 valve installation and maintenance instruction sheets, will prevent similar performance anomalies due to moisture entry into the solenoid enclosures."

The licensee stated that they had not installed any conduit seals on conduit connections to EQ ASCO solenoid valves in the plant. The inspectors informed the licensee that based on qualification information in their EQ files, all 10 CFR 50.49 designated ASCO solenoid valves that were required to be energized during an accident and were susceptible to moisture intension, were unqualified in their currently installed configurations.

The licensee committed to installing conduit seals, prior to startup, on those valves inside and outside the containment that were required to energize in high humidity conditions during and after an accident. The licensee also took immediate corrective action and provided a justification for the continued operation of the ASCO valves not having conduit seals by showing evidence that these valves would either actuate prior to the onset of the harsh environment and go to a dennergized position, or were not required to actuate in harsh environments. The licensee's corrective action relative to installing new seals will be verified by the NRC prior to plant startup. The licensee was informed that enforcement action may be taken, in that the ASCO solenoid valves inside the containment were unqualified past the EQ deadline. Pending further review of this item, this is a Potentially Enforceable/Unresolved Item (50-255/86032-05(DRS)).

b. File Auditability

10 CFR 50.49 Paragraph (j) requires records of qualification to be maintained in an auditable form for the entire period during which the EQ item is installed in the plant to permit verification that the item is qualified for its application and meets specified requirements. During this review the inspectors identified three deficiencies with respect to the auditability of the EQ files.

- (1) 10 CFR 50.49 Paragraph (l) requires replacement equipment to be qualified in accordance with provisions in the 50.49 rule. The inspectors observed that certain EQ files incorrectly identified replacement equipment as qualified to the DOR Guidelines. The licensee stated that replacement equipment had in fact been upgraded to the requirements of 10 CFR 50.49, but that DOR Guidelines "qualification inserts" had been generically inserted erroneously in certain EQ files of replacement equipment. The inspectors confirmed that the appropriate equipment was qualified to 10 CFR 50.49; however, the licensee was informed that relative to this deficiency, extensive revisions to various files were necessary to establish adequate auditability of those files.
- (2) Due to recent discrepancies found in the plant containment temperature and pressure profiles, extensive calculations were performed by the licensee to revise their EQ profiles so as to accurately reflect containment environmental conditions during a Design Basis Accident (DBA). Details of these revisions are

noted in Sections 2a and 2d of this report. The licensee's analysis had concluded that although margins of qualification of certain equipment were reduced, qualification was not invalidated. The inspectors observed that these revisions to the profiles had not been incorporated in the EQ files and were concerned that this discrepancy may cause errors during procurement and maintenance.

The licensee took immediate action and issued an interim letter to appropriate departments in the plant alerting them to revisions to the EQ profiles and any impact to EQ activities. Based on their review the inspectors had no immediate concerns regarding the operability of the plant; however, the licensee was informed that appropriate revisions of their files were necessary to establish adequate auditability of the files.

- (3) During review of the Trans-American level element and the Rosemount transmitter EQ files the inspectors observed that the files had no reference of a qualified connection interface for these instruments. The MEL did list various qualified interfaces but it was not evident to the inspectors which interface was qualified/compatible for use with the above instruments. The inspectors determined that references of appropriate qualified interfaces were necessary to maintain adequate auditability of the EQ files.

The licensee was informed that enforcement action may be taken, in that the EQ files described in above Sections 5a (1), (2), and (3) were not in an auditable form, past the EQ deadline. Pending further review, this is a Potentially Enforceable/Unresolved Item (50-255/86032-06(DRS)).

c. Rockbestos Firewall III XLPE Neoprene Cable (Cable 9 File E26F, Sheet 8)

The inspectors reviewed Rockbestos Firewall III EQ documentation for qualification to the DOR Guidelines. The qualification file and test report did not identify specific formulations of the installed cable; did not address EQ concerns identified in the NRC Information Notice No. 84-44, and did not address Insulation Resistance (IR) characteristics under accident conditions.

The licensee acknowledged these deficiencies and committed to updating their files by April 1987. Since sufficient data and analysis on the qualification of the Firewall III family of polyethylene cables exists in the industry, the inspectors had no immediate concerns regarding the operability of the plant. The licensee was informed that enforcement action may be taken, in that the cable files were deficient past the EQ deadline. Pending further review this is a Potentially Enforceable Unresolved Item (50-255/86032-07(DRS))

- d. General Electric XLPE/PVC Cable (Cable 1, File E23A Sheet1); General Electric XLPE/Neoprene Cable (Cable 2, File E22 Sheet 1)

The inspectors reviewed the above cable files for qualification of Cables 1 and 2 to the DOR Guidelines. Various discrepancies were noted and are addressed below.

- (1) The inspectors identified various discrepancies in the qualification requirements for radiation in the above cable files. Discrepancies between various portions of the files (SCEW sheets, notes, discussion) were noted and discussed with the licensee. A generic lack of analysis for the effects of a beta dose in all appropriate cable files was also identified to the licensee; however based on the high gamma dose considered in the files no concerns regarding the operability of the plant were identified.

The licensee committed to correcting the above discrepancies, and pending review of their corrective action, this is an Open Item (50-255/86032-08(DRS)).

- (2) During review of the General Electric Cable 1 and 2 files the inspectors observed that qualification test failures had occurred in test specimens energized at 480V. The inspectors noted that the licensee has not accounted for the effect of these failures on plant installed cables.

The licensee took immediate corrective action and provided an evaluation in their files to state that the type of failed cables in the report were not used at Palisades, and that the cables qualified by the test report were to be used in 120V circuits only. No further concerns were identified.

- (3) During review of the above cable files, the inspectors observed that IR characteristics during LOCA testing had not been addressed in the files, nor had leakage currents been evaluated for effects on instrument circuits. The licensee was informed that based on testing done at Sandia, small leakage currents could have significant effects on instrument accuracy.

The licensee took immediate corrective action to provide a justification for continued operation demonstrating the adequacy of the tested accuracy relative to the safe shutdown of the plant and committed to updating their files by April 1987. The inspectors concluded that based on information available in the plant EQ files, there were no immediate concerns regarding the operability of the plant. The licensee was informed that enforcement action may be taken, in that they had deficient EQ data for these cables past the EQ deadline. Pending further review of this item, this is a Potentially Enforceable/Unresolved Item (50-255/86032-09(DRS)).

e. Viking Industries Electrical Penetrations and Electrical Connectors
(File E-20 Sheet 39)

The inspectors reviewed Viking Penetrations and Connectors for qualification to the DOR Guidelines. Files reviewed included Viking penetrations using original connectors potted with a Bendix compound and using a silicon rubber sealing washer or O-ring (Bendix Part No. 10-101378).

The original potted connectors and O-ring sealing washers were tested separately. These test reports were briefly reviewed as part of the penetration review. The first of these test reports did not include insulation resistance or leakage current readings during simulated LOCA testing. The inspectors informed the licensee that a lack of consideration of IR's or leakage current indicated a lack of consideration of the effects of these connectors on the accuracy of associated instruments.

The licensee committed to updating their files by April 1987 by including appropriate evaluations in their files. Based on information reviewed at the plant the inspectors had no immediate concerns regarding the operability of the plant. The licensee was informed that enforcement action may be taken, in that they had inadequate EQ data for their potted connectors past the EQ deadline. Pending further review of this item, this is a Potentially Enforceable/Unsolved Item (50-255/86032-10(DRS)).

f. Rosemount Transmitters (File J4650 Sheets 1 Item 6)

During review of EQ documentation in File J4650 for Rosemount Transmitter Model No. 1153, the inspectors observed that the file did not specify the acceptance criteria for the accuracy of the transmitters during accident conditions. In their EQ files the licensee had demonstrated an instrument accuracy of 8% during LOCA conditions; however, there was no justification of this accuracy in regard to the instruments performance of its safety function. The inspectors concluded that without evidence of the adequacy of the demonstrated accuracy in the EQ file, the transmitters were unqualified for their safety function.

The licensee took immediate corrective action and submitted a Justification for Continued Operation by evaluating the effects of the demonstrated instrument accuracy on their set point methodology. Based on their review the inspectors had no immediate concerns regarding the operability of the plant. The licensee was informed that enforcement action may be taken, in that the EQ files did not demonstrate the installed transmitters to be qualified for accuracy, past the EQ deadline. Pending further review of this item, this is a Potentially Enforceable/Unresolved Item (50-255/86032-11(DRS)).

g. Samuel Moore Thermocouple Cable (Cable-13, E23BA, Sheet 2)

During review of the above EQ file the inspectors noted that the test data indicated "anomalous" IR values below 10 ohms at 500., for samples having EPDM I insulation. The licensee was informed that adequate justification had not been provided in the files, with the exception that samples with EPDM II insulation were indicated to have passed the test. The licensee took immediate corrective action and provided additional justification in their files by demonstrating that the cable was used for millivolt service requirements; establishing similarity between EPDM I and II; identifying acceptable IR values for long periods during the LOCA test, and identifying acceptable post LOCA IR values at 100 volts. No further concerns were identified.

6. Plant Physical Inspection

The NRC inspectors selected over 20 items on the MEL for examination in the plant. The EQ file of each item had been reviewed, and information regarding the location, manufacturers, model/serial number, mounting, orientation, environment, and interfaces had been noted prior to the inspection. The inspectors examined the selected items in the field, as accessible, and verified that the method of installation of each item was not in conflict with its environmental qualification. Specific areas reviewed included traceability of installed items to EQ files, ambient environmental conditions, qualification of interfaces, (connectors, wires, seals, insulation, lubricants etc.), evidence of significant temperature rise from process, drainage, mounting methods, physical conditions and housekeeping. In all cases items examined in the field during this walkdown were found to meet their appropriate EQ requirements. The following exception was noted.

- Limatorque Actuator Housing T Drains

During a field inspection conducted by the licensee, six Limatorque Actuators were found to have plugged T Drains. These plugs had not been removed during installation, thereby placing these EQ Actuators in a configuration other than that tested during their environmental qualification. The NRC inspectors concluded that these actuators were unqualified in their installed configuration.

The licensee was informed that enforcement action may be taken, in the installed Limatorque Actuators were unqualified past the EQ deadline. Pending further review of this item, this is a Potentially Enforceable/Unresolved Item (50-255/86032-12(DRSS)).

7. Open Items

Open Items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. Open Items disclosed during this inspection are discussed in Paragraphs 4c(1), 4c(3), 4c(4), and 5d(1).

8. Potentially Enforceable/Unresolved Items

An unresolved item is a matter about which more information is required in order to ascertain whether it is an acceptable item, an open item, a deviation, or a violation. Potentially Enforceable/Unresolved Items are unsolved items, which if ascertained to be a violation will be followed up with enforcement action in accordance with NRC enforcement guidance on environmental qualification. Potentially Enforceable/Unresolved Items are discussed in Paragraph 2c, 5a, 5b(1)(2) and (3), 5c, 5d(3), 5e, and 5f.

9. Exit Interview

The NRC inspectors met with the licensee representatives (denoted under Paragraph 1) during an interim exit on December 12, 1986, and discussed findings by phone at the conclusion of the inspection on January 13, 1987. 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.