CONSUMERS POWER

POWERING MICHIGAN'S PROGRESS

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Nuclear Regulatory Commission
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Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-10 - PALISADES PLANT REPLY TO NOTICES OF VIOLATION FOR ENVIRONMENTAL QUALIFICATION DEFICIENCIES

By letter dated November 23, 1988 the Nuclear Regulatory Commission transmitted two Notices of Violation and a Proposed Imposition of Civil Penalty regarding environmental qualification of electrical equipment deficiencies at the Palisades Nuclear Plant. In accordance with 10CFR2.201, a "Reply to a Notice of Violation" for both items is provided herein.

1. NRC Description Of Violation

10CFR50.49(a) and (g) require, in part, that no later than November 30, 1985, each holder of a license to operate a nuclear power plant establish a program for qualifying the electric equipment important to safety and qualify that equipment.

10CFR50.49(d)(1) requires that the qualification file include the performance specifications under conditions existing during the following design basis accidents.

10CFR50.49(f) requires each item of electric equipment important to safety be qualified by testing or testing and analysis.

Contrary to the above, as of December 8, 1986, Consumers Power Company failed to qualify the following equipment designated important to safety by appropriate testing or testing and analysis as evidenced by the following examples:

a. Fifty-five Rosemount Model 1153 transmitters, in various safety system control and indication circuits, were not demonstrated to be qualified in that performance requirements were not specified and shown to be satisfied for instrument accuracy under postulated accident conditions.

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b. Thirty-eight ASCO solenoid valves, installed in some safety systems, were not qualified in that (1) these valves were inadequately sealed to prevent moisture intrusion, or (2) the recommended sealed vented conduit/junction box system was not implemented. ASCO test report AQR-67368 indicated test failures and recommended a sealed vented conduit/junction box system. Franklin Research Center identified the need for seals at the solenoid enclosure interface. However, neither the recommended systems were installed nor other adequate means to prevent moisture intrusion provided.

c. Eight Limitorque actuators, installed in the high pressure safety injection (HPSI) system inside containment, had SUN EP-50 lubricant in the main gear cases. The licensee's EQ files did not contain appropriate testing or testing and analysis to demonstrate that the lubricant was qualified to permit the Limitorque actuator to meet its specified performance requirements under postulated high temperature and radiation accident conditions.

d. Seven Limitorque actuators in the high pressure and low pressure Safety Injection systems were installed with plugged T-drains in their motor housings. Qualification was based on actuators with T-drains installed. Therefore the EQ files did not demonstrate that the actuators with plugged T-drains were qualified to meet their specified performance requirements under postulated accident conditions.

Reply

Consumers Power Company acknowledges the facts as stated in the violation to be essentially correct except as specifically noted below.

Reason For Violation

a. Rosemount Model 1153 Transmitters

IE Inspection Report 86032 identified that equipment qualification files for the model 1153 Rosemount Transmitters contained instrument accuracies to within 8 percent during loss of coolant accident (LOCA) conditions. However, appropriate justification of this accuracy in regard to the instruments performance of its safety function was not evidenced.

The failure to include an analysis of transmitter error effects on plant systems and operator actions was due to the assumption that transmitter error contributions would be included within the overall instrument loop error. Consumers Power Company personnel did not consider loop error to be a required facet of specific instrument environmental qualification. Based on the fact that the Rosemount test report indicated that the model 1153 transmitters performed adequately to envelope Palisades environmental conditions and system requirement with no catastrophic failures, and that instrument inaccuracies would be included in loop error, it was believed that qualification requirements were satisfied.

b. ASCO Solenoid Valves

At the time inspection 86032 was conducted, sealing of ASCO solenoid valves and their associated conduit/junction box systems had not been completed. Consumers Power Company did not provide moisture intrusion barriers due to the belief by the Plant staff that sufficient, previously reviewed and accepted documentation existed to conclude equipment qualification was acceptable for the installed equipment without seals.

At the request of the Nuclear Regulatory Commission (NRC) during the June 24, 1988 Enforcement Conference, Consumers Power Company submitted additional information on July 7, 1988 which detailed our belief that moisture intrusion barriers were not required for equipment qualification. This information included the NRC acceptance of Consumers Power Company's September 14, 1984 submittal which in part provided our basis for not sealing solenoid valves since they were either:

1. Located outside the harsh containment building atmosphere or

2. That the solenoid valves performed their functions before significant environmental changes would occur. Further, the subsequent failure would not have a detrimental impact on the safety function provided by the solenoid valves.

NRC acceptance of this position was provided in a January 31, 1985 Safety Evaluation Report which indicated that Consumers Power Companys' proposed resolution to potential equipment qualification deficiencies was acceptable.

c. Limitorque valve actuators (SUN EP-50 Lubricant)

The type of lubricant installed within Limitorque valve actuators located inside the containment was not identified by Plant personnel, until samples taken and analyzed verified its composition. Lubricant samples were taken in support of IE Bulletin 85-03.During the development of equipment qualification files, a review of IE Bulletins, Notices and Circulars identified only one item pertaining to lubricants. This item pertained to the use of Beacon 325. Additionally, previous reviews of Palisades equipment qualification program and files, performed by the Franklin Research Center in 1982, did not identify any lubricant issue that would affect actuator operability. Therefore, Plant staff did not recognize the potential qualification difficulties until May 1986.

d. Limitorque Valve Actuators (motor housing T-drains)

IE Notice 83-72 provided information that the presence, or lack thereof, for motor housing T-drains may affect equipment qualification, however, no absolute conclusions were drawn.

Plant personnel controlling application of Palisades electrical equipment qualification program became aware of the significance regarding the presence of motor housing T-drains during an advisory group meeting sponsored by the Electric Power Research Institute in mid 1986.

A review of Limitorque test reports which qualified the valve actuators did not identify the relevance of T-drains within the report text. A review of test setup photographs was the first indication of T-drains. Therefore, Limitorque actuator motor housing configuration regarding the presence of T-drains has been attributed to a failure to recognize that the presence of T-drains was a significant qualification issue.

Corrective Steps Taken/Results Achieved

a. Rosemount model 1153 Transmitters

As presented by the NRC in IE Inspection Report 86032, Consumers Power Company took immediate action in response to the inspectors concern regarding instrument accuracies. An analysis to evaluate the effects of the demonstrated instrument accuracy on setpoint determination methodologies was initiated. The inspection report stated that "the inspectors concluded that based on information available in the plant environmental qualification files, there were no immediate concerns regarding the operability of the plant."

The evaluation took into account each transmitter identified on the Palisades Equipment Qualification master equipment list. The results of this evaluation were presented in detail to NRC at Region III headquarters in Glen Ellyn on March 16, 1987. In this presentation, Consumers Power Company summarized that the expected transmitter errors were acceptable in all cases except for the transmitters providing Primary Coolant System (PCS) pressure indication for determining when to enter the PCS shutdown cooling mode of operation, and the transmitters providing steam generator level indication for determining when to enter the PCS Once-Through Cooling mode. Included in this evaluation were recommendations that Emergency Operating Procedures be revised to emphasize the use of more accurate Control Room indication to ascertain when to switch into these plant modes. These recommendations were developed as the result of a coordinated Plant Engineering and Operations Departments evaluation of system requirements and were not prompted by the NRC as indicated in the November 23, 1988 "Notice Of Violation And Proposed Imposition Of Civil Penalty". On March 26, 1987, the procedural recommendations related to the aforementioned pressure transmitters were incorporated into the appropriate Emergency Operating Procedures. Concurrently, conclusions were reached not to incorporate the recommendations related to the level transmitters since alternate qualified indication exists by which to ascertain when the PCS should be aligned for Once-Through Cooling. This action was taken in response to our systems evaluation and occurred prior to reactor restart from a prolonged plant outage which had commenced prior to the environmental qualification inspection. The reactor was taken critical to conclude that outage on April 2, 1987.

Based in part on the agreement between the NRC and Consumers Power Company that no safety concerns existed, replacement of the pressure transmitters

was scheduled for the next outage of sufficient duration. This decision was made to enhance the Emergency Operating Procedures by allowing the recommended guidance to be extracted from the procedures. On November 5, 1987, the replacement of four Rosemount 1153 Model Transmitters with Rosemount 1154 models was completed, rendering the subject PCS pressure indicating loops significantly more accurate.

Consumers Power Company believes that this response represents a prudent course of action to upgrade plant instrumentation capability.

b. ASCO Solenoid Valves

As presented above, it was Consumers Power Companys' belief that installation of moisture intrusion barriers was not necessary due to NRC acceptance of the basis presented in our submittal of September 14, 1984. This submittal presented Consumers Power Companys' proposed resolution to potential equipment qualification deficiencies identified in the 1982 Franklin Research Centers' Technical Evaluation Report. When Consumers Power Company was informed by NRC personnel during the 1986 equipment qualification inspection that moisture intrusion barriers (ie conduit seals) were required, immediate response was provided by implementing design changes to install the seals.

As detailed in Consumers Power Companys' July 7, 1988 submittal of additional information regarding questions stemming from the June 24, 1988 Enforcement Conference, we still believe moisture intrusion barriers are not required to maintain equipment qualification. This position was confirmed by a systems review, included in the July 7, 1987 submittal, which concludes that seals are not required since:

1. Mechanisms do not exist which drive or allow moisture into the solenoid valve coil assembly for valves located outside containment and

2. Solenoid valves located inside containment are not required to change state during or after the onset of harsh environmental conditions. Additionally, any subsequent failures would not jeopardize the safety function performed by the system utilizing the solenoid valves.

The decision to install the seals was solely based on resolving technical differences between the NRC inspectors and Consumers Power Company technical personnel in order to resolve a Plant restart issue.

c. Limitorque Valve Actuators (Sun EP-50 Lubricant)

Contrary to the statement presented in IE Inspection Report 86032 that "the NRC identified the use of unqualified lubricants by the licensee in Limitorque valve actuators...", Consumers Power Company representatives identified the presence of Sun EP-50 in qualified actuators and presented this information to the NRC. The existence of Sun EP-50 was identified by Consumers Power Company representatives during the Plants Limitorque Maintenance Program in May 1986. The program was part of the effort

instituted by Consumers Power Company in response to IE Bulletin 85-03. The NRC was notified as to the presence of Sun EP-50 during the Safety System Functional Inspection, IE Inspection Report 86029, conducted at Palisades during the period of September 22, 1986 through October 24, 1986.

Consumers Power Company initiated, and subsequently completed an analysis of Sun EP-50 on November 6, 1986, which demonstrated that the lubricant would have operated within its design parameters in accordance with 10CFR50.49. This analysis was then filed in the appropriate equipment qualification files prior to the December 8, 1986 NRC inspection. However, in order to promote a consistent approach to all to Limitorque lubrication, and to resolve any technical differences between the NRC and Consumers Power Company, all existing SUN EP-50 lubricant was removed and certified Nebula EP-0 lubricant installed. This action was completed prior to plant restart on April 2, 1987.

d. Limitorque Valve Actuators (Motor Housing T-Drains)

As detailed in IE Inspection Report 86032, the concern regarding actuator qualification and motor housing T-drains was identified and reported to the NRC by Consumers Power Company. The Plants' Electrical Equipment Qualification group became aware of the T-drain issue during an EPRI-sponsored Equipment Qualification Advisory Group Meeting held during the summer of 1986. This potential condition was reported to plant management immediately thereafter and a walkdown of all EEQ-listed Limitorque operators was promptly scheduled. A walkdown was conducted which was controlled by checklists, developed utilizing as a basis the April 1986 "Clarification of Information Related to the Environmental Qualification of Limitorque Motorized Valve Operators" issued by the Nuclear Utility Group on Equipment Qualification. During the walkdown, Limitorque operators were inspected to confirm the existence of required critical qualification characteristics in all operator subcomponents (eg, limit switch, torque switch, and terminal block materials, the presence of grease reliefs, T-drains and the operating status of compartment heaters). The inspection team consisted of a plant Equipment Qualification Engineer and an electrician, as well as an independent contract engineer considered an expert on Limitorque requirements. As a result of this inspection, the operator motors requiring T-drains were identified and T-drains were installed by February 11, 1987. This action, from a potential problem to correcting the problem, all occurred while the plant was shutdown. The plant did not restart until April 2, 1987.

Corrective Actions To Be Taken To Avoid Further Non-Compliance

The Equipment Qualification program inspected by the NRC between December 8, 1986 and January 13, 1987 was developed by Consumers Power Companys' headquarters engineering group. Since the time of the inspection, the environmental qualification program has undergone several changes. Equipment qualification

responsibilities have been transferred to the Palisades Plant Projects Group - Electrical. This group currently has assigned, two individuals whose primary responsibility is the Palisades equipment qualification program. These individuals have received extensive training on the equipment qualification process and objectives. Representatives attend EPRI sponsored Equipment Qualification Advisory Group meetings and the Plant is a member of an Equipment Qualification Database program. These efforts were instituted to enhance the Palisades qualification program through industry knowledge gained regarding changing qualification issues. Due to these extensive changes, no major program alterations are felt to be necessary at this time.

Date(s) When Full Compliance Was Achieved

a. Rosemount model 1153 Transmitters

The evaluation to determine the effects of the demonstrated instrument accuracy on the setpoint methodology was completed and subsequently presented to the NRC on March 16, 1987. On March 26, 1987, recommendations related to pressure transmitters from the aforementioned evaluation were incorporated into appropriate Emergency Operating Procedures. Model 1153 Transmitters associated with PCS pressure indicating loops were replaced with Rosemount model 1154 transmitters on November 5, 1987. Therefore, full compliance to 10CFR50.49 has been achieved and no further corrective actions are required regarding this issue.

b. ASCO Solenoid Valves

Absolute compliance to 10CFR50.49 for this item was achieved by the installation of moisture intrusion barriers (conduit seals) by February 28, 1987. No further corrective actions are required regarding this issue.

c. Limitorque Valve Actuators (SUN EP-50 Lubricant)

An analysis was completed on November 6, 1986 which concluded that SUN EP-50 would have operated within its design limits in accordance with expected environmental conditions. All SUN EP-50 lubricant was removed and certified Nebula EP-0 installed by April 2, 1987. Full compliance with 10CFR50.49 has been achieved such that no further corrective actions are required regarding this issue.

d. Limitorque Valve Actuators (Motor Housing T-Drains)

Full compliance with 10CFR 50.49 was achieved by February 11, 1987, when T-drains were installed in motor housings requiring them by test configuration. No further corrective actions are required regarding this issue.

The corrective actions taken for each of these four issues represents a prompt and thorough effort to effect compliance 10CFR50.49.

2. NRC Description Of Violation

10CFR50.49(a) and (g) require, in part, that no later than November 30, 1985, each holder of a license to operate a nuclear power plant establish a program for qualifying the electric equipment important to safety and qualify that equipment.

10CFR50.49(d)(1) requires that the qualification file include the performance specifications under conditions existing during and following design basis accidents.

10CFR50.49(j) requires a record of the qualification be maintained in an auditable form to permit verification that each item of electrical equipment important to safety is qualified and the equipment meets the specified performance requirements under postulated environmental conditions.

Contrary to the above, as of December 8, 1986, Consumers Power Company failed to prepare and maintain the following qualification files to permit verification that equipment important to safety is qualified and meets the specified performance requirements, including insulation resistance, under postulated environmental conditions, as evidenced by the following examples:

a. The qualification files for General Electric XLPE/PVC cable and XLPE/Neoprene cable used for instrument, power, and control circuits did not demonstrate qualification in that performance requirements were not specified and shown to be satisfied for the insulation resistance characteristics of these cables.

b. The qualification file for Rockbestos Firewall III XLPE/Neoprene cable used for instrument, power, and control circuits inside and outside of containment did not demonstrate qualification in that performance requirements were not specified and shown to be satisfied for the insulation resistance characteristics of the cable and did not demonstrate adequate similarity of the tested and installed cable in that the specific formulation of the cable was not identified.

c. The qualification file for Viking penetrations using Bendix potting compound connectors and sealing washers did not demonstrate qualification in that performance requirements were not specified and shown to be satisfied for the insulation resistance characteristics of the potted connectors.

d. Qualification files for replacement equipment, including those for Limitorque valve operators, Namco position switches, and Masoneilan electric pneumatic converters, were inadequate in that they inaccurately claimed qualification to DOR Guidelines, when in fact qualification was required to be under 10CFR50.49.

e. The qualification files for butyl rubber insulated cables outside containment were inadequate in that performance requirements were not specified and shown to be satisfied for insulation resistance for the postulated radiation conditions.

Reply

Consumers Power Company acknowledges the facts as stated in the violation are essentially correct.

Reason For Violation

a. General Electric XLPE/PVC and XLPE/Neoprene cable

Consumers Power Company recognizes that identification of component performance requirements is the responsibility of the licensee, however, 10CFR50.49 is not detailed in defining critical performance requirements.

The failure to provide an analysis, within equipment qualification files, of insulation resistance degradation during postulated accident environmental conditions, was due to Consumers Power Companys belief that insulation resistance characteristics (which gives rise to leakage currents) is demonstrated by overall instrument loop error.

b. Rockbestos Firewall III XLPE/Neoprene Cable

The failure to include insulation characteristics and demonstrated similarity between tested and installed insulation formulation has been attributed to failure of the qualification file developers to recognize the impact of environmental qualification related NRC correspondence. This failure is particularly evident in this case where IE Information Notice 84-44 identified qualification concerns regarding difficulties experienced by Rockbestos in controlling insulation formulation.

c. Viking Penetrations Using Bendix Potting Compound Connectors And Sealing Washers

The cause of the qualification file omission for insulation resistance characteristics of the potted connectors is the same as that indicated in item a above for General Electric cable. Individuals developing the qualification files for Viking penetrations believed the individual component variances of insulation resistance degradation to be included within the overall instrument loop error and not a specific qualification issue.

d. Qualification Files For Replacement Equipment

The root cause of the failure to delete qualification file reference to the DOR Guideline requirements (10CFR50.49(k)) and replace with 10CFR50.49

cannot be positively determined. However, this failure can be attributed to either reviewer oversight or failure to recognize the significance of referencing qualification standards. Both of these potential causes can be attributed to varying equipment qualification knowledge levels of involved personnel.

e. Performance Requirements Of Butyl Rubber Insulated Cable

After careful review of IE Inspection Report 86032, Consumers Power Company concludes that this issue as presented in the November 23, 1988 NRC submittal is misstated. IE Inspection Report 86032 did discuss insulation resistance and beta radiation concerns, however, only for General Electric XLPE/PVC (Cable 1) and XLPE/Neoprene (Cable 2). Butyl rubber insulated cable is used at Palisades in applications not inside containment, however, no reference to concerns regarding beta radiation was noted.

The butyl rubber insulated cable in use at Palisades was manufactured by General Electric and is listed in equipment qualification files as Cable 3. The cable of this type in use is located in areas outside the containment building where beta radiation levels do not present a concern. The cables are utilized as 2.4 kilovolt motor power feeds. Testing of this cable at rated voltage (5 kilovolts) and current indicated it to be suitable for use in expected environmental conditions.

Corrective Steps Taken/Results Achieved

a. General Electric XPE/PVC and XLPE/Neoprene Cable

Insulation resistance and the resultant leakage currents have been analyzed against Palisades specific requirements for the General Electric cables in question. Specific discussion resulting from these analyses have been placed in the appropriate equipment qualification files.

b. Rockbestos Firewall III XLPE/Neoprene Cable

Information regarding cable insulation formulation for Firewall III cable in service at Palisades was obtained from the Rockbestos Corporation. This information has been incorporated into the appropriate qualification files. The insulation resistance characteristics were analyzed in accordance to Palisades loading and postulated environmental conditions, and the results incorporated into Rockbestos Cable qualification packages where utilized in instrumentation circuits.

c. Viking Penetrations Using Bendix Potting Compound Connectors And Sealing Washers

An analysis was satisfactorily completed which evaluated the insulation resistance and resulting leakage currents for applicable Viking Penetrations.

This analysis demonstrated that critical performance requirements were satisfied for expected conditions at Palisades. The results of this analysis was included within the Viking Potted Connector package.

d. Qualification Files For Replacement Equipment

All equipment qualification packages were reviewed for inclusion of appropriate referencing to qualification standards. Applicable packages now contain a positive statement as to the qualification standards and methods (ie 10CFR50.49(k) DOR Guidelines or 10CFR50.49) that correspond to the equipment.

e. Performance Requirements Of Butyl Rubber Insulated Cable

In that butyl rubber insulated cable in use at Palisades is qualified for its motor power feed application, no corrective actions are necessary.

IE Inspection Report 86032 did present concerns regarding qualification requirements for beta radiation, however, this concern was only noted for General Electric XLPE/PVC (Cable 1) and XLPE/Neoprene (Cable 2). The qualification package for General Electric Cable 1 and Cable 2 packages were revised to specify performance requirements. An analysis was completed to determine the effects of beta radiation on cable qualification. The radiation dose from beta radiation was added to the gamma contribution according to the equipments' physical location in the plant. No equipment qualification concerns regarding insulation resistance degradation was noted. Applicable qualification packages were updated to reflect the completed analysis.

Corrective Actions To Be Taken To Avoid Further Non-Compliance

Consumers Power Company has established all necessary administrative controls to maintain qualification files in an auditable form. The programatic changes noted for Violation 1 will also provide higher quality equipment qualification packages in that assigned personnel have a broad knowledge of equipment qualification package requirements. Updates to qualification packages will be performed by these individuals, as required by Plant Administrative Procedures, thus ensuring consistent upgrades will be performed. The assigned Equipment Qualification Engineers are familiar with NRC positions regarding current IE Bulletins and Circulars and the need to evaluate Palisades qualification files when industry experience is presented. No further corrective actions are required for items a. through e. of this violation to ensure compliance with 10CFR50.49.

Date(s) When Full Compliance Was Achieved

a. General Electric XLPE/PVC and XLPE/Neoprene Cable

All analyses were completed and equipment qualification packages were updated by July 2, 1987.

b. Rockbestos Firewall III XLPE/Neoprene Cable

Necessary information was obtained from the vendor files were updated by July 2, 1987.

c. Viking Penetrations Using Bendix Potting Compound Connectors And Sealing Washers

Results of insulation resistance calculations performed by Plant personnel were included in equipment qualification files by July 2, 1987.

d. Qualification Files For Replacement Equipment

Applicable qualification standards were presented in equipment qualification files by August 19, 1987.

e. Performance Requirements Of Butyl Rubber Insulated Cable

Insulation resistance calculations were performed and applicable qualification files updated by July 2, 1987.

David P Hoffman
Vice President
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CC Administrator, Region III, NRC
NRC Resident Inspector - Palisades Plant

CONSUMERS POWER COMPANY
Palisades Plant
Docket 50-255 - License DPR-20

RESPONSE TO NOTICE OF VIOLATION AND PROPOSED
IMPOSITION OF CIVIL PENALTIES DATED NOVEMBER 23, 1988

At the request of the Commission and pursuant to the Atomic Energy Act of 1954 and the Energy Reorganization Act of 1974, as amended, and the Commission's Rule and Regulations thereunder, Consumers Power Company submits our response to Notice of Violation and Proposed Imposition of Civil Penalties dated November 23, 1988. Consumers Power Company's response is dated December 23, 1988.

CONSUMERS POWER COMPANY

By _____
David P Hoffman, Vice President
Nuclear Operations

Sworn and subscribed to before me this 23rd day of December 1988.

_____
Elaine E Buehrer, Notary Public
Jackson County, Michigan
My commission expires October 31, 1989