

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-309/89-16

Docket No. 50-309

License No. DPR-36

Licensee: Maine Yankee Atomic Power Company  
83 Edison Drive  
Augusta, Maine 04326

Facility Name: Maine Yankee Atomic Power Station

Inspection At: Bolton, Massachusetts

Inspection Conducted: August 28 to September 1, 1989

Inspectors: *Thomas Koshy* 10/10/89  
Thomas Koshy, Senior Reactor Engineer date

*M. Yost* 10/10/89  
For M. Yost, (NRC Consultant) date

Approved by: *C. J. Anderson* 10-10-89  
C. J. Anderson, Chief, Plant Systems Section date

Inspection Summary: Inspection on August 28 - September 1, 1989 (Inspection Report No. 50-309/89-16)

Areas Inspected: Special announced inspection to review licensee action to resolve the concerns identified in Equipment Qualification Inspection 87-16 and Special Electrical Inspections 87-12.

Results: Two items remained unresolved (1) Electrical Load growth tracking (2) D. G. O'Brien penetrations.

## DETAILS

### 1.0 Persons Contacted

#### 1.1 Yankee Atomic Electric Company (YAEC)

- \*P. Anderson, Maine Yankee Project Manager
- M. Babin, Senior Electrical Engineer
- \*F. Banter, Lead Electrical Engineer
- \*R. Benson, Lead Safety Evaluation Group
- T. C. Cogdill, I&C Consultant
- D. Kulp, Acting Lead Instrumentation and Controls
- \*J. J. McCann, Staff Engineer
- D. P. Ross, Engineering Assistant Supervisor
- \*R. Shone, Engineering Manager
- S. Urbanosky, Senior Electrical Engineer
- B. Wilkins, Acting Equipment Qualification Coordinator

#### 1.2 Maine Yankee Atomic Power Company (MYAPCO)

- S. Nichols, Licensing Section Lead
- J. Hebert, Engineering Manager

### 2.0 Purpose and Scope

The purpose of this inspection was to ascertain that the concerns identified in the special electrical inspection conducted in June 1987, and the equipment qualification inspection conducted in July 1987, have been addressed adequately by the licensee.

### 3.0 Licensee Actions On Previously Identified Electrical Issues

#### 3.1 (Closed) Violations 50-309/87-12-01 and 87-12-02, Lack of properly rated breakers/setpoints for 480v breaker overcurrent trip devices and lack of calibrating the overcurrent devices

The 480v breakers for the Maine Yankee station had utilized General Electric EC type over current devices for electrical protection. These protective devices have an adjustable range within which a setpoint could be established depending on protection required for the load it is serving. The ratings indicated in the licensee electrical one line drawings did not agree with the installed overcurrent devices. Moreover, the overcurrent devices were not calibrated periodically in order to assure the trip function.

In response to the above concern on improperly rated breakers, the licensee conducted a complete physical inspection of the electrical loads. The discrepancies observed are being corrected through Design Change Requests (DCRs). The corrective action on the safety related buses were

completed in the 1987 refueling outage. The non safety related buses were inspected in the 1989 outage and the DCRs are currently being reviewed for incorporation into the drawing. The inspectors reviewed the DCRs and no discrepancies were observed in the corrective actions. This activity is being completed in accordance with the commitments made in 1987.

With regards to the concerns on the lack of calibrations of overcurrent devices, the licensee developed the required setpoints for the overcurrent devices. Using the new setpoints, a calibration was performed to confirm the required trip characteristics. Subsequent to the 1987 outage, the licensee replaced the above trip devices with General Electric Micro Versa Trip, a solid state tripping device. This device provides better coordination features and better repeatability in operational characteristics. The license has in place a new procedure 3.5.105 Revision 0, titled "Multi-Amp Testing of 480 Volt Circuit Breakers." This procedure addresses the calibration of the solid state trip devices.

In responding to the above violation, the licensee letter dated September 22, 1987 did not specifically address all the 3 items addressed under 10 CFR 2.201. However, during the inspection, the inspector verified the licensee actions to be timely and prudent. In the recent licensee responses, the licensee has been addressing all the specific requirements. No other discrepancies are observed. These violations are closed.

### 3.2 (Closed) Unresolved Item (87-12-03), Ampacity of Feeder Cables

This item deals with the apparently marginal current carrying capability of some feeder cables to switchgear, motor control centers and distribution panels.

Subsequent to the inspection, the licensee completed the calculation MYP-1042, which documented the ampacity of all the feeder cables. This calculation recommended replacing cables 172 PL1 and 187PL1 which serve non-safety related motor control centers. These cable replacements were completed during the previous refueling outage.

This item is closed.

### 3.3 (Closed) Unresolved Item (87-12-04), Short Circuit Capability of Electrical Switchgear.

This item pertains to the inadequacy of the short circuit interrupting capability of the 6.9 Kv and 4.16 Kv switchgear. The Stone and Webster study E-5 indicates momentary duty of 6.9 Kv breakers exceeds the breaker momentary rating by approximately 1.4 percent and the interrupting duty of the 4.16 Kv breakers exceeds the breaker rating by approximately 6.7 percent under worst case operating conditions.

The licensee was aware of this situation. Subsequent to the inspection, the licensee recalculated the fault current without the loads that are normally not in service. They are the fire pump, and service water pumps C and D. The recently retired Mason Station also reduced the short circuit current contribution from the offsite power system.

The recalculated value of short circuit current for the 6.9 Kv breaker is 70,946 Amps. This current exceeds the breaker rating of 70,000A by 1.35 percent. This value is applicable to the fault at the 6.9 Kv bus only. Other faults away from the bus would be subjected to less current because of the cable impedance; therefore the problem will not apply. A fault at the bus would make the whole bus unavailable even if the fault is cleared by the power source breaker. A fault of this nature can delay the offsite power availability. However, this is considered a low probability event.

The recalculated value of short circuit current for 4.16 Kv breaker shows a minimum of 35,505 amps when the contribution of Seabrook station is accounted for. This results in a short circuit duty of 6.9 percent higher than the switchgear rating of 33,200 amps. This condition does not apply to the safety related buses and is limited to 6 breakers. However, the following factors reduce the potential fault current.

- The two year load projections from Central Maine Power indicate a drop in fault current contributions.
- The ANSI standard C.37.010-1979, recognizes the delay in the relay actuation to provide a signal for breaker trip. This delay of 3 cycles based on the specific relay setting reduces the fault current contribution.
- Any fault beyond the load terminals of the breaker will add additional impedance to the circuit and reduce fault current.
- The most probable fault that could occur is an internal unit substation transformer fault. However, a transformer fault will be of reduced magnitude and within the breaker's rating since cable and transformer winding impedance will help limit the fault current.
- The fault current magnitude is contingent upon worst case loading conditions, which have assumed that a diesel generator is being load tested, and that the electric motor driven steam generator feed pumps are running. A diesel generator is load tested once a month for a few hours, while a steam generator feed pumps may be required infrequently when a steam driven feed pump is out of service. Without these motor contributions, the fault current is reduced to within a small fraction of the breaker rating.

Moreover, the licensee has an inhouse commitment to periodically track the offsite fault current contributions and has a different program to track the load growth within the plant. Based on the above facts, this item is closed.

3.4 (Closed) Unresolved Item 87-12-05, Coordination of Low Power Circuits

This pertains to the electrical coordination between safety related distribution panel feeders and branch breakers.

The licensee has completed a study on the circuits that lack coordination. The study evaluated the risk associated with the lack of coordination based on the function. The loads for heat tracing were not modified due to its limited impact on safety functions. All other uncoordinated circuits were addressed in a modification program. The modifications involved replacement of breakers or fuses. Due to the lengthy lead time in obtaining the specific type of breakers, the licensee was unable make these modifications in the previous outage. The licensee letter on August 24, 1989 from G. D. Whittier to NRC states the licensee commitment to replace these breakers in the outage following cycle 11 operation.

This item is closed.

3.5 (Closed) Unresolved Item 87-12-06, Testing of Batteries

This item regards the lack of load discharge testing for batteries 2 and 4. Batteries 1 and 3 were in the licensee testing program, however batteries with similar function, 2 and 4 were not in the program.

The inspectors reviewed the licensee's revised procedure No. 3.5.3 Revision 13 which included the testing of batteries 2 and 4 along with 1 and 3. Currently all the safety related batteries are in the maintenance and surveillance program. No discrepancies were observed.

This item is closed.

3.6 (Update) Unresolved Item 87-12-07, Tracking of Electrical Load Growth

This pertains to the administrative control on the electrical load changes. This control is important at Maine Yankee where in some instances the breaker interrupting rating has no margin to permit any load growth.

In response to the NRC concern, the licensee has made changes to the following procedures.

1. Document Revision Procedure No. 17-22-1 Revision 5.
2. Drawing Control No: 0-06-3 Revision 1,
3. Engineering Design Change Request No: 17-21-2 Revision 4.

These procedures address the need for updating the electrical calculations for modifications. However, the component replacements and minor modifications are forwarded to the engineering organizations only after the installation. This approach can lead to unacceptable conditions. Administrative controls are needed for load tracking as an on-line function so that potential concerns are reviewed before installation. The electrical systems manual, a compilation of calculations, referenced in the procedures for review is not yet issued. At Maine Yankee where the breaker interrupting rating has no margin, a strict control on load changes is important. This item will remain open pending NRC review of the licensee program to implement an electrical system review before installation.

#### 4.0 Licensee Action on Previously Identified Environmental Qualification Issues

##### 4.1 (Closed) Unresolved Item (50-309/87-16-01), Status of SOV-1102 in EQ Program

As a result of the review of the EQ master list and associated procedures, during the July 20-24, 1987 inspection, the inspectors found administrative controls to be in place and adequate. However, a deficiency in the implementation of the program to control the master list was noted in the case of SOV-1102.

To resolve this item, MYAPCO has made revision to procedure MY-EQP-1 Rev. 5. The EQ Master List is controlled by Procedure MY-EQP-1. Paragraph 3.8 of MY-EQP-1 details specific activities that may impact the EQ program description. As detailed in paragraph 3.9 of MY-EQP-1, the EQ coordinator performs an evaluation of the activities and any associated changes to the EQ program description. This evaluation is documented on Form No. MY-EQP-1-5. Paragraph 3.10 of MY-EQP-1 details the steps followed when revising the EQ Program Description.

Based on the review of the above documentation, this unresolved item is now considered closed.

##### 4.2 (Closed) Unresolved Items (50-309/87-16-02) and (50-309/87-16-03), Commercial Grade Items for EQ Applications and L'crepancies in Procedure 0-04-01

During the July 20-24, 1987 inspection, the inspector reviewed Revision 1 of Procedure MY-EQP-3. Paragraph 5.3.3 of this procedure permits the use of commercial grade items for EQ application. There were no controlling documents to ensure that commercial items would meet the EQ requirements. The licensee stated that no commercial grade items had been procured for EQ application, and that the statement in paragraph 5.3.3 will be revised to exclude commercial grade items. This item was unresolved pending NRC review of the revised version of Procedure MY-EQP-3.

The inspectors also reviewed Operational QA Program Manual, Section IV entitled "Procurement Document Control." The inspectors noted that discrepancies exist in that responsibilities of EQ personnel defined in Procedure 0-04-1 differ from the operational QA manual. The licensee agreed to review both documents and to resolve the discrepancies.

MYAPCO concluded that they could not exclude commercial grade equipment usage in their EQ Program. Therefore, Maine Yankee Procedure No. 0-04-4 (Procurement of Commercial Grade Items for Safety Class Applications) addresses the commercial grade item for use in a safety class application. This procedure describes how the critical characteristics of a component are determined and how the critical characteristics are evaluated.

The Licensee revised the Operational QA Manual, Section IV, Paragraph B.3 specifying that the Engineering Department is responsible for reviewing and specifying technical and quality requirements for material, equipment, and service conditions. Also, Procedure 3 0-04-1, paragraph 4.2.2 was revised to include a cross-reference to Procedure MY-EQP-3 of the EQ manual. Procedure 0-04-01, Paragraph 4.2.4 was also revised to indicate that the PED (Plant Engineering Department) shall review any technical requirement supplied with the MPR (Material Purchase Request) and provide additional requirements/specifications as deemed appropriate. Procedure 0-04-01 also was revised to include a reference to Environmental Qualification. Additionally, the EQ Program Manual is also listed in the references Section 5.0 of the procedure.

Based on the review of the above documentation, it is judged that the above unresolved items are now closed.

4.3 (Closed) Unresolved Item (50-309/87-16-04), Acceptance Criteria for Weidmuller Terminal Blocks Qualification Test

During the July 20-24, 1987 inspection, the inspectors noted, while reviewing QDR-0968, that the acceptance criteria of 1.0 amp. leakage current was used without specifying the bases, and no insulation resistance values were reported during the LOCA simulation. The licensee had obtained leakage current data and stated that they would be appropriately evaluated and included in the EQ file.

The inspector confirmed that MYAPCO has now incorporated the leakage current data into the QDR on page G209. A detailed evaluation of the data has also been incorporated into the QDR on page A2. Based upon this review of completed licensee actions, this unresolved item is closed.

4.4 (Closed) Unresolved Item 50-309/87-16-05, Incorrect Data for Similarity Analysis for Brand-Rex Cable

During the July 20-24, 1987 inspection, the inspectors reviewed QDR 0870. In the package, a numerical error in the qualification data which was brought to the licensee's attention. (Section A.5, Page A3 gives an

argument to qualify 27 mil insulated cable based on testing of 51 mil insulated cable; however, the tested cables is actually 20 mil). The licensee stated that this would be corrected.

The package contains a statement that 24 ma leakage current is acceptable without justification for instrument circuits. The licensee stated that this generic criterion would be replaced by specific criteria based on actual applications. The licensee also provided the inspector with a calculation showing that the worst case leakage current in the thermo-couple circuit is within the acceptable range and stated all these would be incorporated into the EQ file. This item was unresolved pending NRC verification of: 1) the numerical error is corrected; 2) the generic acceptance criterion (24 ma leakage current) is replaced by specific criteria based on evaluation; and 3) the worst case leakage current calculation is incorporated into the EQ file.

To resolve this item, MYAPCO has performed the following:

- The numerical error of "51 mils" in Section A.5, page A3 of the QDR reviewed at the time of the audit has been corrected to "20 mils."
- The generic acceptance criteria of 24 mA as stated in the QDR reviewed during the audit has been revised to include a more detailed analysis of the insulation resistance values obtained during testing. Reference pages A3-A5 of the QDR.
- The worst case leakage current calculation was also included in QDR. Reference pages A3-A5 of the QDR.

From the review of the above documentation, this unresolved item is closed.

#### 4.5 (Closed) Unresolved Item 50-309/87-16-06, Qualification of Rockbestos Coaxial Cables

The first generation of Rockbestos Model RSS-6-104 was considered unqualified. At first, it was not clear to the inspector from reviewing the Summary section of the QDR which generation of the coaxial cables was installed at Maine Yankee (RSS-6-104 for first generation, RSS-6-104/LD for second generation, or RSS-6-104/LE for third generation). However, the file did contain a reference to a purchase order which indicates that the cable purchased is a second generation cable (this was also confirmed by physical inspection at the plant). However, the file did not contain a direct statement that second generation cable is installed. The licensee uses two Rockbestos test reports (QR-2806 and QD-2806S) to support the qualification of the cable. However, these documents are considered invalid because of Information Notice 84-44 "Environmental Qualification Testing of Rockbestos, Test Report QR-6802 (for the qualification of the third generation cable) dated March 12, 1986, which is considered a valid



document. However, this report was not used to support the qualification. The licensee stated that the two old reports would be deleted from the file and that the new report would be used to support the qualification together with a vendor prepared similarity analyses (between the second and the third generation cables) which was found in the QDR, Page B214. This item is unresolved pending NRC's review of licensee's revised file for this cable 1) invalid test reports are removed from the file; 2) new test report and similarity analysis are included in the file; and 3) a statement that the cable to be qualified is a second generation cable.

MYAPCO's action to resolve the above items are as follows:

- Rockbestos reports QR-2806 and QR-2806S were to be deleted from the QDR as discussed in the NRC audit report, however, these two reports are still in the file as supplemental information.
- Qualification is substantiated using Rockbestos report QR-6802 with a similarity analysis detailed in Section A.3 of QDR 0840-1.
- Section A.3 of QDR 0840-1 revised the equipment description to indicated model number "KSS-6-104/LD." "LD" is the nomenclature used by Rockbestos to indicate second generation cables and also detailed in Section A.3 of the QDR.

Based on the review of the above documentation, this unresolved item is considered closed.

4.6 (Closed) Unresolved Item 50-309/87-16-07 and Violation 50-309-87-16-14, Potential Moisture Intrusion to Litton-Veam Connectors and Qualification of Litton-Veam Connectors

Item 50-309/87-16-07 is an unresolved item and item 50-309-87-16-14 is a violation. These items are addressed together both in the July 20-24, 1987 inspection report and MYAPCO's responses described herein.

During the July 20-24, 1987 inspection, QDR 316B for Litton-Veam connectors was reviewed. The inspection report stated: Revision 2 of the QDR is based on an unnumbered, November 1978, test report by Isomedix for Litton and proprietary to Reuter-Stokes. Revision 3 is based on NTS Hartwood test report 558-1657A, dated November 4, 1985, for Litton-Veam Division. Both QDR revisions failed to establish similarity between the installed equipment and the tested specimens. No discussion of design differences was provided except a statement in the NTS Hartwood test report that all CIR series connectors are identical except for the number and size of contacts that the insert (insulator) can accommodate. Since it is known that some of the connectors may be potted with Veam Specification VAP-201 material while other connectors use different potting materials, as an example of possible design difference, a mere statement

by a test laboratory involving model numbers that it did not test is inadequate for demonstrating similarity. The licensee stated that similarity can be established by an analysis.

The 1978 test report did not address thermocouple circuits, the principal use of the connectors at Maine Yankee. Although the test was claimed to be in accordance with IEEE 323-1974, the test report contains no data or description of the thermocouple circuit performance during the LOCA test. The 1985 test report indicates that the connector used for thermocouple circuits was tested; however, no test result data was given in the test report. The licensee was unable to provide this data for the inspectors' review during the inspection period. The licensee contacted the test laboratory which confirmed that the required test data were available (in chart form) to demonstrate successful completion of the test.

The inspectors concluded that qualification of Litton-Veam connectors was not established at the time of this inspection. This is in violation of 10 CFR 50.49 paragraphs (f) and (g) which require that each item of electrical equipment important to safety be qualified and that qualification must be completed at a time no later than November 30, 1985 (50-309.87-16-14). However, based on additional information provided during the 1987 inspection, the licensee was able to show the inspectors that the connectors are qualifiable.

A Combustion Engineering letter LD-87-025, dated May 22, 1987 addressed to the NRC, reports that during LOCA testing of Litton connectors series 16A and 20 (presumed similar to Maine Yankee connectors), moisture entered the connectors. An error of 45°F was reported by Combustion Engineering, who did not include Maine Yankee among the twelve plant sites they identified as affected. The licensee did not receive a copy of this letter. The licensee stated that they procured the connectors from Westinghouse, after previously buying the connectors from Combustion Engineering and Reuter-Stokes. However, they planned to evaluate the applicability of this letter to the connector installed at Maine Yankee.

In the resolution of these items, MYAPCO revised QDR-316B (Litton-Veam connectors) Rev. 3. This revision incorporates NTS test report number 558-1657A, "Nuclear Qualification Testing of Safety-Related Class 1E Electric Cable-Connector Assemblies for use in Nuclear Power Generating Stations." Section A of the QDR details that:

- Report 558-1657A qualified a test specimen potted with VAP-201. The connectors at Maine Yankee are also potted with VAP-201.
- Report 558-1657A addressed thermocouple applications which is the same application as Maine Yankee's.

- The test data which was not located in the test report was provided to Maine Yankee under MYP-VC-88-18 and was available for review.
- A similarity analysis between the tested and installed configuration is detailed in Section A of the QDR. This similarity analysis is further substantiated with vendor correspondence provided on page G187.

An evaluation of Combustion Engineering (CE) letter, LD-87-025, was incorporated into QDR-3168 in Section G.3. It was determined that the Core Exit Thermocouples are potted with VAP-201. This potting compound, in this configuration, was tested in NTS report 558-1657A. The subject specimen in the CE letter was not potted.

Additionally, IEIN Notice 89-23, "Environmental Qualification of Litton-Veam CIR Series Electrical Connectors," has been evaluated for the Maine Yankee application. Results of the evaluation, detailed in MYP 89-218, Rev. 1, indicate that the Maine Yankee Litton-Veam connectors were not affected.

Based on the review of QDR-316B and the above supporting documentation, the violation and the unresolved item are now closed.

4.7 (Open) Unresolved Item (50-309/89-16-08), D. G. O'Brien Electrical Penetration Assemblies, QDR and Raychem Sleeves

During the July 20-24, 1987 inspection of the D. G. O'Brien Electrical Penetration Assemblies (EPA), QDR-1017 the inspectors had the following concerns:

Unlike other files, this QDR for electrical penetration assemblies was difficult to audit and the licensee agreed to contact D. G. O'Brien and revise the QDR. D. G. O'Brien Test Report ER 268 and Analysis ER 315 address LOCA test failures and design corrections intended to correct these failures, and also provide justification for modifying the test specimen and LOCA testing it without repeating earlier steps of the test sequence. The reports did not adequately address that 1) data from the original LOCA test are omitted from the test report; 2) the test specimen was modified without changing its sample identification (7439E); and, 3) the LOCA test described in the reports was actually a second test performed on the modified design. The QDR summary sections failed to state that the modified design successfully completed the test.

During the 1987 walkdown inspection, an apparent deficiency was observed in non-EQ connectors on two EPAs, C-4 and the one approximately three feet to its right when viewed from inside containment. Each EPA contains a header with several connectors in it, each about 2 inches in diameter. Typically one or two cables are associated with each connector, sealed by a Raychem sleeve. Three non-EQ connectors in the two subject EPAs had

Raychem sleeves that were not tightly sealed and properly aligned. The licensee could not show the NRC Inspectors that the Raychem sleeves for EQ and non-EQ connectors were installed using different procedures. Therefore, defects or deterioration in the non-EQ sleeves led to suspicion on the integrity of the EQ sleeves. The licensee committed to conduct a thorough walkdown on the EQ connectors before restart.

To resolve the above concerns, MYAPCO contacted D. G. O'Brien for assistance, after an extended period of time, it was determined that the concerns could not be fully resolved.

As a result, at 1438 hours on February 14, 1989, Maine Yankee initiated a reactor shutdown due to concerns about the environmental qualification for containment electrical cable connectors. Maine Yankee identified that the heat shrink tubing associated with fit-one connectors was not in conformance with the manufacturer's recommended usage range. The status of environmental qualification of the connectors, therefore, could not be fully determined. Due to the large number of connectors involved, Maine Yankee decided to shutdown the reactor and repair the connector seals. The seals were repaired and the reactor returned to power on February 21, 1989.

The above is documented, in part, in Maine-Yankee LER 89-002-01-Environmental Qualification Discrepancies Identified in Containment Cable Connector Seals.

After the rework MYAPCO issued an interim justification (dated March 9, 1989) for the sealing method that was used. During the NRC review of the JCO and other documentation during this inspection it could not be determined that the modified cable connector seals were environmentally qualified as the modified configuration had not been tested. Also the JCO did not specify the length of time the JCO would be active. Upon further discussion with MYAPCO personnel, it was determined that during the next refueling outage (April 1990) the D. G. O'Brien EPAs would be replaced with fully qualified EPAs.

Based on the above uncertainties, MYAPCO committed to: revise the JCO to include the period of time the JCO will be active, provide justification for the present cable in comparison with connectors utilizing the original potting compounds, affected systems, and alternate methods in the event the present connections are inoperable.

Subsequent to the current inspection, the licensee submitted a justification for continued operation (JCO). The JCO established the similarity of the cable termination with the originally tested configuration and the alternate signal paths available in case the above splices become inoperable. The licensee also stated that the above penetration and the questionable splice connections will be replaced in the spring of 1990. This item will remain open until the EPA replacement is made.

4.8 (Closed) Unresolved Item (50-309/87-16-09), 3M Conduit Seals Damming Materials, Moisture Intrusion and Yearly Check

The acceptability of using Dux-Seal as a dam prior to pouring the scotch cast into the EYS fitting was a concern, as well as moisture intrusion into the conduit seals, during the July 20-24, 1987 inspection. These two items were unresolved pending verification that the resolution of these two concerns are incorporated into the EQ file.

To resolve these items MYAPCO Incorporated a detailed discussion on the approved damming materials in the QDR, page A3.

Calculation MYC-1001 (located in EQ reference files) was performed to determine the amount of water that would accumulate in the limit switch compartment, assuming the Scotchcast did not seal properly. Results of the review indicated that the amount of accumulated water is not enough to affect the operation of the limit switch.

A detailed discussion on moisture intrusion into the conduit seals has also been included on pages A2-A3 of the QDR. The discussion concluded that a drain hole is not required.

However, to provide an additional level of protection, new installations will be provided with well/drain to further minimize this potential. QDR page G.2-2 provides the details of the scotchcast seal configuration with drain hole.

Based on the above licensee actions this unresolved item is closed.

4.9 (Closed) Unresolved Item (50-301/87-16-10), ASCO Solenoid Valves, Moisture Intrusion and Yearly Check

During the July 20-24, 1987 inspection, two concerns were raised by the inspectors during the file review.

- ASCO requires provision be made for moisture intrusion. The ASCO requirement is to prevent moisture intrusion by use of a properly sealed/vented junction box system. It was not clear to the inspectors how Maine Yankee installation was meeting this criteria. In response to this concern, the licensee indicated that, for inside containment installations, the junction boxes were vented with weep holes. For outside containment installations, where a steam environment could exist, the licensee's practice prior to the inspection, for ensuring no moisture buildup, was to remove a bottom cover hold down bolt. The inspector indicated potential problems with this practice for two reasons. The first was that the bolt hole was on a lip of the box which could be 1/4 inch or more above the bottom and, therefore, allow moisture accumulation before it started draining. The second was that there was dirt and dust in

the bottom of the boxes inspected. This dirt and dust could plug the hold and prevent draining. As part of the response, the licensee committed to provide additional drainage capability by drilling drain holes in the junction boxes instead of leaving the cover bolts out. The licensee also committed to complete the modifications prior to startup.

- ASCO recommends the solenoid valves be cycled at least once a year. This was not addressed in the maintenance requirements. The licensee researched this issue and found that, of 58 valves qualified using this file, 36 were cycled every three months and 16 at cold shutdown in accordance with the Inservice Testing Program. The remaining 6 were part of or would be incorporated into the Maine Yankee Operation Surveillance Program. The licensee committed to revise the file to address this concern.

These two items were unresolved pending NRC's verification that the EQ file would be revised to incorporate the resolution of the above two concerns.

To resolve the two unresolved items MYAPO drilled drainage holes into the bottom of the junction boxes associated with the SCO SOVs to ensure proper drainage. This work was performed under DR/RO 4914-87 and DR/RO 5204-87.

Additionally, an inspection was performed during the 1988 refueling outage under DR/RO 5157-88 to ensure that the associated conduit sloped away from the SOV housing. As a result of the inspection the conduit associated with the following SOVs were reworked under the DR/ROs to increase the margin of safety of the subject installations.

SOV-212	DR/RO 5550-88
SOV-257K	DR/RO 5553-88
SOV-3303	DR/RO 5551-88
SOV-3501	DR/RO 5552-88
SOV-3507A	DR/RO 6331-88

The cycling requirement was discussed with John Shank at ASCO. Mr. Shank indicated that the yearly cycling requirement recommended by ASCO was conservative. He concurred that cycling the valves quarterly, yearly, or during every refueling meets the intent of the recommendation.

The maintenance section of the QDR Tab E, was revised to incorporate the cycling requirements also the above telecon was added to the QDR.

Based on the review of the above documentation supplied by MYAPCO this unresolved item is closed.

4.10 (Closed) Unresolved Item (50-309/87-16-11), Justification of Limitorque Valve Actuators That Cannot be Cycled Twice a Year

During the July 20-24, 1987 inspection of QDR-0531-2 the inspectors noticed that Limitorque recommended the valve operator be cycled at least twice a year. This was not addressed in the EQ file, nor was it mentioned in the valve maintenance program. The licensee researched this issue and responded that the actuators in question were either cycled quarterly or at each cold shutdown per inservice inspection requirements. The licensee committed to provide justification in the EQ file for those actuators that cannot be cycled twice a year. This item was unresolved pending the NRC's review of the licensee's justification in the EQ file.

To resolve this item MYAPCO Provided justification for cycling the motor operators every 24 months in lieu of Limitorque's recommended cycling interval of every six months. This justification is included in Tab G.3 of QDR 0531-2. The maintenance section of the QDR, Tab E, had also been revised to include the cycling requirements. Also a letter from Mobil Oil Corporation dated 10/2/87 states that Mobilux EPO can withstand intervals of inactivity of up to 24 months and remain in serviceable condition.

Based on the review of the above documentation this unresolved item is closed.

4.11 (Closed) Unresolved Item 50-309/87-16-12, Limit Switch Housing Gasket

During the July 20-24, 1987 inspection when the cover was removed from the limit switch SOV-2603, it was apparent that leakage into the switch had occurred. A residue that appeared to be boron remained in the bottom of the housing. Further examination revealed moisture in the housing. The licensee stated that a line containing borated water had ruptured in this area and had leaked past the seal into the limit switch. The action taken was to clean out the limit switch housing, clean the limit switch contacts, and reseal the switch (some boron stains remained on the bottom of the housing after cleaning). This however, did not explain the moisture found in the switch at the time of the inspection. The licensee examined the switch cover gasket and concluded that the gasket was damaged when the cover was reinstalled, and this allowed condensate to form inside the housing.

The damaged gasket was replaced per Repair Order No. 4919-87. In addition the licensee committed to inspect the limit switch in about two weeks to ensure that no further moisture entered the switch. Since two other limit switches in the same area were inspected and no moisture was found, the inspectors considered this an isolated maintenance/QC deficiency.

Following completion of the inspection, the licensee submitted for NRC review a response to this concern. The response indicates that the subject limit switch provides Control Room indication that Valve BD-T-32

has closed following a safety injection or containment isolation signal. Valve BD-T-32 is an air operated valve actuated by SOV-2603. Any postulated limit switch malfunction will not affect the closure of the valve, since the power source of the SOV is independent from that of the valve indication. The subject limit switch is located in the Primary Auxiliary Building (PAB). Following a Design Basis Accident in the containment, the environmental effects in the PAE are limited to radiation and a small temperature increase associated with the assumed loss of ventilation. For a postulated HELB in the PAB, which would result in a steam environment, SOV-2603 is not required for mitigation.

To resolve this item the audit report required that the limit switch housing associated with SOV-2603 be opened and inspected for moisture intrusion. The housing was inspected under DR/RO 5007-87. MYAPCC stated there was no moisture accumulation noted.

Cover gaskets of the Namco limit switches were also inspected under DR/RO 5235-87 and DR/RO 5236-87. The visual inspection included:

- Inspect top and bottom cover gaskets to ensure proper seating around the entire periphery of the covers.
- Inspect cover screw o-rings to ensure proper seating.

The following installations were reworked under the listed DR/ROs to provide an additional margin of safety:

SOV-210Z	DR/RO 5240-87
SOV-216	DR/RO 5241-87
SOV-259K	DR/RO 5242-87
SOV-1102	DR/RO 5249-87
SOV-2012	DR/RO 5243-87
SOV-2602	DR/RO 5244-87
SOV-3301	DR/RO 5237-87
SOV-3410	DR/RO 5238-87
SOV-3415	DR/RO 5346-87
SOV-2507A	DR/RO 5247-87

Additionally, the maintenance sections of both limit switch QDRs, 1135-2 (EA180) and 1135-3 (EA740) have been revised to incorporate a precautionary statement into the maintenance section ensuring proper installation of the cover gaskets and cover screw o-rings.

Based on the review of the above documentation this unresolved item is closed.



4.12 (Closed) Violation (50-309/87-16-13), Qualification of Containment-Sump-Level Instrument-circuit-terminal Blocks and Cables for Reactor Coolant Hot and Cold Leg RTDs

The particular item had previously been closed under inspection report No. 50-309/87-10-1. However it will be included in this report for completeness.

On May 26, 1987 during the cycle 9/10 refueling shutdown, the licensee identified that several Raychem splices were inadequately installed, two containment-sump-level-instrument terminal blocks were not environmentally qualified, and four RTD circuits in Loops 2 and 3 hot and cold leg temperature measurement contained cable whose qualification was not established.

The Licensee initiated Discrepancy Report/Repair Orders to replace questionable Raychem splices using proper size sleeves and shim, as required. An independent QC verification was also conducted prior to acceptance by the Operations group. The licensee had established and implemented procedures for the installation of the Raychem splices. In addition, the licensee performed an evaluation of the originally installed splices. Based on the test results of the Commonwealth Edison's Raychem splices of a similar configuration to that of the Main Yankee Atomic Power Station, the licensee concluded that, as far as the insulation of the original splice was concerned, it adequately enveloped the Raychem recommended usage range, and therefore considered the originally installed splices qualified. This is discussed in more detail in Paragraph 16.0. The inspectors verified the adequacy of a selected sample of Raychem splices associated with pressure transmitters PT-1013A, B, C, D, and determined that the licensee's action was complete.

The licensee replaced the two terminal blocks in the containment sump level circuits (LT-307K and 308K) with environmentally qualified Raychem splices. In addition, the licensee verified that all of the originally installed terminal blocks for inside-containment instrumentation circuits were replaced with qualified Raychem slices. Also, the EQ Master List and other related EQ documentation were accordingly updated to reflect the as-built configuration.

The licensee replaced the cables with unknown qualification status in Loop 2 RTDs (TE-121X, Y), and Loop 3 RTDs (TE-131X, Y) circuits with environmentally qualified cable and installed Raychem splices in accordance with the station I&C Maintenance Procedure 6-01-1 entitled "Instrumentation and Control Corrective Maintenance." The licensee also updated the EQ diagrams to reflect the qualified status of the new cable, Raychem splices, and additional junction boxes. The licensee conducted a 100% reverification of the EQ diagrams against the plant drawings and concluded that the as-built configuration was correctly delineated. The

inspectors reviewed the related discrepancy Reports Nos. 2982-87, 2983-87, 2984-87, and 2985-87 and determined that the licensee's action was adequate. Based on the above, the licensee's action is considered complete. This item is closed.

MYAPCO provided the following additional information during the followup inspection. The terminal blocks found in the Containment Sump Level transmitter circuits were replaced with environmentally qualified splices. Qualification of the splices is substantiated in QDR-2137, "Raychem Splices." These modifications were performed under the following DR/ROs

LT-307K	DR/RO 2948-87
LT-308K	DR/RO 2949-87

QDR-2137, Page B4 has been revised to incorporate the additional splices.

The cable run for the Loop 2 cold leg RTD, TE-121Y, which had a terminal block was replaced with a new run of Brand-Rex cable. No terminal blocks or splices were used in this run of cable. Qualification of the cable is substantiated in QDR-0870, "Brand-Rex Ultrol Cable". The modification was performed under DR/RO 2983-87.

The unqualified Continental cables associated with Loops 2 and 3 hot and cold leg RTDs were replaced with Brand-Rex cables. Qualification of the cables is substantiated in QDR-0870, "Brand-Rex Ultrol Cable." Modifications were performed under the following DR/ROs.

TE-121X	DR/RO 2982-87
TE-121Y	DR/RO 2983-87
TE-131X	DR/RO 2984-87
TE-131Y	DR/RO 2985-87

QDR-0870, page B2 has been revised to incorporate the additional splices.

USNRC letter, dated October 17, 1988, Subject: Notice of Violation (NRC Inspection Report No. 50-309/87-16) closes out the above items.

#### 5.0 Unresolved Item

Unresolved items are matter for which more information is required in order to ascertain whether they are acceptable violations, or deviations. Unresolved items are discussed in Sections 3 and 4 of this report.

#### 6.0 Exit Interview

The inspector met with the licensee representatives at the conclusion of the inspection on September 1, 1989, as denoted in Section 1.0. The inspector summarized the scope and findings of the inspection at that time. No written material was given to the licensee during this inspection.