



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA ST., N.W.  
ATLANTA, GEORGIA 30323

Report Nos.: 50-250/88-27, 50-251/88-27, 50-335/88-24 and 50-389/88-24

Licensee: Florida Power and Light Company  
9250 West Flagler Street  
Miami, FL 33102

Docket Nos.: 50-250, 50-251,  
50-335 and 50-384

License Nos.: DPR-31, DPR-41, DPR-67  
and NPF-16

Facility Name: St. Lucie Nuclear Plant Units 1 and 2  
Turkey Point Power Plant Nuclear Units 3 and 4

Inspection Conducted: September 12-16, 1988

Inspector: Albert B. Ruff 10/24/88  
Albert B. Ruff, Team Leader Date Signed

Team Members: C. Paulk, Region II Inspector  
C. Smith, Region II Inspector

Approved by: T. E. Conlon 10/24/88  
T. E. Conlon, Chief Date Signed  
Plant Systems Section  
Engineering Branch  
Division of Reactor Safety

SUMMARY

Scope: This special, announced inspection was conducted in the areas of Environmental Qualification (EQ) of electrical equipment findings of previous inspections, including a followup of NRC open items and an inspection on Bulletin responses.

Results: The licensee management is considered to be involved in assuring quality and safety. This is based on data packages that were prepared for this inspection. The engineering staff at the General Office was very knowledgeable of the EQ issues and were cooperative and responsive to the NRC inspectors inquiries and questions.

In the areas inspected, no violations or deviations were identified.

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## REPORT DETAILS

### 1. Licensee Employees Contacted ;

- \*W. Busch, Electrical Engineer
- \*R. Gouldy, Principal Engineer Nuclear Licensing
- \*J. Hosmer, Director Nuclear Engineering
- \*R. Lee, QA Maintenance/Inspection Turkey Point Supervisor
- \*C. F. Leppla, Instrumentation & Controls Supervisor, St. Lucie
- \*G. Madden, Principal Engineer Nuclear Licensing
- \*J. DeMastry, Manager, Nuclear Licensing
- \*D. Osborn, Backfit Construction
- \*D. Parker, Senior Electrical Engineer
- C. Pell, Assistant to Senior Vice President Nuclear
- \*G. Regal, EQ Coordinator
- \*D. Smith, Supervisor Electrical
- \*D. Sager, Acting Vice President - Nuclear Energy

\*Attended exit interview

### 2. Action On Previous Inspection Findings and NRC Bulletins - For Turkey Point (92701 and 92702)

- a. (Closed) URI 50-250,251/87-08-01, Lack of Cable Traceability. During a previous inspection, a problem tracing field cable to an EQ test report was identified. By taking the cable number from the installed cable, it should have been traceable to a purchase order and a qualification test report. The tracing of the cable was hampered because of an error in its labelling.

The qualification of the cable was easily shown once it was properly identified (The licensee changed the labels to properly identify the cable). A cable and conduit list provides information to trace the cable to a qualification test report from the cable number. To trace the cable to the purchase order, the cable pull card was retrieved and it was shown that the cable was purchased to the requirements of the qualification test report.

The ability to trace cable/wires was shown during this inspection. The task is relatively easy if the cables are properly labelled. As indicated above the cable label was corrected. The cable could be identified via the cable and conduit list and other drawings. The licensee demonstrated traceability to EQ test reports. This item is closed.



- b. (Closed) Violation 50-251/87-08-02, Raychem Splice Sleeves in Unqualified Configuration. FP&L's letter of response dated March 9, 1988, has been reviewed and determined to be acceptable by Region II. The inspectors reviewed FP&L's file J.P.E - PTPM-87-1081-E, Appendix C, which is an analysis for the unqualified splice configuration observed during the March 1987 EQ audit. This document which was prepared after that audit showed that the splices in question and similar splices were qualified. The analysis was based on Wyle Test Reports 58722-2 and 17859-02B covering Raychem splices. The former was performed for Raychem Corporation and Raychem installation guidelines were followed for the test samples. The latter test was performed for CeCo and Raychem splices for the test samples were deliberately installed to less stringent requirements.

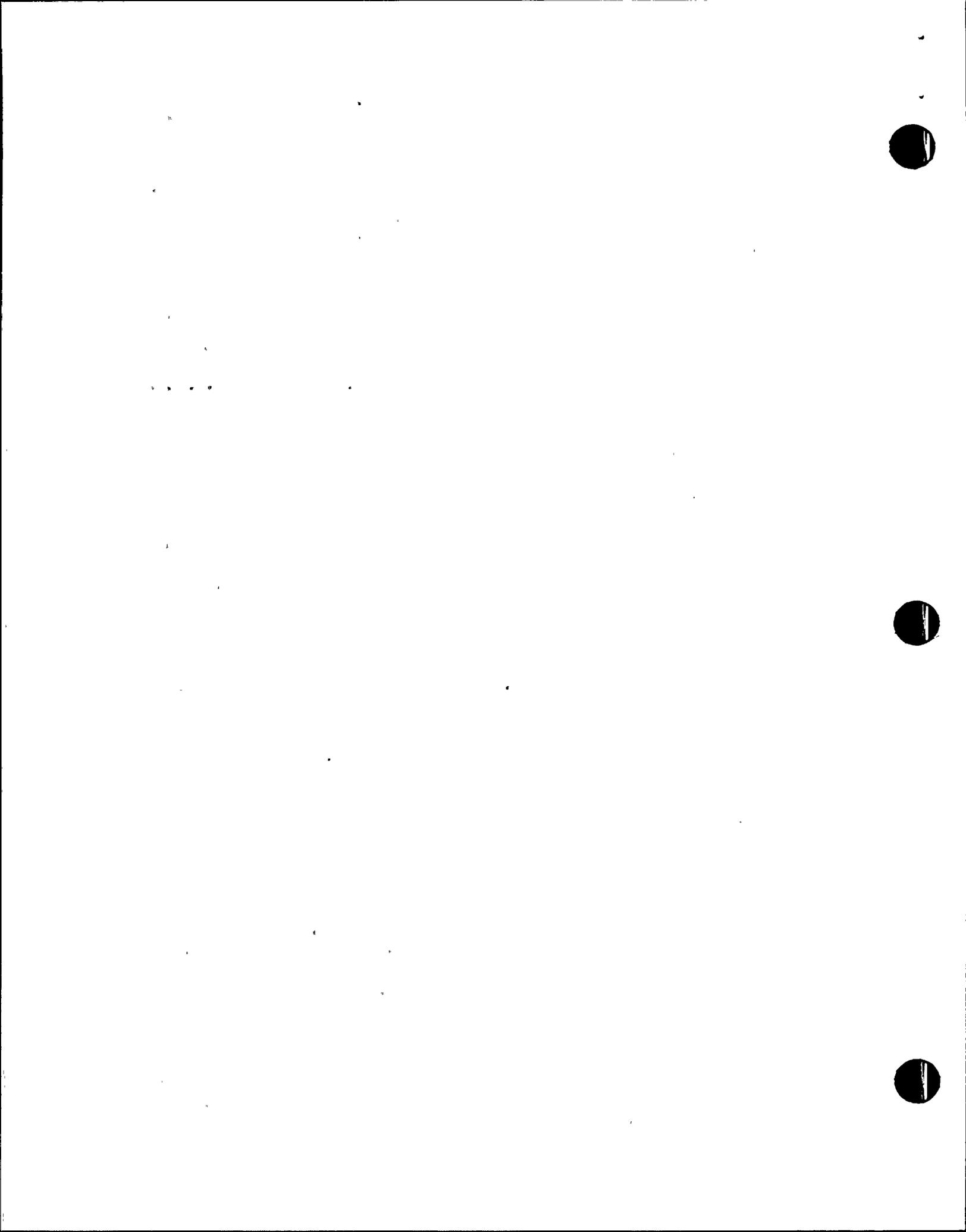
The inspectors also reviewed the following procedures that are applicable to Raychem splices:

- (1) Corrective Maintenance Procedures, CME 102.1, Motor Operated Valve Operators, Maintenance
- (2) General Maintenance Procedure, GME and GMI-102.2, Raychem Sleeve Installation
- (3) Administrative Procedure, ADM-704, EQ Maintenance Index

CME-102, MOV Operator Maintenance specifies that the EQ Master List be checked to ensure that the PWO is appropriately annotated for EQ. It does not get the planner or the worker to other EQ requirements, that could affect the MOV's qualification, such as items listed in ADM-704 and GME and GMI 102.2. As required by Procedure ADM-703, EQ requirements that are to be checked during review of EQ PWO are the responsibility of the lead maintenance department and planners, and are verified by QC. The licensee agreed to review CME 102.1 and update it accordingly.

The licensee also stated that GME and GMI 102.2 are being revised to list all EQ Raychem splice and kit configurations associated with components and their location. This will ensure that the licensee's baseline reference to EQ Raychem configurations, as determined by their walkdown inspection and/or up-graded repairs, will be preserved and properly restored for any future work.

The licensee stated that all EQ Raychem configurations, except for Unit 4 outside the containment area, have been up-graded to meet the manufacturer's guidelines. This includes documentation records. The Unit 4 outside containment area will be completed during the September 1988 refueling outage. This item is closed.



- c. (Closed) Violation 50-250,251/87-08-03, Unqualified Texaco Marfak Grease. FP&L's letter of response dated March 9, 1988, has been reviewed and determined to be acceptable. A review of the licensee data and analysis on this grease showed that it was qualified for the time it was used at Turkey Point. The qualification was in accordance with DOR guidelines and was based on test and analysis.

The licensee has stated that all EQ limitorque MOVs were cleaned and relubed with Exxon Nebula Grease in November 1985.

Procedure O-PMM 102.1, Limitorque Operators: General Inspection and Lubrication, was reviewed. This procedure requires that the gear housing be checked for amount and quality of lubricant. If lubricant is required, Nebula EP-1 is to be used. The main gear case for EQ Limitorque MO is to be inspected every refueling outage as required by EQ Tab 19 in ADM-704, Environmental Qualification Index.

Procedure 102.1, Limitorque Operators, references ADM 709, Equipment Lubrication Guide. The latter procedure identifies the lubricant codes and lubricant brands plus types. This procedure also provides by system the equipment lubrication list but not all EQ Limitorques are included as part of the system designation. For example, System 050 (RHR system) and System 062 (SI System) are listed in AD-709 and both have EQ Limitorque and the Limitorque are not listed as components. The licensee agreed to review the procedure and make the necessary changes.

The MOs have been relubricated and are periodically scheduled to be checked by procedures. This item is closed.

- d. (Closed) Violation 50-250,251/87-08-04, 3M Tape Similarity. During a previous inspection, DOC PAC 28.0- 3M, Scotch, Electrical Insulation Tapes, did not contain an adequate similarity analysis between the as tested and the as installed configurations. The licensee responded to this violation by letter dated March 9, 1988. The licensee stated that the materials were qualified and concurred with the findings with regard to the installed configuration.

The licensee initiated an inspection and enhancement program for all EQ splices to verify that splices were installed in accordance with a qualified configuration. All splices inside both containments have been inspected and, if required, enhanced. EQ splices outside Unit 3 containment have also been inspected and, if required, enhanced. All splices outside Unit 4 containment have been inspected, and those requiring corrective actions (approximately 200 splices) will be completed in the upcoming refueling outage.

The licensee has included a similarity analysis for the 3M tape splices in the DOC PAC. this was verified by a review of DOC PAC 28.0. Additionally, the taped splice procedure O-GME-102.6 was revised to provide better details for installing the splices.

Based on the licensee's completed actions and those to be completed during the refueling outage, this item is closed.

- e. (Closed) Violation 50-250,251/87-08-05, 3M Scotch 23/Scotch 70 Tape Level of Qualification. During a previous inspection, this violation was identified because the licensee did not having any controls to ensure that DOR qualified tape splices would be upgraded to 10 CFR 50.49 requirements if they were replaced. This requirement, to upgrade, is specified in R. G. 1.89 in Section C.6. The licensee's letter of March 9, 1988 to NRC that addressed this violation was reviewed and considered acceptable.

The licensee has included test reports in DOC PAC 28.0, Scotch Brand Splicing Tapes. The additional reports establish qualification of these tapes to to 10 CFR 50.49 requirements for high temperature and radiation harsh environments. The DOC PAC states that the tape splice configuration is to be used outside containment only and for power and control circuits only. The SCEW sheets did not reflect this, however, the licensee stated that the discrepancies would be corrected.

The licensee has revised the following procedures that address splices:

0-ADM-704, Rev. 28, Environmental Qualification Maintenance Index.

0-GMI-102.2, Rev. 15, Raychem Sleeve Installation (Instrumentation).

0-GME-102.2, Rev. 15, January 7, 1987, Raychem Sleeve Installation (Electrical).

0-GME-102.6, Rev. 17, Low Voltage Tape Splicing.

The licensee is in the process of revising 0-ADM-704 and 0-GME-102.6 again to further emphasize that DOR qualified splices are to be upgraded and that tape slices may be used only outside containment on power and control circuits.

Based on the licensee's revision of the procedures and DOC PAC 28.0 to ensure upgrade to 10 CFR 50.49 qualified splices this item is closed.

- f. (Closed) IFI 50-250,251/87-08-06, Cable and Splice Performance Requirements/Instrument Accuracy. During a previous inspection, cable files were identified that did not contain insulation resistance (IR) performance/acceptance criteria. Also, DOC PAC 1001, Generic Approach, was noted as not correcting IR values for the length of the cable.



DOC PAC 5.1, Brand Rex Instrumentation Cable; DOC PAC 1.0, Anaconda Cable; and DOC PAC 1001 were reviewed to verify that the performance/acceptance criteria were added to the files. Additionally, DOC PAC 1001 was reviewed to verify that the accuracy calculation took into account the cable length.

Based on a review of the above revisions, this item is closed.

- g. (Closed) IFI 50-250,251/87-08-07, Limitorque Heaters (IN 86-71). During a previous inspection, it was noted that some Limitorque operators had energized space heaters in the LS/Torque switch compartments. These energized heaters could cause a heat built-up in the compartment to degrade the wiring. Of these operators, eight were inside containment. Arrhenius calculations were performed to show that the heaters could remain installed and energized until November 1988 without reducing the qualified life of the wires to less than the plant life. The licensee will deenergize the heaters prior to the end of November 1988.

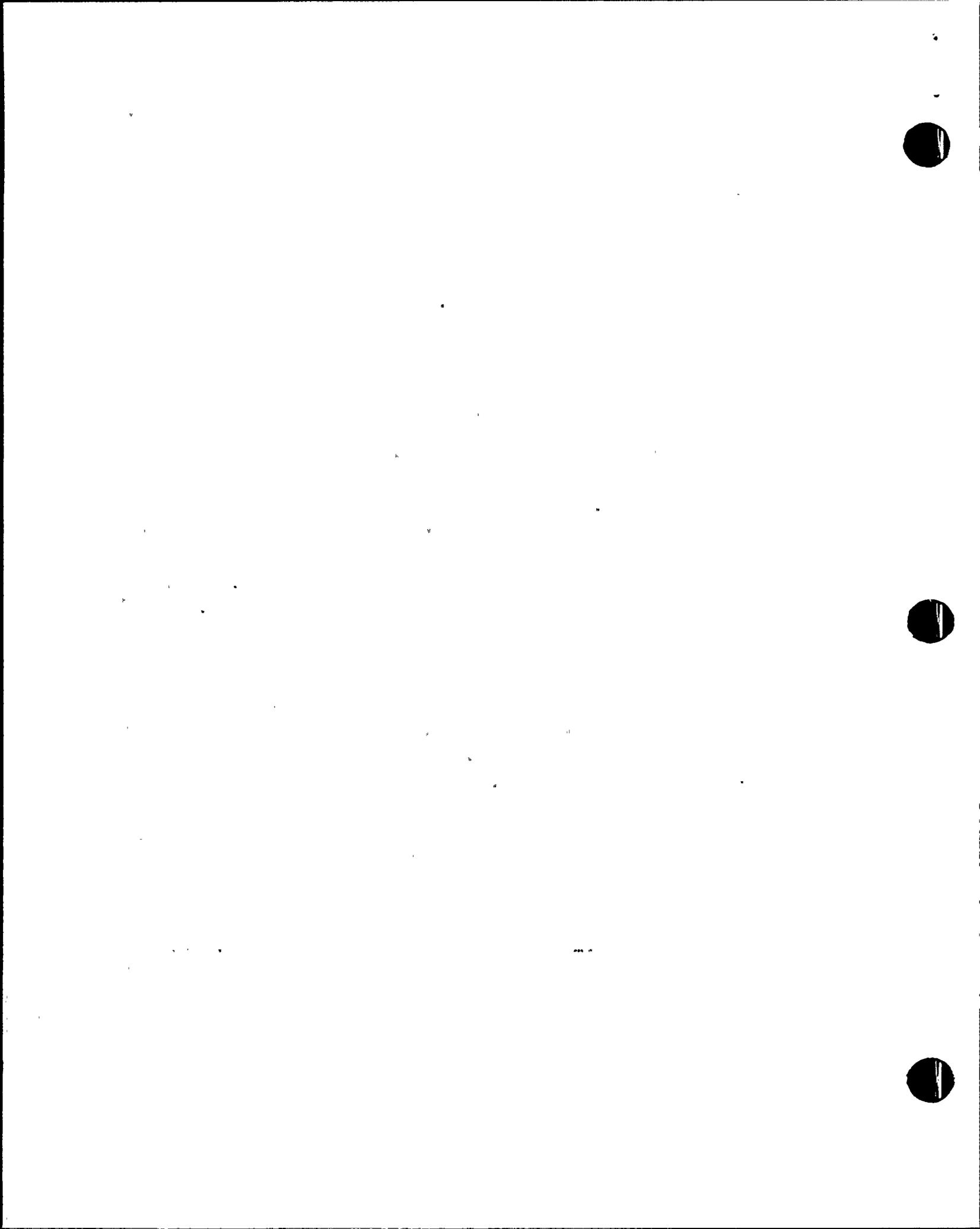
The licensee removed the GE Vulkene SIS wire from the operator identified during the previous inspection and replaced it with qualified wire. The licensee obtained a test report which showed that the Vulkene wire was qualified for approximately 29 years at 150°F, therefore the wire was qualifiable when it was identified.

Based on the licensee evaluating the qualified life with the heaters energized, committing to deenergize the heaters, and demonstrating the qualifiability of the GE Vulkene wire, this item is closed.

- h. (Closed) IFI 50-250,251/87-08-08, Limitorque Motor Leads (IN 87-08). During a previous inspection, it was identified that Turkey Point had three motors with the suspect Nomex/Kapton insulated leads in plant spares. One of these motors was used to replace a failed motor in the plant. The licensee prepared a justification for continued operation in order to operate until replacement motors could be obtained.

New motor operators were ordered in October 1987, and the operator with the Nomex/Kepton wiring was replaced in April 1988. The other two operators with the Nomex/Kapton wiring were returned to Limitorque. This item is closed.

- i. (Closed) IFI 50-250,251/87-08-09, Raychem Performance Requirements. During a previous inspection, it was identified that DOC PAC 21.0, Raychem Heatshrink Sleeving, did not contain performance/acceptance criteria, and ADM 704 did not identify RNF-100 as being qualified for mild environment outside containment nor did it identify WCSF-050-N as shim material only. DOC PAC 21.1, Raychem NMCK Motor Connection Kits, did not have performance/acceptance criteria and it had an incorrect beta analysis.



The licensee revised DOC PACs 21.0 and 21.1 to include the performance/acceptance criteria. ADM 704 was revised to reflect the use criteria for RNF-100 and WCSF-050-N. DOC PAC 21.1 was revised to correct the beta analysis. These revisions were verified by reviewing the applicable documents and were found acceptable. This item is closed.

- j. (Closed) IFI-50-250,251/87-08-10, Teledyne Thematics Qualified Life. During the March 1987 EQ Audit this cable's qualified life was questioned when its life was extended from 32.7 years to 40 years by analysis. The qualified life by the Arrhenius methodology was determined to be 32.7 years. Since the cable was installed in the plant in 1985 (Plants have been in commercial operation since 1970 and 1971), it was considered that the more conservative qualified life (32.7 years.) would be reflected in the EQ Documentation Package. DOC PAC-36 has been revised accordingly. During the review, several minor items concerning clarification in the summary section of this DOC PAC were discussed with the licensee. For example, reference to DOC PAC 1001 and Table 6.1 are no longer needed. The licensee stated that these corrections would be made. This item is closed.
- k. (Closed) IFI 50-250,251/87-08-11, Samuel Moore Cable Performance and SCEW Correction. During the March 1987 EQ Audit a discrepancy was noted in the SCEW concerning the insulation material for the Samuel Moore Cable. This SCEW was corrected to show EPDM insulation on the 2/C No. 16 AWG wire and Hypalon as the cable jacket. This item is closed.
- l. (Closed) IFI-50-250,251/87-08-12, Barton 288A DPS Terminal Box Corrosion. During the March 1987 EQ Audit corrosion was observed on Terminal Board inside Terminal Box 4120. The licensee issued Work Order PTN 04-7946/64 to clean up the Terminal Box. In addition; a Terminal Box/Terminal Board periodic maintenance inspection on a five year interval was added to ADM 704 EQ Maintenance Index. The change in ADM 704 was made to cover GE Terminal Block (EQ Tab 13), Gould, Inc., equipment (EQ Tab 14), ITT Bartons (EQ Tab 15) and Limitorque MOV (EQ Tab 19). This item is closed.
- m. (Closed) IFI-50-250,251/87-08-13, Conax RTD SCEW Accuracy. During the March 1987 NRC EQ audit the required and demonstrated accuracies for these RTDs were not listed correctly on the SCEW. The licensee has revised the SCEW and changed the summary section of DOC PAC 6.2. During the review it was noted that RTDs are used for containment atmospheric temperature monitoring and RCS loop temperature monitoring. The summary section appears to address only RTDs in the containment atmospheric temperature application. The licensee agreed to update the summary section to reflect the use of these RTDs in both of the above applications. This item is closed.



- n. (Closed) IFI 50-250,251/87-88-14, Limitorque Magnesium Motor Rotors (IN 86-02). During a previous inspection, four Limitorque motor operators (two inside each containment) were identified as having magnesium rotors. These operators had a potential to fail as indicated in IN 86-02, Failure of Valve Operator Motor During Environmental Qualification Testing. The information notice indicated that operators with magnesium rotors failed during a BWR EQ test. The test profile used in that BWR Test exceeded the Turkey Point's test profile parameters by a significant amount. Testing for a profile similar to that of Turkey Point's did not reveal any failures.

The valves identified (MOV-3-744A,B and MOV-7-744A,B) are for Low Head Safety Injection to the RCS cold legs. They are required to close on Low-Low RWST level (about 20 minutes after DBE) to switch from injection mode to recirculation mode. The valves would be required to open, and remain open, 18 hours into the event to switchover to hot leg recirculation. In the case that they failed to open at this point, backup valves outside of the harsh environment could be opened to establish the necessary flow path.

Based on the qualification report using an accident profile similar to that of Turkey Point's and the operating requirements of the valves, this item is closed.

- o. (Closed) IFI-50-250,251/87-08-15, Barton 288A Switch Material Similarity. During the March 1987 NRC EQ Audit, DOC PAC 15.0 indicated that the material for the switches from one manufacturer was unknown. Correspondence was available during this audit to show that material was identified. This correspondence has been added to the DOC PAC, Section 3.11 and 3.12 that shows the same material is used in the switches manufactured by both companies. This item is closed.
- p. (Open) IFI, 50-250,251/87-08-16, Brand Rex Coax Jacket Integrity. During the March 1987 NRC EQ Audit, concerns were raised with respect to the use of this cable with the General Atomic High Range Radiation Monitor. The concerns were: (1) the file contained a record of a telephone conversation with regard to qualification procedure for the HRRM but there was no confirming letter in the file; and (2) the test report indicated that numerous jacket cracks had been observed in the test and these were not discussed with regard to EQ. The licensee addressed these concerns by including the telephone conversation confirming letter in the DOC PAC and the cable jacket integrity is addressed and discussed in the summary section of DOC PAC 5.0.

As a result of this correspondence and an additional review by the NRC inspector, it is considered that additional work is required to update the DOC PAC. The letters of correspondence do not appear to be in agreement and indicates that the HRRM may not meet R.G 1.97 Table 3, Note 8 requirement (...accuracy within a factor of two over the entire range)..



At abnormally high containment temperatures (peak accident temperature) and low radiation levels the HRRM would not meet the recommendation of RG 1.97 as indicated above. The licensee considers that the HRRM is environmentally qualified and meets the intent of RG 1.97. FP&L stated that they would write to NRR stating and justifying their position for an exemption from the verbatim recommendations of R G 1.97 with regard to the HRRM. This item remains open and will be reviewed at a future date.

- q. (Closed) IFI 50-250,251/87-08-17, Kerite FR/FR Test Anomalies. During a previous inspection, it was identified that DOC PAC 34.2, Kerite FR/FR Cable, did not address the anomalies in the Conax test report IPS-850. The licensee did have another Conax test report, IPS-848, which could be used to address the anomalies. The licensee has incorporated IPS-848 into DOC PAC 34.2 and has adequately addressed the anomalies on the beta analysis. This was verified by review of DOC PAC 34.2. This item is closed.
  - r. (Closed) URI 50-250,251/86-39-05, Environmental Qualification of Limitorque Motor Operators. This item is closed based on the results of the 10 CFR 50.49 inspection conducted March 2-6, 1987 and documented in Inspection Report 50-250,251/87-08.
  - s. (Closed) 50-250,251/BU-88-01, Defects in Westinghouse Circuit Breakers. The licensee has stated in letter dated April 11, 1988, to NRC that they do not have any of the subject breakers. This item is closed.
  - t. (Closed) 50-250,251/BU-88-03, Inadequate Latch Engagement in HFA Type Latch Relays Manufactured by General Electric. The licensee has stated in letter dated July 14, 1988, to NRC that it does not have any of the subject relays. This item is closed.
3. Action On Previous Inspection Findings and NRC Bulletins - For St. Lucie (92701 and 92702)
- a. (Closed) URI 50-335/86-08-07, Limitorque Operator Wiring,  
 (Closed) URI 50-389/86-07-05, Limitorque Operator Wiring,  
 (Closed) IFI 50-335/86-08-08, Limitorque File and Field Corrections,  
 (Closed) IFI 50-389/86-07-06, Limitorque File and Field Corrections.

During a previous inspection, concerns with the qualification of Limitorque motor operators were raised. The documentation packages did not contain adequate information to support qualification of TFF jumper wire, nor did they include information to demonstrate a post-accident operability time of greater than 200 days as was indicated on the SCEW sheets. Another concern was that the licensee should correct the following Limitorque related items that were identified by the inspectors: 1) establish a positive method to



identify terminal blocks in Limitorque valve operators and verify that qualified terminal blocks are installed in the operators; 2) tighten the Sealflex connection to the operator on valve 2-V-2553 and repair the braid that was pulled out of the Sealflex connector on the operator for valve 2-MV-09-9; and 3) remove valve 2-MV-3539 from the EQ list.

The licensee removed the TFF jumper wires from the outside containment operators and prepared a JCO for continued operation and to show that the wire was qualifiable. The licensee then completed inspection of all Limitorque operators outside containment on Unit 1 and both inside and outside containment on Unit 2. The inside containment operators on Unit 1 had already been inspected and replaced. Any questionable jumpers were replaced. To further support the argument of qualifiability of the internal wiring, the licensee performed HELB tests on an operator with some of the insulation removed the conductors. The operator performed satisfactorily during this test. The test was conducted twice to an HELB profile that had a maximum temperature of approximately 400°F and a maximum pressure of approximately ten psig.

The licensee has identified which Limitorque operators have terminal blocks and verified that they are qualified. This information has been put into written procedures, however, the licensee plans to incorporate it into its Nuclear Information Management System (NIMS) which is under development.

The problems with the Sealflex on valves 2-V-2553 and 2-MV-09-9 were corrected. This was verified by reviewing the PWO under which the work was accomplished.

Valve 2-MV-3539 was verified to have been removed from the EQ list. DOC PAC 3.1 was also reviewed and the information necessary to demonstrate greater than 200 days post accident operability was included.

Based on the above, the identified open items are closed.

- b. (Closed) Violation (50-335/86-08-05, 50-389/86-07-04): File Auditability; (50-335/86-06-06): General Cable Qualification; (50-335/86-08-10): Victoreen Radiation Detectors; (50-389/86-07-08): Garrett Solenoid Valve Qualification. The licensee's response dated March 21, 1988, was considered acceptable by Region II. The first round EQ inspection identified a generic deficiency in that auditable qualification files had not been prepared by the licensee to demonstrate EQ for various equipment types. Based on the corrective actions taken for specific deficiencies identified in the following qualification documentation packages, Item 50-335/86-08-05 and 50-389/86-07-04 is closed.

The inspectors reviewed Environmental Qualification Data Package 8.0 and verified that it had been updated to include calculations demonstrating a qualified life for electrical cable. Section 3.2 of the qualification package documents the engineering analysis performed to address the aging requirements. Using the LOCA profile of the Franklin Institute Test certified by General Cable for Plant St. Lucie 1 in their letter of May 13, 1973, a calculation was performed that demonstrated a qualified life of 44.5 years for normal service inside containment. A similar methodology was employed to demonstrate that the cable is also qualified for 48.54 years outside containment service plus the required DBE service. Item 50-335/86-08-06 is closed.

The inspectors reviewed Environmental Qualification Documentation Package 26.0 and verified that deficiencies identified during the first round EQ inspection had been corrected. Section 3.2 of the documentation package establishes qualification of the Victoreen containment radiation monitors by type test supported by analysis. Age sensitive components in the radiation monitors were identified by a materials analysis. The limiting components were determined to be the neoprene housing insulator pad and o-rings. External interfaces have been addressed and information concerning Raychem cable and qualified Raychem splices have been added to the qualification documentation packages. In addition, based on Victoreen Test Report No. 950.310A, the licensee has demonstrated that the detectors are qualified for the required one hour operating time. Adequate margin has also been demonstrated for temperature, pressure and radiation as documented on the component evaluation worksheet. Based on corrective actions completed by the licensee Item 50-335/86-08-10 is closed.

Further evaluation by the licensee has revealed that Garrett solenoid valves, EQDP NO. 35.9 (Unit 2), do not have to be environmentally qualified. Based on the inspectors' review of the evaluation performed by Ebasco and documented in letter P-M-SL-86-0812, dated July 30, 1986, Item 50-389/86-07-08 is closed.

The licensee's corrective actions for deficiencies related to file auditability included in the violation, but not identified with a unique identification number, were reviewed by the inspectors. The results of this review are discussed in the following paragraphs.

The inspector reviewed Environmental Qualification Data Package 6.3 (Unit 2) and verified that the test profile enveloped the St. Lucie 2 DBE/MSLB profile. Environmental qualification of the Rockbestos cable is based on the test profile documented in Rockbestos Report No. QR-6802. The test lasted 107 days and 19 hours. An engineering evaluation was performed that demonstrated that the tested profile envelopes the DBE profile which has a duration of 180 days. A generic thermal lag analysis has also been completed, for MSLB inside containment, that shows no adverse effect is experienced by the



cables. Additional reviews of the test and DBE pressure profile showed that the accident profile was enveloped by the test profile. No auditability problems were identified during this review.

The inspectors reviewed EQDP No. 8.2 (Unit 2) and verified that the test conditions enveloped St. Lucie 2 DBE/MSLB profile. Environmental qualification of the Barton Model 763 and 764 transmitter is based on Test Report Numbers R3-763-6 and R3-764-9 respectively. The simulated accident condition had a duration of 15 days with temperature and pressure values as shown on Figures 16 and 17 of the test report. The licensee performed an engineering analysis, documented in Section 6.2 of the EQDP, which demonstrated that the tested temperature profile adequately envelops the St. Lucie 2, DBE profile with margin. The methodology involves the use of the Arrhenius methodology to calculate the equivalent life of the transmitters, for both the accident and test profiles, at the average 40 year containment temperature of 115°F.

The results showed that thermal degradation due to the 15 day test is more severe than that caused by the DBE. Review of the test profile for pressure showed that it adequately envelops the DBE pressure profile. No auditability problems were identified during this review.

The inspectors reviewed Environmental Qualification Data Package No. 22.0 and 23.0 (Unit 1) and 8.5 (Unit 2) and verified that comments made by the inspectors have been incorporated into the documentation package. The following appendices have been added to documentation package: Appendix E, Functional Test Report (non-harsh environment); Appendix F, Seismic Requirements; and Appendix I, Reliability Predictions for the TEC 1414 Valve Flow Monitoring System. Addition of the above appendices to TEC Report No. TR-517-03, Revision 2, completes the licensee's corrective action.

The inspectors reviewed Environmental Qualification documentation Package No. 19 (Unit 1) and determined that environmental qualification of the cable is based on Franklin Test Report No. F-C3016. This report, which has been added to the documentation package, replaces Franklin Report F-C4033-1 and better addresses similarity between the tested specimen and the installed cable. Both cables were manufactured by Rome Cable Corporation. The licensee has demonstrated EQ of the Rome cable based on actual test and combination of tests and analysis. The documentation package was reviewed to verify that: (1) the test profile adequately envelops the DBE profile; (2) the required post-accident operating time compared to the duration of time the cable has been demonstrated to be qualified; (3) margin applied to the EQ parameters, and; (4) aging calculations for qualified life. Cable IR values obtained during the test, and an evaluation of the effect of these values have been



performed and incorporated in the qualification package. No auditability problems were identified during this review.

The inspector concluded that the licensee had determined the full extent of the violation, taken actions to correct current conditions, and developed corrective actions needed to preclude recurrence of similar problems. Corrective actions stated in the licensee response have been implemented.

- c. (Closed) Violation (50-389/86-07-07) RDF Resistance Temperature Detector Qualification. The licensee's response dated March 21, 1988, was considered acceptable by Region II. The inspectors reviewed Environmental Qualification Documentation Package 39.1 and verified that the documentation package had been updated to include calculations which demonstrated a qualified life for the RTV sealant used in the detectors. Qualification was demonstrated by performing three calculations. The first method uses the Arrhenius equation to calculate the thermal aging of the sealant due to the DBE and the test profile relative to the normal service temperature of 122.5°F. The difference between the two values gave a thermal qualified life of 41.4 years. Values of qualified life given by the other two calculations were 131.3 years and 2501 years. The conservative value of 41.4 years has been documented as the qualified life. Additional conservatism was applied to this value by the licensee who states that assuming an inherent 10% margin in the calculated value of 41.4 years, the thermal qualified life of the sealant would be 37.6 years. This qualified life could be extended to 40 years by replacement of the sealant and the gasket.

The inspector concluded that the licensee had determined the full extent of the violation, taken actions to correct current conditions, and developed corrective actions needed to preclude recurrence of similar problems. Corrective actions stated in the licensee response have been implemented.

- d. (Closed) URI 50-335/86-08-04 and 50-389/86-07-03, GE Vulkene/Raychem Flamtrol Cable on EQ List. The GE Vulkene wire that was observed outside containment in a MOV for Unit 1 was removed and replaced by qualified wire as indicated in FP&L's letter dated March 10, 1987. A JCO was issued at this time to cover other similar potential wiring problems for MOV located outside of the containment. It should be noted that prior to the 1986 NRC EQ audit all inside containment MOVs where inspected and any questionable wiring was replaced.

By May 1986, all questionable wiring in all EQ Limitorque MOVs was replaced with identifiable and qualified wire. Since GE Vulkene wire is not used in EQ application, it has not been added to the EQ list. Raychem Flametrol is qualified and is still in use at the site. This wire/cable has been added to the EQ list for Unit 2 and the EQ DOC PAC prepared for Unit 1 is now applicable also to Unit 2. These items are closed.



- e. (Closed) IFI (50-335/86-08-01) and (50-389/86-07-01), EQ Program Procedures Update. Procedure number QP 2.17, Environmental Qualification of Electrical Equipment, Revision 0, has been developed and implemented to assign responsibilities and specify requirements for the EQ of electrical equipment. This procedure replaces the FP&L Corporate EQ Program manual that was in effect at the time of the first round EQ inspection. By reference to the following quality related procedures, Procedure QP 2.17 ensures that EQ requirements are considered during the procurement process. Procedure No. QP 4.5, Procurement of Safety Related and Quality Related Electrical Equipment, Revision 1, has been revised to incorporate requirements of the EQ program. Similarly, Procedure QP 4.1, Control of Procurement Originated by Operating Plant Personnel, Revision 19; and Procedure QP4.4, Control of Procurement Originated by Non-operating Plant Personnel, Revision 20, has been revised to address EQ requirements during procurement activities. This item is closed.
- f. (Closed) IFI 50-335/86-08-02, Maintenance Clarifications. During a previous inspection, two apparent discrepancies were noted during the review of EQ maintenance requirements. One was to replace the electrolytic capacitors every ten years in the General Atomics radiation detector No. RE-26-58-RD-23 for Unit 1. The other was to replace a 133A alarm module every 19.4 years and a 134 relay and power supply every 7.8 years for the TEC acoustic flow monitor Tag No. FT-1200 for Unit 1. The capacitors were evaluated by the licensee and determined to be in a harsh environment and thus added them to the EQ list with a replacement interval of ten years. The acoustic flow monitor components, on the other hand, were in a mild environment and therefore, are not required to be environmentally qualified. Based on the above, this item is closed.
- g. (Closed) IFI 335/86-08-03, EQ Lists Deletions. The ASCO Solenoid Valves listed under TER Item Nos. 47 and 48 and the Namco Limit Switch listed under TER Item No. 68 are all located in mild environments and therefore do not need to be on the EQ List as required by 10 CFR 50.49. These items have been deleted from the EQ Master List. This item is closed.
- h. (Closed) IFI 50-335/86-08-09, Victoreen Radiation Detector File Corrections. The inspectors reviewed Environmental Qualification Documentation Package 26.10 and determined that a supplementary review sheet has been added to Section 3.2, Engineering Analysis, of the documentation package. This review sheet states that the cable used with the detectors is the qualified Raychem cable discussed in St. Lucie Unit 1, documentation package 18.0. Additionally, it states that wire connections are made with qualified Raychem splices, which are supported by St. Lucie Unit 1 Documentation Package 29.0. This issue is closed.



- i. (Closed) IFI 50-389/86-07-09, Garrett Solenoid Valve File Corrections. Further evaluations by the licensee has revealed that Garrett solenoid valves do not have to be environmentally qualified. An engineering evaluation performed by Ebasco and documented in letter P-M-SL-86-08-12, dated July 30, 1986, shows that the valves need not be environmentally qualified. The valves have been removed from the EQML. This item is closed.
- j. (Closed) IFI 50-335/86-08-11, TEC Acoustic Monitor File Corrections. In response to the NRC concerns licensee management performed a technical audit of Technology for Energy Corporation (TEC) test program with regard to the acoustic flow monitoring instrumentation. The results of this audit are documented in FP&L interoffice correspondence EPO-86-17, dated August 21, 1986. The inspectors reviewed the results of the technical audit which had been added to Documentation Package 23.0 and verified that it resolved the concerns expressed by the NRC. This item is closed.
- k. (Closed) IFI 50-335/86-08-12, NAMCO Limit Switch File Corrections. During a previous inspection, a discrepancy was identified in that the qualification file documented a maintenance requirement for replacement of elastic components every five years inside containment. The EQ List had a replacement schedule of ten years.  
  
The licensee recalculated the qualified life of the components by means of Arrhenius methodology. The new qualified life for inside containment was 9.1 years. The EQ List was revised as was DOC PAC 15.1, NAMCO Limit Switches, to include the new value. This item is closed.
- l. (Closed) IFI 50-389/86-07-107, Microswitch Limit Switch File Corrections. The inspectors reviewed Environmental Qualification Documentation Package 9.4, Unit 2, and verified that the SCEW pages 09.4-2-04 through 09.4-2-06 had been revised. The location for limit switches, tag numbers V5203LS, V5204LS, and V5205LS, is documented as the auxiliary building in lieu of the Reactor Building. This item is closed.
- m. (Closed) 50-335,389/BU-88-03, Inadequate Latch Engagement in HFA Type Latch Relays Manufactured by General Electric. The licensee identified 20 HFA relays of the type described in the bulletin as being installed in safety-related systems at St. Lucie. There were 14 in Unit 1 and 6 in Unit 2. Of these 20 relays, 17 were HFA-54E and 3 were type HFA-154E. Of the 17 HFA-54E relays tested, 4 failed and were replaced with type HFA-154E relays. This was verified by reviewing work procedures PWO 5519/61 and 5149/62.



The licensee states in his September 22, 1988, letter to the NRC that these were all the relays installed in safety-related systems of the type identified in the bulletin. The licensee further states that future spares received will be inspected prior to installation if manufactured prior to November 1, 1987. This item is closed.

#### 4. Exit Interview

The inspection scope and results were summarized on September 16, 1988, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

#### 5. Acronyms and Abbreviations

BU	-	NRC Bulletin
CeCo	-	Commonwealth Edison Company
DBE	-	Design Base Event
DOC PAC	-	Documentation Package for EQ
DOR	-	Division of Operating Reactor
DPS	-	Differential Pressure Switch
EQ	-	Environmental Qualification
EQDP	-	Environmental Qualification Document Package
EQML	-	Environmental Qualification Masterlist
FP&L	-	Florida Power and Light Company
HRRM	-	High Range Radiation Monitor
IFI	-	Inspector Followup Item
IN	-	NRC Information Notice
IR	-	Insulation Resistance
JCO	-	Justification for Continued Operation
LOCA	-	Loss of Coolant Accident
LS	-	Limit Switch
MO	-	Motor Operator
MOV	-	Motor Operated Valve
MSLB	-	Main Steam Line Break
PSIG	-	Pounds Per Square Inch Gauge
PWO	-	Plant Work Order
RCS	-	Reactor Coolant System
RG	-	Regulatory Guide
RHR	-	Residual Heat Removal
RWST	-	Refueling Water Storage Tank
SCEW	-	System Component Evaluation Worksheets
SI	-	Safety Injection
TER	-	Technical Evaluation Report by Franklin Research/NRC
URI	-	Unresolved Item
VIO	-	Violation