

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 050-244/87-03

Docket No. 050-244

License No. DPR-18 Priority -- Category C

Licensee: Rochester Gas and Electric Company

49 East Avenue

Rochester, New York 14649

Facility Name: Ginna Station

Inspection At: Rochester, New York 14649

Inspection Conducted: February 9-13, 1987

Inspectors:

R. J. Paolino
R. J. Paolino, Lead Reactor Engineer

5-29-87
date

Other participants and contributors to the report include:

- J. Hanek, Consultant Engineer, Idaho National Engineering Laboratory
- R. Vanderbeek, Consultant Engineer, Idaho National Engineering Laboratory
- M. Dev, Reactor Engineer, NRC/RI
- L. Cheung, Reactor Engineer, NRC/RI
- O. Gormley, Equipment Qualification and Test Engineer, NRC/IE/HQ
- A. Sugarman, Consultant Engineer, ENRAC

Approved by:

C. J. Anderson
C. J. Anderson, Chief,
Plant Systems Section, EB/DRS

6/2/87
date

Inspection Summary: Inspection on February 9-13, 1987 (Inspection Report No. 050-244/87-03).

Areas Inspected: Special, announced inspection to review the licensee's implementation of a program for establishing and maintaining the qualification of electrical equipment within the scope of 10 CFR 50.49.

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Results: The inspection determined that the licensee has implemented a program to meet the requirements of 10 CFR 50.49 except for certain deficiencies listed below:

<u>Violations</u>	<u>Paragraph</u>	<u>Item Number(s)</u>
1. Similarity was not established between the installed penetration and the Crouse-Hinds penetration tested.	12.2	50-244/87-03-02
2. PVC cable test specimens different from installed cable. No similarity analysis.	12.4	50-244/87-03-03
3. Leakage current not considered in performance requirements for Coleman Instrument Cable.	12.5	50-244/87-03-04
4. Qualification data not available to support installed Victoreen High Range Radiation Monitor Cable/Connector Assembly.	12.7	50-244/87-03-05
5. Qualification data not available to support minimum bend radius and splice seal length less than 2 inch.	13.0	50-244/87-03-06

Unresolved Item(s)

- | | | |
|--|------|-----------------|
| 1. EQ file adequacy/auditability Problem | 12.1 | 50-244/87-03-01 |
| a. Equipment error analysis, plant performance criteria, acceptance criteria missing from files. | | |
| b. Referenced qualification basis very general. | | |
| c. EQ component walkdown/ verification not documented. | | |
| d. Basis for licensee acceptance of EQ files not clear. | | |
| e. Extraneous information in EQ files. | | |



DETAILS

1.0 Persons Contacted

1.1 Rochester Gas and Electric Company (GINNA)

C. Anderson, Manager Quality Assurance
G. Daniels, Manager Electrical Engineering
E. Edgar, I&C Supervisor
N. Goodenough, QC Engineer
R. Kober, V.P. Electric Production
R. Mercredy, Director Engineering Services
P. Perry, Site Procurement Specialist
D. Servatius, Electrical Engineer
T. Scanlon, Supervisor of Purchasing
R. Smith, Chief Engineer
B. Snow, Superintendent Nuclear Production
S. Spector, Superintendent Ginna Production
W. Stiewe, QC Engineer
P. Wilkens, Manager Nuclear Engineering
G. Wrobel, Senior Engineer

1.2 Ginna Consultants

R. Arnold, Senior Engineer, EPM, Inc.
P. DiBeneditto, President - DBA Associates
R. Ho, Senior Engineer - EPM, Inc.

1.3 U.S. Nuclear Regulatory Commission

T. Polich, Senior Resident Inspector

All personnel listed above were present at the exit meeting on February 13, 1987.

2.0 Purpose

The purpose of this inspection was to review the licensee's implementation of a program to meet the requirements of 10 CFR 50.49 for the Ginna Station and their implementation of corrective action commitments resulting from deficiencies identified in Franklin Research Center Technical Evaluation Report. (FRC-TER).

3.0 Background

On February 8, 1979, the NRC Office of Inspection and Enforcement (IE) issued to all licensees of operating plants, (except those included in the Systematic Evaluation Program (SEP)), IE Bulletin (IEB) - 79-01. "Environmental Qualification of Class 1E Equipment."



On January 14, 1980, the NRC issued IEB-79-01B which included DOR Guidelines and NUREG-0588 as attachments 4 and 5, respectively. Subsequently on May 23, 1980 Commission Memorandum and Order CLI-80-21 was issued and stated that the DOR Guidelines and portions of NUREG-0588 form the requirements that licensee must meet regarding environmental qualification of safety related electrical equipment in order to satisfy those aspects of 10 CFR 50, Appendix A, General Design Criterion (GDC) 4. Supplements to IEB-79-01B were issued for further clarification and definition of the staff's needs. These supplements were issued on February 27, September 30 and October 24, 1980.

A final rule on the environmental qualification of electrical equipment important to safety for nuclear power plants became effective on February 22, 1983. This rule, Section 50.49 of 10 CFR Part 50, specified requirements of electrical equipment important to safety located in a harsh environment. In accordance with this rule, equipment for Ginna may be qualified to the criteria specified in either the DOR Guidelines or NUREG-0588, except for replacement equipment. Replacement equipment installed subsequent to February 22, 1983 must be qualified in accordance with the provisions of 10 CFR 50.49, using the guidance of Regulatory Guide 1.89, unless there are sound reasons to the contrary.

On April 17, 1984 the NRR Staff met with Rochester Gas and Electric Corporation to discuss proposed methods for resolving environmental qualification deficiencies identified in the December 13, 1982 SER and the May 28, 1982 FRC-SER. The major deficiencies identified include documentation, similarity, aging, qualified life and replacement schedule. Minutes of the meeting and proposed resolution to the environmental qualification deficiencies were documented and submitted to the NRC by letter dated May 29 and August 30, 1984.

On November 30, 1984, by telecon, Rochester Gas and Electric Corporation stated that all installed equipment within the scope of 10 CFR 50.49 is environmental qualified and that there was no need for a justification for continued operation at this time. This was followed by a similar confirming submittal dated January 24, 1985.

4.0 EQ Program

Appendix E of the Ginna Station Quality Assurance Manual defines the additional quality assurance program requirements for replacement and maintenance of environmentally qualified equipment to assure compliance with the requirements of 10 CFR 50.49.

The EQ program is embedded in procedures for design, installation and maintenance of systems and components. The principal control document is the summary of environmental qualification data Form EEQ-1.



Engineering is responsible for establishing an evaluation process which documents the basis for any changes to the Equipment Qualification Master List (EQML) through the use of the EEQ-1 and EEQ-3 form as described in procedure No. QE-328. Nuclear Engineering is responsible for implementation of the program as it applies to replacement, maintenance activities and additions for EQ equipment. The Electrical Engineering department must review and approve qualification documentation and revisions for modified EQ equipment prior to accepting an item for operation. Qualification Test Reports or qualification data received with purchased EQ equipment are forwarded for review and acceptance and then used in completing the Electrical Equipment Environmental Qualification Data Summary (EEQ-1).

Environmental Qualification Data Packages are used to substantiate EQ equipment qualification and are maintained in the central engineering files. The Central EQ files include electrical equipment EQ data summary form EEQ-1, qualification test reports, applicable IEEE-323-1974 waiver forms (EEQ-2) and other documentation listed on the EEQ-1 form.

Based on the above, the inspector concluded that the licensee has implemented a program that meets the requirements of 10 CFR 50.49 for environmental qualification of electrical equipment except for the deficiencies noted in paragraph 12.0.

5.0 EQ Master List

The Ginna Station Quality Assurance Manual Appendix E, entitled, "Quality Assurance Program for EQ Equipment Replacements, Maintenance and Additions" is the controlling document for the EQ program. This document assigns the Engineering Department the responsibility for an evaluation process which documents the basis for any changes to the EQ Master List (EQML) and assigns Nuclear Engineering group the responsibility to "... coordinate implementation, indoctrination for the program associated with the replacement, maintenance and addition of EQ Equipment." Electrical Engineering is assigned the responsibility for establishing and maintaining Central EQ files and also acceptance or approval of various changes. The EQML appears as Table 1 to Appendix E of the QA Manual and is arranged by system.

Changes to the EQML are made by using two forms referenced in Appendix E. Form EEQ-1 is similar to the System Component Evaluation Worksheet (SCEW) and is used to add equipment to the EQML. Form EEQ-3 is used to remove equipment from the EQML and Form EEQ-2 is used to justify use of replacement equipment that does not meet 10 CFR 50.49 requirements.

The NRC inspector performed an audit of Revision 2 of the EQML, dated January 28, 1987 to determine its validity. Four P&ID diagrams and one Emergency Operating Procedure (EOP) were examined to identify equipment which must operate in an accident. The licensee was able to establish justification for equipment identified during the review that was not on the EQML.



The P&ID's examined were: Reactor Coolant System 1260, Reactor Heat Removal System 1247, Containment Spray System 1261, Waste-Disposal Gas System and the Hydrogen Recombiner System 1275, Revision 1. The EOP examined was Loss of Reactor or Secondary Coolant (E-1) including establishment of cold leg recirculation.

Within the scope of this inspection no deficiencies were identified.

6.0 IE Information Notices

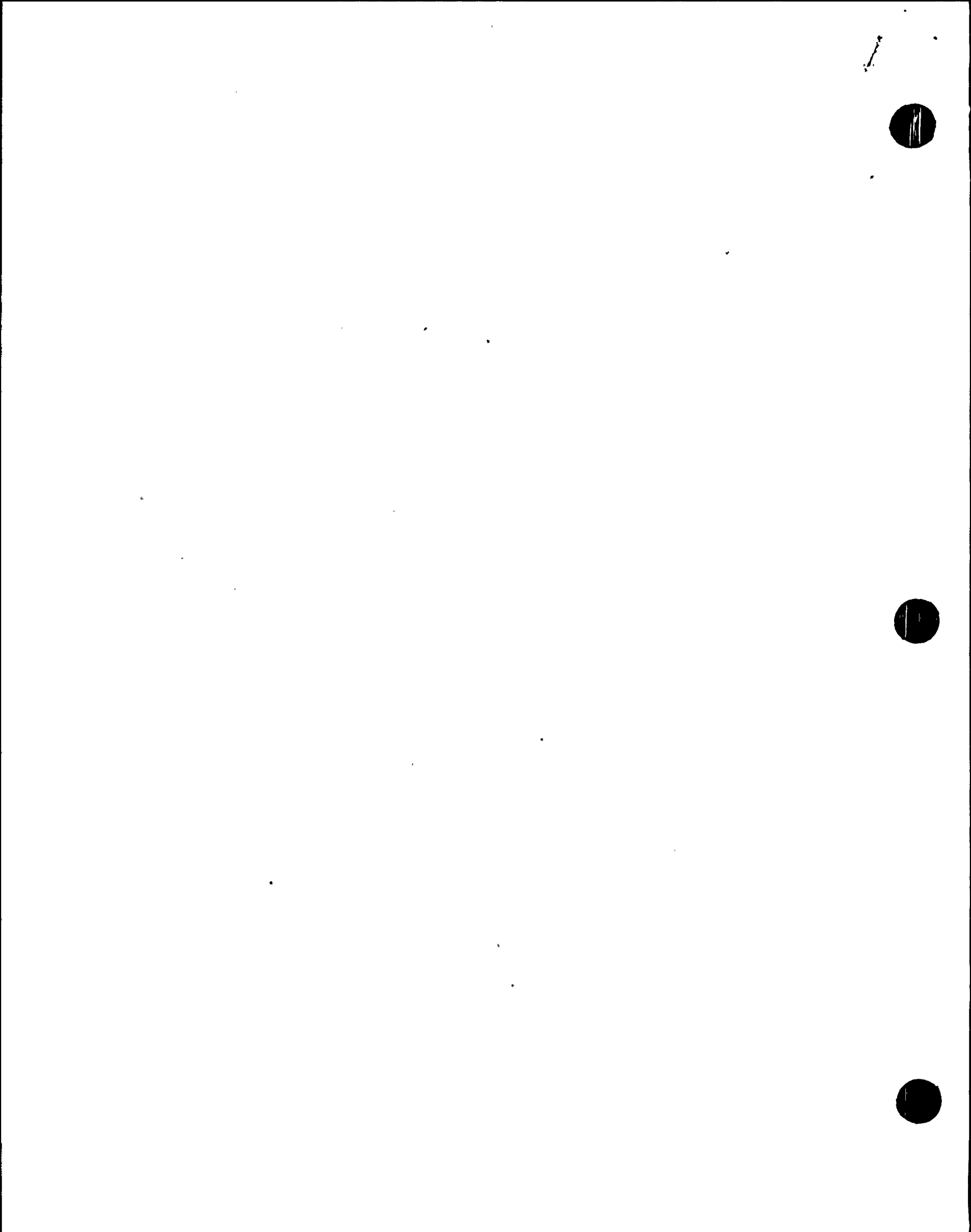
Licensee procedure No. A-1404, Revision 9, dated January 29, 1987 "Operational Assessment Program", describes the review and feedback process for NRC Bulletins (IEB) and Information Notices (IN). The operations assessment engineer screens the NRC notices for review by cognizant maintenance supervision. Plant specific implication is assessed by the Plant Operations Review Committee as applicable and the review is documented in the EQ history file.

The NRC inspector reviewed the following EQ related notices: IEB 82-04, IN82-11, IN82-52, IN83-45, IN84-23, IN84-44, IN84-47, IN84-57, IN84-68, IN86-03 and IN86-53.

The NRC inspector concluded that the licensee had reviewed the NRC Notices and Bulletins. However, in some instances the reviewers comments were limited to a notation on the NRC Notice/Bulletin. The licensee commented that prior to A-1404 Revision 8, the review of NRC Notices/Bulletins was not formalized. The NRC inspector did not identify any EQ file or hardware deficiencies resulting from the licensee's prior lack of a formal system to review Information Notices and Bulletins.

7.0 Licensee Response to Information Notice (IN) 86-03

In response to NRC Information Notice 86-03, the licensee conducted a preliminary inspection of their Limitorque Valve Actuators in February 1986. The preliminary inspection identified that PVC jumper wires were used inside the actuator housing. Subsequently the licensee issued Procedure No. M-64.1.1 "Electrical Maintenance and Inspection of Environmentally Qualified Motor Operated Valves", Revision 0, dated February 18, 1986. This procedure was used to inspect and modify all EQ Limitorque Valve Actuators, both inside and outside containment. There are 15 Limitorque Motor Operated Valves (MOV). Two of these MOVs are located inside containment. The jumper wire was replaced on all but two MOV's (MOV-704A&B) outside the containment prior to February-22, 1986. Before April 2, 1986 the jumpers were replaced on the two MOV's inside the containment. Anaconda NSIS qualified wiring was used in replacing the PVC jumper.



MOV Nos. 704 A and B are located in a mild environment except for radiation exposure. The licensee performed a radiation dose calculation on February 18, 1986 for both valve locations and determined that the maximum integrated dose to be 2.8×10^6 rads, well within the radiation levels for PVC. (reference EQ file No. 44). The licensee, however, replaced the jumper wire on both valves in February 1987.

The inspector reviewed Procedure No. M-64.1.1, Revision 0, the inspection records and work authorizations for replacing jumper wire for valve Nos. MOV-852A (inside containment) and MOB-871B (outside containment). The inspector physically inspected MOV-852A verifying that the replacement had been made with qualified Anaconda NSIS wire.

Within the scope of this inspection no deficiencies were identified.

8.0 EQ Maintenance Program

The EQ maintenance requirements are defined in Appendix E of the licensee QA manual. The required maintenance is specified in the EEQ-1 form and transmitted to the I&C supervisor at the plant site for implementation.

Implementation of the maintenance requirements is described in procedure No. A-1006 "EQ Maintenance Program-1987" Revision 2, Attachment 1, listing all required EQ maintenance, maintenance frequencies, prior maintenance activities and scheduled maintenance activities.

EQ activities are not restricted to any one group. The Electrical Maintenance group and the I&C group, at the site are both responsible for performing EQ maintenance activities. Both groups report to the I&C supervisor who is responsible for preparing the EQ maintenance procedures to cover specific and generic maintenance activities. Before specific maintenance is done the I&C supervisor issues a Maintenance Request (MR) to the maintenance foreman who assigns experienced craftsmen to perform the activity.

The inspector reviewed the following procedures used in performing the EQ maintenance activity.

- Procedure No. M-51.13 "Maintenance and/or Replacement of Valcor Solenoid Valves" Revision 1, dated February 10, 1987.
- Procedure No. A-1007 "Limitorque Electrical Preventive Maintenance Program-1987," Revision 0, dated January 29, 1987:-
- Procedure No. M-64.1.1 "Electrical Maintenance and Inspection of Environmentally Qualified Motor Operated Valves", Revision 0, dated February 18, 1986.



- Procedure No. CP-430 "Calibration and/or Maintenance of Pressurizer Pressure Channel 430," Revision 5, dated February 10, 1987.

Upon completion of the maintenance package, the MR is returned to the I&C supervisor for review and incorporation into an attachment to Procedure No. A-1006.

Two MR packages were selected at random to verify procedural implementation as follows:

- Calibration Package on Procedure No. CP-482 "Calibration and/or Maintenance of Steam Generator Pressure Channel 482" for Instrument Nos. PT-482, PQ-482, PM-482A&B and PC-482A.
- Electrical Maintenance package for Limitorque Motor Operated Valve Nos. MOV-852A and MOV-871A.

Within the scope of this inspection no deficiencies were identified.

9.0 EQ Procurement Control

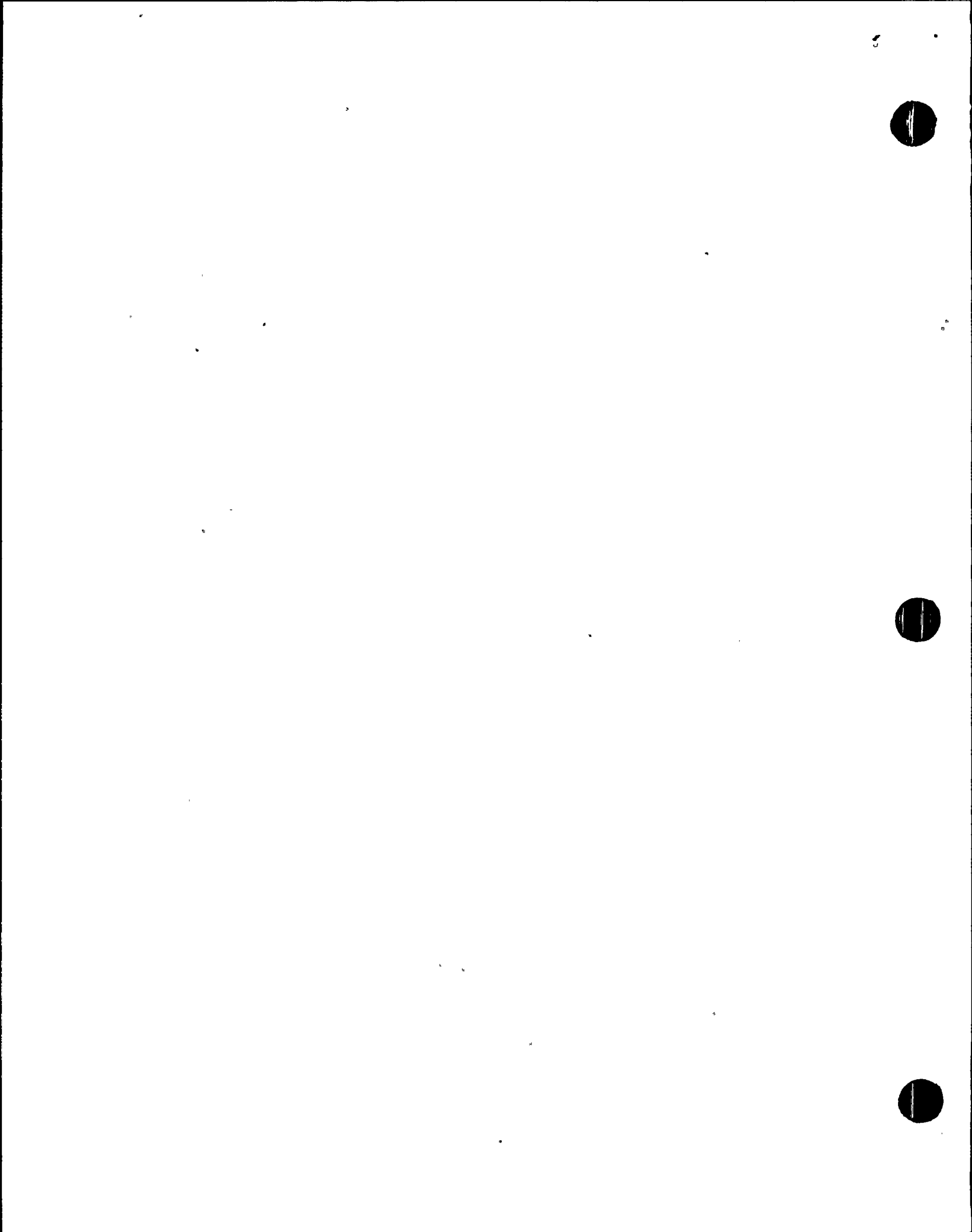
The requirements for procurement of new equipment and components are defined in Section 4 of Appendix E of "QA Program for Equipment Replacement, Maintenance and Additions". The implementation of these requirements is described in Procedure No. A-401 "Control of Procurement Documents Prepared at Ginna Station" Revision 15, dated January 29, 1987.

The procurement of new EQ Items are handled by the Corporate Procurement Specialist, who prepares and issues purchase orders, negotiates prices and shipment. New EQ items are required to comply with 10 CFR 50.49 unless "sound reasons to the contrary" can be justified. This is accomplished by using the EEQ-2 Form "IEEE-323-1974 Waiver Authorization". New EQ items that cannot meet the 10 CFR 50.49 requirements are identified on Form EEQ-2 and forwarded to licensing engineering personnel for evaluation and approval.

Procurement of spare parts is handled by the Site Procurement Specialist. Procedures similar to that described in "EQ Procurement Control" are used to assure that the new replacement parts are qualified. EQ requirements are itemized in the purchase requisition which is forwarded to EQ personnel for review and approval.

The inspector reviewed Purchase Order Nos. N-Q-10425-B-GE, PR-99025N (ASCO Solenoid Valves), PR-N-89798 (Conax Seal) and PR-N87843 (Raychem Splice Kits). The NRC inspector verified use of the EEQ-2 form and compliance with procedure No. A-401 for controlling procurement of EQ items.

Within the scope of this inspection no deficiencies were identified.



10.0 EQ Control of Plant Modifications

Procedure No. QE-310 "Design Interface Control" provides necessary controls and responsibilities for design and review of plant EQ modifications. Accordingly, an Engineering Work Request is issued and the responsible engineer establishes the technical requirements including: a) design analysis, b) engineering drawings, c) engineering specifications, d) installation instruction, and e) test procedures. The responsible engineer also performs the safety evaluation to determine if the proposed EQ modification involves a change in the technical specification or is an unreviewed safety issue, in accordance with 10 CFR 50.59.

The inspector reviewed two Engineering Work Request packages, EWR-3697 and EWR-3262 to verify compliance with established procedures. The packages contained documentation on design criteria, safety analysis, engineering change notices, field change requests, non-conformance report, procurement documents, vendor manuals, drawings and modification related correspondence. The Receipt Inspection Report and procurement documentation was missing from one of the packages. However, the licensee was able to retrieve the information and replace it in the proper package before the conclusion of the inspection.

Within the scope of this inspection no deficiencies were identified.

11.0 EQ Personnel Training

Procedure No. QE-102 "Indoctrination Training" provides the necessary instructions to implement portions of Section 1 of the Quality Assurance Manual. The procedure provides for indoctrination in regulations, codes, standards, the Quality Assurance Manual and its Appendices and training in Engineering Procedures of engineering personnel responsible for performing activities affecting quality and to assure that they are knowledgeable in quality assurance procedures and EQ requirements. All indoctrination is conducted by cognizant personnel assigned by the Director of Engineering Services. Engineering personnel performing EQ safety related activities must attend relevant indoctrination classes assigned by the respective Manager or Supervisor.

The assigned instructor must document the attendance at each indoctrination and training session and record the length of the training session and verify the record by signing and dating the form.

Training may consist of individual training, training class or by reading and attesting to the reading of new or revised procedures.

The inspector reviewed several training records verifying EQ personnel training and attendance.

Within the scope of this inspection no deficiencies were identified.



12.0 Environmental Qualification Files (EQ)

12.1 Scope of EQ File Inspection

The licensee's EQ files were examined to verify the qualified status of equipment within the scope of 10 CFR 50.49. In addition to comparing plant service conditions with qualification test conditions and verifying the basis for these conditions; the inspectors selectively reviewed areas such as required post-accident operating time compared to the duration of time the equipment has been demonstrated to be qualified; similarity of tested equipment to that installed in the plant (i.e. insulation class, component materials, test configuration versus installed configuration and documentation for both); evaluation of adequacy of test conditions, aging calculations for qualified life and replacement interval determination; effects of decrease in insulation resistance on equipment performance; adequacy of demonstrated equipment accuracy; evaluation of test anomalies; and applicability of EQ problems reported in IE Bulletins and Information Notices and their resolutions.

The inspectors reviewed 27 of 48 EQ files. The types of equipment covered by these files included areas such as electrical cable, limitorque motor operated valves, motors, solenoid operated valves, pressure transmitters, cable splices, radiation detectors and resistance temperature detectors. An equipment type is defined as a specific type of electrical equipment, designated by the manufacturer and model, which is representative of all identical equipment in the plant area exposed to the same or less severe environmental service conditions.

The inspectors identified several file deficiencies consisting of 1) missing performance and acceptance data; 2) no indication that a file has been reviewed or that a walkdown verification of the installed equipment has been done to assure completeness of the file; or 3) non-compliance with 10 CFR 50.49 requirements. Many of the file references are very general. These files lacked specific references to supporting data to allow a determination of the adequacy of the qualification data. In addition, applicable Information Notices and the final disposition of issues raised in the TERs are not addressed in the EQ files. The EQ files do not contain a positive statement by the licensee that the equipment is qualified for its application. The identification of the plant equipment to which each EQ file applies is addressed as a general description, not as specific component numbers.

Based on this review and discussions with the licensee on correcting the file deficiencies, this item is unresolved pending NRC review of licensee corrective action for updating EQ files. (50-244/87-03-01)



12.2 Crouse-Hinds Electrical Penetrations, File No. 8

This file described all of the Crouse-Hinds containment penetrations used for control and instrument circuits. Qualification was stated to be to DOR Guidelines. The file consisted of an accumulation of sketches, certifications, test reports with related correspondence, and some vendor information. However, there was nothing to relate that information to the installed penetrations which had been identified by the vendor with model and serial numbers. Other information provided during the inspection revealed that there were over 20 penetrations, 2-3 inboard insulator types in various sizes, 7 inboard head configurations (insulator size and layout) and 2 types of connecting cable between the inboard and outboard heads.

The main problem with the file was that similarity was not established between the installed penetrations and the applicable qualification test. There was insufficient descriptive information about the penetrations to support the licensee's claim that they were similar. In addition, a Westinghouse letter in the file which identified the referenced qualification test as the applicable one cautioned that Westinghouse had made design changes in the region of the external surface of the inboard head. The Westinghouse letter, dated October 10, 1980, also states that: "the Brunswick data is applicable to qualify the seal, canister and internal components, but cable, cable splices and connector must be qualified by other data." Procurement information in the file suggested that the penetrations had been manufactured by Westinghouse rather than Crouse-Hinds, although the installed penetrations examined by the inspector had Crouse-Hinds data plates.

The licensee had expended significant effort in obtaining information on the individual insulators which are mounted on the inboard heads of the penetrations and are the heart of the sealing/insulating system. This information showed that no degradable components were present. Additional qualitative evaluations had been made concerning degradable materials on the inboard surfaces of the heads and the cables between the inboard and outboard heads. The licensee concluded that since the silicone rubber potting and the phenolic disk on the inboard surfaces provided neither a sealing nor an insulating function they were not of concern. The effects of the products of degradation, or geometry changes resulting from degradation, on insulator to head resistance or insulator to insulator resistances were not considered. The licensee concluded that; in the absence of an electrolyte such as steam or spray inside the penetration, the degradation of the cable insulation itself would not cause degraded cable performance. The licensee did not consider the effects of humidity or of other moisture sources such as the gas used to test the penetration. The inspector concluded from this that the analyses with respect to radiation and aging effects in the LOCA DBA were incomplete.



Subsequent to the inspection, the licensee has shown that except for minor material changes (to non-organic materials) the RG&E penetration and the one shown by the Crouse-Hines drawing No. 0100350 are basically the same. In addition, the licensee has indicated that the penetrations insulator/insulation is shielded from the products of degradation that could affect the insulator/insulation resistances. This information will be incorporated into the EQ file.

Other file defects which were satisfactorily addressed during the inspection were as follows:

- (1) While interface requirements were missing from the file as originally reviewed, the licensee was able to show that qualified splices were used for electrical interfaces.
- (2) The inspector accepted a loop analysis for cable as an adequate specification of plant performance/acceptance criteria which were not originally included in the file.

Based on the above review, the inspector concluded that prior to this inspection the licensee had not adequately demonstrated qualification of the penetration since similarity between the test specimen and the installed units had not been established. This is a violation of 10 CFR 50.49 paragraph (F) and (K) (050-244/87-03-02)

12.3 Westinghouse Penetration AE-12, File No. 9

This file described the Westinghouse penetration presently used for TV signals and which is qualified to DOR Guidelines. While the penetration is stated to be qualified for low EMF instrument circuits 10-50 ma DC at less than 90V DC, or control circuits less than 120V AC/125V DC and 5 amps, the file contained no plant performance/acceptance criteria for comparison with test results. A loop analysis for cable was provided during the inspection which the inspector accepted as applicable to the penetration. The file contained a statement that the Ginna penetration was similar to one tested elsewhere, and a Westinghouse letter provided certification of similarity. While the file contained insufficient descriptive information of either penetration to allow an evaluation of similarity, and neither the model numbers nor the drawing numbers matched, there were a series of proposal, procurement, specification and other documents which the inspector accepted as sufficient evidence of similarity.

Within the scope of the inspection no deficiencies were identified.



12.4 PVC Cable (General Cable Corp.), File No. 44

This cable is used throughout the containment in locations which would experience doses up to 1.4×10^7 Rads in a LOCA DBA. The file contained a number of deficiencies which were primarily a result of the licensee relying on a generic test run under idealized conditions. The Ginna cable was stated to be similar to PVC cable tested at Wyle Labs and reported in Wyle Test Report 45307-1 dated December 23, 1981. The tested cable was not identified other than "CP&L PVC cable." The test specifications stated that the cable was not to be moved in the simulated cable tray after irradiation. In addition, the mandrel test was omitted for the PVC cable. Acceptance criteria met by the cable at various stages in the testing were as follows: First, insulation resistance (500V DC for 1 minute) Dielectric strength at 1250V AC 60 HZ of 0.5 ma; and second, 1 megohm - no flashover, continuity, visual inspection - no obvious damage.

The acceptability at this level of performance was not addressed for Ginna in quantitative terms. No Ginna plant performance/acceptance criteria were specified. While the loop analysis provided during the inspection should be an adequate specification of required insulation resistance for this cable, it could not be determined that these requirements were met by the Wyle test during LOCA (steam) exposure.

An additional test of a sample of a Ginna General Cable PVC cable was just being completed at the end of the inspection.

Preliminary test results, reported verbally to the licensee by the testing facility during this inspection, indicates that the PVC cable is qualified for use in the Ginna LOCA DBA environment. Written confirmation of the test results was received by the licensee on February 12, 1987. The test report was released to the NRC for review but later withdrawn so that the licensee could perform its own review and evaluation.

Based on the above review, the inspector concluded that prior to this inspection the licensee had not adequately demonstrated qualification of the subject cable since similarity between the test specimen and the installed cable has not been established. This is a violation of 10CFR 50.49 paragraph (F) and (K) (050-244/87-03-03).

12.5 Coleman Cable, File No. 13

The inspector reviewed the Coleman cable file for inside containment use of the cable. Qualification was a on test results from The Franklin Research Center Test Report No. F-C5074.



The inspector noted the following deficiencies in the use of the test report to support qualification of the Coleman Cable. Of the seven test specimens used in the qualification test, none were identified as Coleman cable test specimens. The licensee claims to have sent a section of Coleman cable taken from the plant, however, no records or documentation of the sample and shipment were available.

In reviewing the Franklin test report, the inspector observed that insulation resistance measurements (as leakage currents) were not taken during the simulated LOCA tests. This information is important to establish cable qualification for cable used in instrument circuits. Small leakage currents (10-20 ma) would not be detected by the test configuration described in the report. However, with this leakage current applied to the transmitter current loop (typically 10-50 ma or 4-20 ma) unacceptable errors may be introduced.

The licensee has stated that they are in the process of testing the Coleman Cable. Preliminary test results, reported verbally to the licensee by the testing facility during the inspection, indicates that the Coleman cable is qualified for use in the Ginna LOCA DBA environment. Written confirmation of the test results was received by the licensee, however, the test report was not available for NRC review since the licensee had not completed its review and evaluation of the test results.

Based on the above, the inspector concluded that prior to this inspection the licensee had not adequately demonstrated qualification of the Coleman cable. Similarity of the test specimens and the installed cable had not been established. This is a violation of 10 CFR 50.49 paragraph (F) and (K) (050-244/87-03-04).

12.6 Raychem Cable Splice - Information Notice 86-53/File No. 12A, B & C

Prior to issuance of Procedure No. A-1404, Revision 8, the licensee did not have a formal program to address Information Notices/Bulletins. In reviewing the licensee file on Information Notice 86-53, there was no indication that the licensee had taken any action to determine the applicability of the Notice to the Ginna site. The file contains an internal memo dated July 21, 1986 indicating that an NRC inspection may be conducted, however, there was no evidence that an evaluation or recommendations on technical content of the notice had been performed.



During this inspection, the licensee indicated that the test program was in progress and that preliminary telephone information indicated there were no problems with the Raychem tests. A preliminary report was received on Friday, February 13, 1987 the last day of the inspection and which was given to the NRC for review. However, the report was withdrawn since the licensee had not evaluated its contents.

The licensee assembled an EQ file No. 12 A, B & C for Raychem splices. The file contains vendor catalogs, instructions and procedures for installing the various types of Raychem splices.

Splice qualification has been established by Raychem for various types of splice configuration. Applicable test reports are included in the file.

There was no evidence to indicate that the licensee had performed an inspection to determine the adequacy of installed Raychem splices. (Reference paragraph 13)

12.7 Victoreen High Range Radiation Monitor (HRRM), File No. 36

The inspector reviewed the EQ file for the Victoreen HRRM Model 877-1-5. This equipment is used to provide containment radiation level readings to operators and is not used for initiation of any plant signals. Qualification is based on DOR guidelines. The plant profile was enveloped by the test conditions similar to IEEE-Std-323 profile. The cable/connector assembly (Model 878-1-5) on the test specimen was different from the equipment installed in the plant. A similarity analysis of the test specimen and the installed configuration was provided to justify the difference between the two. The HRRM cable connector assembly installed at Ginna Station is jacketed with a Raychem Shrink fit sleeve with approximately one inch overlap beyond the first mating interface at the cable/connector assembly and ending at the detector base plate. No attempt was made to seal the interface between the Raychem Shrink sleeve and the detector base plate against moisture intrusion. Visual inspection, by the NRC inspector, of the installed configuration confirms the exposed connector surfaces subject to moisture intrusion. (Reference paragraph 13)

Based on the above, the inspector concluded that prior to this inspection the licensee had not adequately demonstrated qualification of the cable/connector assembly and detector interface. Section 5.0 Qualification Methods, paragraph 6 Installation Interfaces of Guidelines for Evaluating Environmental Qualification of Class IE Electrical Equipment for Operating Reactors (commonly referred to as "DOR Guidelines") states that: "Equipment...electrical...seals used during type test should be representative of actual installation for the test to be considered conclusive".



This is a violation of 10 CFR 50.49 paragraph (f) and (k) (050-244/87-03-05).

12.8 Conax Connector, File No. 37

The inspector reviewed the Conax Connector EQ file for Conax Connector Model Nos. N-24154-0, N-21457-0, N-24156-04 and sub-assembly Nos. N-29074-012, N-32075-02, N-4509-12 and N-59017-01 core exit thermocouple assemblies for providing display of Reactor Coolant System temperature in the Reactor Vessel. Qualification was based on IEEE-Std-323-1974. The plant profile was enveloped by the test conditions similar to the IEEE-Std-323 profile. The tested specimens are identical to the equipment installed in the plant. However, insulation resistance during the test and post test were reported, but no correlation between the increased current leakage in the assemblies and the potential errors in the temperature measurements was found. The error analysis for the core exit thermocouple circuits was provided by the licensee during this inspection using readily available data from another source. This data will be incorporated in the EQ file as reference 3.6.10.

Within the scope of the inspection no deficiencies were identified.

12.9 Asco Solenoid Valves, File No. 1

The inspector reviewed the EQ file for Asco Solenoid Valve, Model No. 7970A, Series B. Qualification was based on IEEE-Std-323-1974. The plant profile was enveloped by the test conditions similar to IEEE-323 profile. The test specimens are identical to the equipment installed in the plant. References to applicable Information Notices 82-52 and 83-57 were not included in the EQ file. Information Notice 85-17, which reports on sticking solenoid operated valves resulting from microscopic foreign substances on the lower core/plug nut interface was referenced in the EQ file. Licensee response to this Information Notice was that no maintenance was required since the new models, recommended in the Notice, contained Ethylene Propylene Rubber (EPR) elastomers as did those installed in the Ginna Station. The inspector considered this response inadequate since there was no indication in the Notice that the collection of foreign substances was traceable to the formulation of polymer used. This specific example of the inadequacy of the file data, should be addressed in licensee response to paragraph 12.1, covering the generic issue of missing and incomplete EQ file data.

Within the scope of the inspection no deficiencies were identified.



12.10 Brand-Rex Cable, File No. 41, Revision 1

The inspector reviewed the Brand-Rex EQ file for inside containment application to determine whether the file contains sufficient information to qualify the Brand-Rex cable for the environmental condition in which it must function.

The qualification file makes reference to Brand-Rex Report No. QULT-7600 "Long Term". The smallest cable size tested was 16AWG. There was no justification or similarity analysis in the EQ file for the 22AWG cables for incontainment application. However, the licensee was able to perform an evaluation, using readily available cable data, during this inspection that showed the 22AWG cable insulation thickness and jacket thickness exceed those of the 16AWG cable. The greater thickness translates into higher insulation resistance. The inspector had no further questions. The licensee incorporated the additional data into the EQ file. Within the scope of this inspection no violations were identified.

12.11 Limitorque Motor Valve Operators (MOV) - File No. 7, Revision 3

The inspector reviewed the EQ file for Limitorque MOV Model No. SMB-1 used inside containment. MOV No. 852 A and B is used to open valves 852A and B upon receipt of a safety injection signal to allow low head upper plenum safety injections.

No open items/concerns were noted during the file review for the valve operators.

Valve operator No. 852B was not accessible during the plant walkdown due to its location in a high radiation area, however, valve operator No. 852A was examined. The Limitorque Motor Operator Valve identification name plate did not designate Type B insulation for the motor. Instead, the motor was designated Code M with a temperature rise of 75 degrees C. The file specifies type B insulation. There was no written verification or correlation between the Code M motor and a type B insulation motor in the file.

The licensee was able to verify the type B motor rating for these motors with the manufacturer and will include this data in the file.

During this inspection, TER item 18, concerning aging was reviewed and found to be acceptable.

12.12 Transamerica-DeLaval Level Switches - File No. 34 Revision 0

The inspector reviewed the EQ file for Level Switch Part No. LS57761 used on containment sump B for Level indication.



During the file review it was noted that Form EEQ-1 specified a required test pressure of 60 psig and that the test specimen was qualified to 60 psig. This does not allow for sufficient margin as required by IEEE-Std-323-1974 and 10 CFR 50.49 paragraph (d)(8).

The licensee determined that Figure XII-1 of Wyle Report No. 45700-2 shows a pressure peak of 66 psig and that the pressure shown on Form EEQ-1 (60 psig) is a typographical error. The licensee revised the EEQ-1 form to reflect the actual pressure indicated in Figure XII-1.

Based on the references supplied, equipment qualification is established in accordance with the guidelines of IEEE-Std-323-1974.

13. Physical Inspection of Electrical Equipment

The plant walkdown of environmentally qualified equipment was limited to safety-related equipment selected from the EQ Master List. Items selected for examination included Pump Motors, Limitorque Motor Operated Valves, Electrical Penetrations, Cable, Cable Splices, Connectors, Solenoid Operated Valves and High Range Containment Radiation Monitor.

The NRC inspectors examined characteristics such as mounting configuration, orientation, connection interfaces, bend radius, Model and Instrument type, cleanliness and physical condition.

During this inspection deficiencies were identified in two areas, the Containment High Range Radiation Monitor and the Raychem Heat Shrink Tube (HST) In-line Splices

The NRC inspector noted that the Containment High Range Radiation Monitor cable/connector assembly was not completely covered by the Raychem HST. The Raychem HST splice is used to prevent moisture intrusion in the cable connector interface. The amount of HST shrinkage at the connector end was sufficient to expose the connector/detector interface. Exposure of the connector/detector interfaces would subject the connector assembly to moisture intrusion and circuit failure in accident conditions. Qualification data to support the installed configuration was not available. (reference paragraph 12.7)

The NRC inspectors examined Raychem HST Splices in Electrical Penetrations (containment side) and in several electrical junction boxes. In penetration Nos. CE-5 and CE-6 the inspector observed Raychem HST splices that did not meet the minimum 2 inch seal overlap and the minimum 5xO.D. of HST bend radius. Cable bundle No. 12 contained HST splice seal overlap of 3/4-1 inch. Cable No. R-69 and R-341 were observed to have HST splice bend radius of approximately 1 inch.



Pig tail leads (circuits 6-349, 6-350) from ASCO Solenoid Valve No. 5872 had HST splice bent at right angle.

The licensee was not able to provide support documentation prior to this inspection to qualify the installed configuration for Raychem HST splice seal overlap of less than 2 inch and bend radius of less than 5xO.D. of HST.

The licensee has indicated that a test program is in process to determine minimum environmental seal length for Raychem cable splices and to establish minimum splice bend radius requirements.

Preliminary test results, reported verbally to the licensee by the test facility during this inspection, indicates that a Raychem splice seal length of $\frac{1}{2}$ inch is qualified and that there was no minimum bend radius established for which failure occurred. The report (NTS No. 22775-87N) was not available for NRC review since the licensee had not completed its review and evaluation of the test results.

This item is a violation of 10 CFR 50.49, paragraph J (050-244/87-03-06).

14.0 Unresolved Item(s)

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items or violations. An unresolved item identified during this inspection is discussed in Details, paragraph 12.1.

15.0 Exit Meeting

The inspector met with licensee corporate personnel and licensee representatives (denoted in Details, paragraph 1) at the conclusion of the inspection on February 13, 1987. The inspector summarized the scope of the inspection and the inspection findings.

At no time during this inspection was written material given to the licensee.

11-11-11

