



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

Report No.: 50-400/85-43

Licensee: Carolina Power and Light Company
 P. O. Box 1551
 Raleigh, NC 27602

Docket No.: 50-400

License No.: CPPR-158

Facility Name: Harris Unit 1

Inspection Conducted: October 20 - November 20, 1985

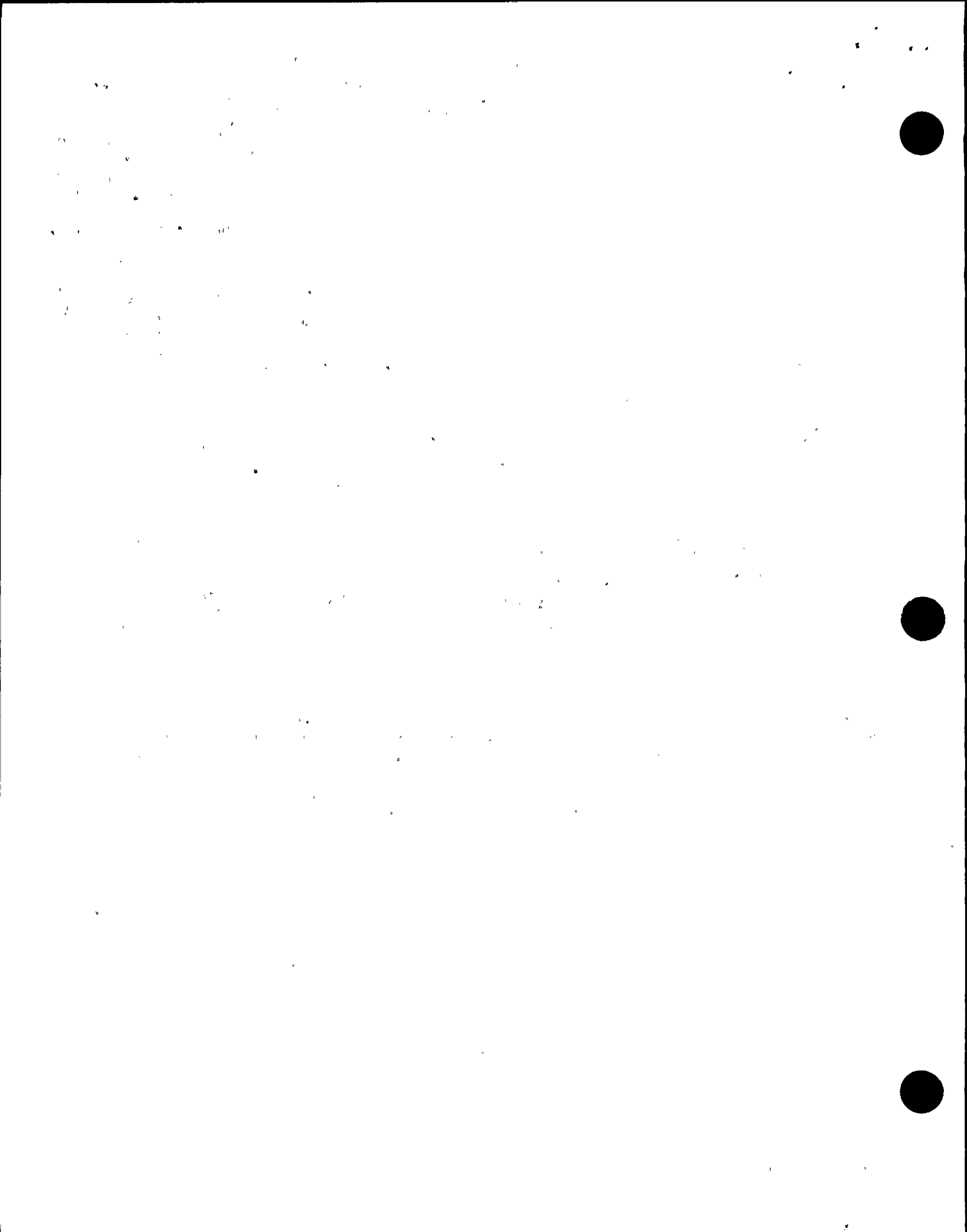
Inspectors: <u>J.S. Mellen</u>	<u>1/2/86</u>
For: G. F. Maxwell	Date Signed
<u>J.S. Mellen</u>	<u>1/2/86</u>
For: S. P. Burkis	Date Signed
Approved by: <u>P. E. Fredrickson</u>	<u>1/2/86</u>
P. E. Fredrickson, Section Chief	Date Signed
Division of Reactor Projects	

SUMMARY

Scope: This routine, announced inspection involved 222 resident inspector-hours on site in the areas of: Integrated Design Inspection, Meeting with Public Officials, Fire Prevention/Protection, Preoperational Test Program, and Other Activities.

Results: No violations or deviations were identified.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

N. J. Chiangi, Manager, QA/QC Harris Plant
J. M. Collins, Manager, Operations
G. L. Forehand, Director, QA/QC
J. L. Harness, Assistant Plant General Manager, Operations
C. S. Hinnant, Manager, Start-up
L. I. Loflin, Manager, Harris Plant Engineering Support
D. A. McGaw, Superintendent QA
C. L. McKenzie, Acting Director, Operations QA/QC
G. A. Myer, General Manager, Milestone Completion
R. M. Parsons, Project General Manager, Construction Confirmation
Completion
M. Thompson, Jr., Manager, Engineering Management
D. L. Tibbitts, Director, Regulatory Compliance
B. Van Metre, Manager, Harris Plant Maintenance
M. D. Vernon, Superintendent QC
E. J. Wagner, Manager, Engineering
C. C. Wagoner, Project General Manager, Construction
R. A. Watson, Vice President, Harris Nuclear Project
J. L. Willis, Plant General Manager, Operations

Other licensee employees contacted included ten construction craftsmen, six technicians, 12 operators, and 22 engineering personnel.

2. Exit Interview

The inspection scope and findings were summarized on November 22, 1985, with the Plant General Manager, Operations. No written material was provided to the licensee by the resident inspectors during this reporting period. The licensee did not identify as proprietary any of the materials provided to or reviewed by the resident inspectors during this inspection.

3. Integrated Design Inspection (IDI) (92701)

The resident inspectors reviewed the corrective action for several items which the IDI team documented in Supplement 1 to the IDI report 50-400/84-48. The status of these items is as follows:

- a. Item D.2.6-1 "Installation of Charging Pump Room Air Handling Units". This item involved concerns with respect to the field installation of the charging pump room air handling units. Specifically, the anchor bolts were not torqued to 19 KIPS as assumed in the design analysis and the equipment installation packages were not complete. The licensee has reviewed the Seismic Qualification Report and noted that none of the anchor bolts experience uplift in a seismic event.



Since shear is the primary force considered in the analysis, bolt preload is only critical to assure contact between nut and bolted surface, and "snug tight" as defined in Work Procedure 105 is sufficient. This assessment has been confirmed by the design organization that performed the original analysis.

With respect to the completeness of equipment installation packages, the licensee informed the team of an ongoing special effort at the site to reassemble the equipment installation packages prior to system turnover. A special group with an approved plan to correct the problem of fragmented installation packages was established prior to the Integrated Design Inspection cutoff date. The team reviewed the plan and implementing procedures, and found them acceptable.

The resident inspectors evaluated the licensee's ongoing efforts concerning the equipment installation package concept. CP&L requires the responsible mechanical engineering group to make sure that equipment installation packages are available, complete and correct prior to a system being turned over. This activity has been previously evaluated by Region II inspection personnel and is routinely evaluated by the resident inspector staff.

- b. Item D.4.5-6, "Design of Masonry Walls Around Stairway A-4". The as-built condition of masonry walls around stairway A-4 did not agree with the design as described in FCR-AS-1045. These differences made the as-built walls less conservative than the requirements of the design. The response from the applicant indicated that the as-constructed condition was not what the FCR showed as-built, but Carolina Power and Light (CP&L) informed the team during the reinspection that they would make sure that the design on the FCR would be adhered to.

The resident inspectors evaluated the as-constructed condition of the masonry wall around stairway A-4. The inspectors observed that CP&L initiated FCR-PW-AS-1045 to document the proposed changes to the wall. On or about April 16, 1985, FCR/PW-AS-1045 was voided and the masonry wall was torn down and reconstructed to meet all of the requirements of the original design. The inspectors evaluated the QC inspection records and found that the rework began around mid-April and was accepted on June 30, 1985.

- c. Item U5.3-1, "Independence of Electric Systems". This item questioned the inconsistency between the FSAR description and the actual design of the load shedding philosophy for nonsafety loads on safety buses. The team reviewed Design Change Notice DCN 251-532 (Train A) and DCN 251-533 (Train B) with the accompanying control wiring diagrams. The team was satisfied that, following implementation of these Design Change Notices, the nonsafety loads would be shed from the safety buses during a LOCA-only condition. The team found this response to be acceptable.

The resident inspectors evaluated the implementation of the above DCNs and observed that electrical design changes have been made to the sequencer panels. The inspectors reviewed the QC documentation for the two sequencer panels. The documents indicate that the electrical modifications were completed about June 15, 1985 and were inspected and accepted in accordance with the applicable construction procedures (TP-68).

- d. Item D5.4.2, "Motor-Operated Valve Thermal Overload Protection". This deficiency identified the incorrect application of motor starter thermal overload heater valves. The team reviewed the new criteria included in FCR-E-4980 and accompanying drawing CAR-2166-B-041, sheets 4A and 4B, for the protection of motor-operated valves. The team also reviewed Start-up Procedure 1/2-9000-E-06, Revision 5, which now includes an acceptable method for sizing overload heaters for motor-driven valve operators. The team found this response to be acceptable.

The resident inspectors verified that FCR-E-4980 had been completed. The inspectors interviewed preoperational test personnel and reviewed the data sheets implementing Procedure 9000-E-06 for two systems and found that the procedure is being correctly implemented.

- e. Item D5.4-4, "Station Service Transformer Protective Relaying". This deficiency identified inadequate protection for the class 1E station service transformers which permitted the transformers to be overloaded by 39% of their qualified rating. The team reviewed new calculation E2-002-02 which resulted in the overcurrent relay setting being reduced by one tap. The relay will now provide an overcurrent protection of 125% of the transformer's qualified rating. While the team preferred the relay setting reduced by an addition tap (which would have still permitted an 11% current swing for the system transients), the team considers the approach to be acceptable, in light of the fact that the licensee has in place a load management program (see response to D5.5-1).

The resident inspectors observed that CP&L has developed a design procedure (7.5.L) titled "System Load Analysis Program" which monitors loading on all 480V class 1E buses. The design procedure requires that any further proposed bus loading be analyzed by Harris Plant Engineering to make sure that the total actual power bus load does not exceed the transformer qualified rating.

- f. Item D.5.5-2, "DC Equipment Rated Maximum Voltage". This deficiency questioned the design basis for the dc system maximum permissible voltage. The licensee is presently conducting a survey of the dc system and vendor data which will document the maximum permissible voltage of class 1E dc equipment. The team reviewed the methodology and results to date of that survey. The team is satisfied that, based on no problems being detected by the survey, and the extent of the

review already completed by the licensee, and the commitment to complete the survey, no questions will remain with the maximum permissible dc system voltage of 140 volts.

The resident inspectors evaluated additional information which Ebasco has provided for this IDI item and found that engineering has completed the evaluations which were required to resolve this item.

- g. Item D5.5-4, "DC System Minimum Voltage". This deficiency identified errors in the assumptions used in the calculations of voltage drop for the switchgear control circuits. The team also reviewed Revision 3 to Calculation 44-SKD which used the results of Calculation 20-WRE for the safety-related circuits. The team also reviewed DCN 251-572 which calls for the addition of interposing relays in the closed circuits of the preferred and backup power supply to the safety-related 6.9 Kv buses. Based on the commitment to add interposing relays to permit remote manual operation of these safety-related breakers from the control room, the team found this response to be acceptable.

The resident inspectors found that DCN 251-572 has been implemented and the work has been completed.

- h. Item D5.6-1, "Penetration Protection Qualification". This deficiency identified a single failure potential with the redundant protection of the electrical containment penetrations for the reactor coolant pump motors. The team reviewed Design Change Notice DCN 251-554 which will add a Train B overcurrent trip to the primary breaker protection and will provide an additional input to the backup breaker. A minor documentation error was noted by the team on control wiring diagram 2166-B-401, sheet 1621, which EBASCO committed to correct for all four backup breakers. The team found this design change an acceptable response to this deficiency.

The resident inspectors verified DCN 251-554 and an applicable Field Change Request, FCR-E-5421, had been implemented and the work had been completed.

- i. Item D5.7-1, "Use of Motor Data in Setting Procedure". This deficiency identified a problem with the use of assumptions in the selection of 480 volt motor protection. The team reviewed calculations used for selection of 480 volt motor protection. The team reviewed calculations E1-001.1 through E1-001.4 for the large safety-related 480 volt motors and FCR-E-5114 which revised the overcurrent relay settings as a result of the new calculations. The team identified an inconsistency on the relay setting drawing for the residual heat removal pump motor which was acknowledged and corrected by the licensee. The team agreed with the resulting overcurrent protection for these large 490 volt motors and found this response acceptable.

The resident inspectors observed that CP&L has implemented a design procedure 7.5.G, titled "Protective Relay Settings and Coordination". As a part of the routine inspection, the resident inspectors have observed several instances where responsible operations maintenance personnel made changes to the relay settings for large 480 volt motors. The inspectors were shown the applicable design documents and noted that the relay settings were checked and changed as required to comply with FCR-E-5114.

- j. Item D5.9-1, "Reactor Vessel Level Instrumentation RCP Inputs". This deficiency identified multiple potential failures of the reactor coolant pump inputs into the redundant reactor vessel level instrumentation systems (RVLIS). The original design used a common reactor coolant pump switchgear breaker auxiliary contact, a common isolation cabinet power supply circuit and a common isolation relay to develop input to the redundant RVLIS cabinet. The team reviewed DCN 251-527 which revised the circuit so that the Train B RVLIS input uses a separate switchgear breaker auxiliary contact and a different isolation cabinet. The team noted that both isolation cabinets are powered from the same uninterruptible power supply but are on different circuits. The team considers that this response presents an acceptable level of redundancy between the sets of reactor coolant pump inputs to the RVLIS.

The resident inspectors verified that DCN 251-527 had been implemented and the work had been completed.

4. Information Meeting with Local Officials (94600C)

During the week of November 4, 1985 the Senior Resident Inspector and the Region II Reactor Projects Section Chief for CP&L conducted meetings with local public officials. Those officials included the mayor of Holly Springs, the mayor of Apex, the mayor of Fuquay-Varina and the Wake County Commissioner whose district encompasses the plant power block.

The officials were given a description of the mission and functional organization of the NRC and its relationship to the construction, preoperational testing and the status of major events yet to be accomplished. During the meetings the officials were encouraged to discuss items of general interest and concern as they related to the Harris Plant.

5. Fire Prevention/Protection (52051C, 71302)

- a. The inspectors observed the fire prevention and protection activities related to containing combustible materials where the ignition of these materials could damage safety-related structures. The inspectors also observed the ongoing site training activities for the construction fire brigade.
- b. Some of the specific areas observed by the inspectors during this period were:

- (1) Nonflammable protective coverings were observed over various safety-related pumps and components located throughout the plant.
- (2) The inspectors observed during the various tours of the reactor auxiliary building and the containment building that the accumulation of combustible materials in these areas was being minimized.
- (3) Flammable materials were stored to prevent or reduce the likelihood of combustion.
- (4) Welding activities were observed in at least ten separate locations throughout the site and in each instance it was observed that appropriate fire extinguishing equipment was available within close proximity of the welding activities. It was also noted that the portable fire extinguishers contained sufficient fire extinguishing medium, as evidenced by displaying current inspection stickers and having unbroken seals.
- (5) The inspectors observed that at the various elevations throughout the reactor auxiliary building and the containment building, fire suppression devices were strategically located and readily available for use.

No violations or deviations were identified in the areas inspected.

6. Preoperational Test Program (71302, 42400B)

- a. The inspectors conducted tours of the various plant areas. The following items were observed and assessed during the tours to assure compliance with requirements:
 - (1) The general condition of the Plant's housekeeping and the overall condition of equipment were observed.
 - (2) The plant was found to be free of any major fire hazards. Fire extinguishing equipment was readily available, and flammable materials were being protected from ignition sources and were being controlled in accordance with site administrative procedures.
 - (3) The inspectors observed electrical personnel placing cables in their respective cable trays and conduits. Sufficient care was being taken to prevent damage to the cables being placed and to cables which had already been installed.
 - (4) The inspectors looked for uncontrolled openings in previously cleaned or flushed systems or components. Where system openings were identified, cleanliness controls were established during flushing.



- (5) The inspector observed instances in which construction personnel were working on equipment which had already been turned over to the start-up group. The work was being accomplished under the proper administrative controls provided in the start-up manual.
- b. The inspectors evaluated the activities being conducted by the CP&L operators QA surveillance personnel. QA surveillance personnel were present and observed the major preoperational tests conducted during this reporting period. The results of their observations were promptly documented and distributed to those responsible for the activities which were observed.
 - c. The inspectors reviewed log books maintained by the test group to identify problems or plant activities that may be appropriate for additional follow-up.
 - d. The inspectors observed operations personnel deenergizing electrical components as required by the clearance program when equipment is being placed out of commission for repairs, tests or rework.
 - e. In addition to this review, the inspectors observed licensee, technical representatives and technical inspection personnel during an owners group certification inspection. This inspection was in progress to provide continuing baseline data for service during future diesel generator operations. The inspectors witnessed Fracture Analysis Associate's performance of nondestructive examination and inspection of the connecting rod bolt holes for the 1A-SA diesel generator. This inspection was performed to verify that the connecting rods were not unduly overstressed during initial assembly.
 - f. The inspectors walked down the chemical and volume control system to compare the as-built drawing to the actual installed system. This verification was performed to insure that: the physical installation was in accordance with CAR-2165-G-805; instrument lines were installed and connected to each instrument; all remote operated valves were operable; and all equipment installed was correctly identified. The inspector identified a valve with an incorrect identification tag attached to it, and the licensee planned to investigate the cause and correct this discrepancy.

No violations or deviations were identified in the areas inspected.

7. Other Activities (71302)

- a. The inspectors, while touring the site operation electrical work area, observed repairs being made on several Brown-Boveri, low-voltage circuit breakers. The repairs were being made due to failures of vendor installed pushrods for the main contacts. The inspectors will evaluate the ongoing repairs during subsequent inspections.



- b. During the week of November 18, 1985, an audit was conducted by NRC licensing personnel. The audit consisted of evaluating documentation for the environmental qualification of class 1E equipment and a tour of the facilities to observe the equipment which was identified.

No violations or deviations were identified in the areas inspected.