

NOTICE OF VIOLATION  
AND  
PROPOSED IMPOSITION OF CIVIL PENALTIES

Commonwealth Edison Company  
Quad Cities, Unit 1 and 2

Docket Nos. 50-254; 50-265  
Licenses No. DPR-29; DPR-30  
EA 88-161

During an NRC inspection conducted on April 18-22, May 2-6, 11, 31 and June 1, 1988 violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1988) the Nuclear Regulatory Commission proposes to impose civil penalties pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U.S.C. 2282, and 10 CFR 2.205. The particular violations and associated civil penalties are set forth below:

I. Violations Assessed a Civil Penalty

- A. Quad Cities Technical Specification 3.9.E.1 requires in part that whenever the reactor is in Startup Hot Standby or Run Mode and the unit or shared diesel generators and/or their respective associated buses are made or found inoperable except as provided for in 3.9.E.2 (performance of maintenance), operability shall be restored within seven days or the reactor shall be placed in cold shutdown within 24 hours.

Contrary to the above, from approximately July 11, 1986, to January 3, 1987, Quad Cities, Unit 2 continued in operation with the 1/2 Emergency Diesel Generator (EDG) being inoperable for a reason other than maintenance. The 1/2 EDG was incapable of automatically performing its intended safety function for Unit 2 due to an undetected failure (blown control power fuse) in the circuitry of the automatic start relay (ASR).

This is a Severity Level III violation (Supplement I).  
Civil Penalty - \$75,000

- B. 10 CFR 50.59(b)(1) requires that the licensee maintain records of changes in the facility, to the extent that the changes constitute changes in the facility as described in the Safety Analysis Report. Those records must include a written safety evaluation which provides the bases for determining that the change does not involve an unreviewed safety question. A proposed change involves an unreviewed safety question if the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the Safety Analysis Report may be increased.

Final Safety Analysis Report Section 8.2.3.2.2 states, "The 125 volt battery system operates ungrounded with a ground detector alarm set to annunciate the first ground. In addition, the ground fault resistance, and the time at which a ground fault occurs, is recorded by a recording voltmeter. Thus, multiple grounds, the only reasonable mode failure, are extremely unlikely."

Contrary to the above, at the time of the inspection the licensee did not have a written safety evaluation for operating the ungrounded ESS DIV 1 125 volt battery system from February 1986 until July 1986 with several grounds, constituting a change in the facility as described in the safety analysis report. This change involves an unreviewed safety question because it increase the probability of occurrence of a malfunction cause by the ESS DIV 1 125 volt battery system.

This is a Severity Level III violation (Supplement I).  
Civil Penalty - \$50,000

## II. Violations Not Assessed a Civil Penalty

- A. 10 CFR Part 50, Appendix B, Criterion III, Design Control, requires that measures be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions.

Contrary to the above, as of June 1, 1988, the licensee's design control program did not assure that the design basis was correctly translated into drawings. For example:

1. The "Diesel Emergency Auto Start Relay" circuit shown on drawing No. 4E-1350B, Revision AC, was also shown on drawing No. 4E-1656H, Revision J. However, the test switch was omitted from the circuit on drawing No. 4E-1656H, while the relay designations for ASR-1 relay and the switchgear cubicle number for 127B14-1X3 (3-4) relay contact were not shown on drawing No. 4E-1350B.
2. Discrepancies were identified in the electrical design drawings associated with Units 1 and 2, 125Vdc ground detection system. Drawing No. 4E-12685B, Revision Y and No. 4E-2685B, Revision S, did not represent the ground detection circuitry as it was installed in the field. In addition, S/D 4E-25755, Revision E, Annunciator Window No. 54, "125V Battery Ground" circuitry did not show the negative ground contact (11-12) in the alarm circuit.

This is a Severity Level IV violation (Supplement I).

- B. 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, requires that activities affecting quality be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances, and be accomplished in accordance with these instructions, procedures, or drawings.

Contrary to the above, as of June 1, 1988, certain activities affecting quality were either not prescribed or were not carried out in accordance with documented instructions or procedures of a type appropriate to the circumstances, in that:

1. The licensee did not have a procedure for or accomplish the lubrication of bearings and performance of certain other specified preventive maintenance activities on Limitorque motor operated valve actuators at 18 or 36 month intervals, although such activities were activities affecting quality, were appropriate to the circumstances, and were recommended in the vendor manual.
2. The licensee failed to perform preventive maintenance on 47 of 93 horizontal 4.16 kV electrical circuit breakers at the required interval, as required by procedure QEPM 200-1, "Inspection and Maintenance of 4.16 kV Horizontal Circuit Breakers", Revision 1.

This a Severity Level IV violation (Supplement I).

- C. 10 CFR Part 50, Appendix B, Criterion XVI, requires measures to be established to assure that conditions adverse to quality and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

Contrary to the above, the following conditions adverse to quality were either not promptly identified or promptly corrected:

1. On November 8, 1986, the 1/2 Emergency Diesel/Generator was manually started and connected to Bus 13-1 to provide power to Unit 1 during modification work in the electrical switchyard. The 1/2 Emergency Diesel/Generator feed breaker to Bus 13-1 subsequently tripped due to activation of the underexcitation relay. The licensee's corrective action included modification of the auto-start circuit; however, such corrective action did not correct the problem of activation of the underexcitation relay when manually starting the 1/2 Emergency Diesel/Generator.
2. During a monthly surveillance test on October 5, 1987, 4.16 kV breaker 152-2329, which connects the 1/2 Emergency Diesel/Generator with Bus 23-1, failed to close. Corrective action included cleaning and lubricating the trip latch rollers of breaker 152-2329 in accordance with an electrical preventive maintenance procedure; however, as of June 1, 1988, the licensee had not implemented corrective action to prevent

recurrence in that neither inspections nor preventive maintenance had been performed on the identical Unit 2 Emergency Diesel/Generator 4.16 kV breaker latch mechanism.

3. In 1980, the licensee identified recurring problems with binding of auxiliary contacts in 480 volt motor control centers; however, corrective action was not effected until July 1987.
4. In 1984, parallel isolation valves were replaced in Units 1 and 2. Due to operating problems, it was determined later in 1984 that a Unit 1 isolation valve was incorrectly installed and unable to isolate the condenser vacuum pump to prevent off gas radiation releases during reactor startup. Adequate corrective action was taken for Unit 1; however, a similar problem on Unit 2 was not identified and corrected until May 1988.

This is a Severity Level IV violation (Supplement I).

- D. 10 CFR Part 50, Appendix B, Criterion XVIII, requires that a comprehensive system of planned and periodic audits be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program.

Contrary to the above, during the period November 30 to December 4, 1987, the licensee conducted an audit (Audit QAA 04-87-55) of the maintenance program, which as described in the audit plan, included preventive maintenance; however, with the exception of four or five Environmental Qualification items, the audit did not verify compliance with and determine the effectiveness of the documented preventive maintenance program in that the examination of four or five items in one specific area does not constitute an audit of the full program.

This is a Severity Level IV violation (Supplement I).

Pursuant to the provisions of 10 CFR 2.201, Commonwealth Edison Company is hereby required to submit a written statement or explanation to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission within 30 days of the date of this Notice. This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each alleged violation: (1) admission or denial of the alleged violation; (2) the reasons for the violation if admitted; (3) the corrective steps that have been taken and the results achieved; (4) the corrective steps that will be taken to avoid further violations; and (5) the date when full compliance will be achieved. If an adequate reply is not received within the time specified in this Notice, an order may be issued to show cause why the license should not be modified, suspended, or revoked or why such other action as may be proper should not be taken. Consideration may be given to extending the response time for good cause shown. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

Within the same time as provided for the response required above under 10 CFR 2.201, Commonwealth Edison Company may pay the civil penalties by letter addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, with a check, draft, or money order payable to the Treasurer of the United States in the amount of the civil penalties proposed above, or may protest imposition of the civil penalties in whole or in part by a written answer addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission. Should the licensee fail to answer within the time specified, an order imposing the civil penalties will be issued. Should the licensee elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalties, in whole or in part, such answer should be clearly marked as an "Answer to a Notice of Violation" and may: (1) deny the violations listed in this Notice in whole or in part; (2) demonstrate extenuating circumstances; (3) show error in this Notice; or (4) show other reasons why the penalties should not be imposed. In addition to protesting the civil penalties, such answer may request remission or mitigation of the penalties.

In requesting mitigation of the proposed penalties, the five factors addressed in Section V.B of 10 CFR, Part 2, Appendix C (1988) should be addressed. Any written answer in accordance with 10 CFR 2.205 should be set forth separately from the statement or explanation in reply pursuant to 10 CFR 2.201, but may incorporate parts of the 10 CFR 2.201 reply by specific reference (e.g., citing page and paragraph numbers) to avoid repetition. The attention of the Licensee is directed to the other provisions of 10 CFR 2.205, regarding the procedure for imposing the civil penalties.

Upon failure to pay any civil penalties due which subsequently has been determined in accordance with the applicable provisions of 10 CFR 2.205, this matter may be referred to the Attorney General, and the penalties, unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234c of the Act, 42 U.S.C. 2282c.

The responses to the Director, Office of Enforcement, noted above (Reply to a Notice of Violation, letter with payment of civil penalties, and answer to a Notice of Violation) should be addressed to: Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington D.C. 799 Roosevelt Road, Glen Ellyn, Illinois 60137.

FOR THE NUCLEAR REGULATORY COMMISSION

  
for A. Bert Davis  
Regional Administrator

Dated at Glen Ellyn, Illinois  
This 15 day September 1988

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-254/88011(DRS); 50-265/88012(DRS)

Docket Nos. 50-254; 50-265

Licenses No. DPR-29; DPR-30

Licensee: Commonwealth Edison Company  
Post Office Box 767  
Chicago, IL 60690

Facility Name: Quad Cities Nuclear Power Station, Units 1 and 2

Inspection At: Cordova, Illinois

Inspection Conducted: April 22-26, May 2-6, 11, 31 and June 1, 1988

Inspectors: *H. A. Walker*  
H. A. Walker

6/21/88  
Date

*W. J. Kropp*  
W. J. Kropp

6/21/88  
Date

*Z. Falevits*  
Z. Falevits

6/21/88  
Date

Approved By: *F. J. Jablonski*  
F. J. Jablonski, Chief  
Maintenance and Outages Section

6/21/88  
Date

Inspection Summary

Inspection on April 22-26, May 2-6, 11, 31 and June 1, 1988 (Reports No. 50-254/88011(DRS); No. 50-265/88012(DRS))

Areas Inspected: Special announced inspection of maintenance activities and follow-up on previous identified inspection items using selected portions of Inspection Modules 62700, 62702, 92701, 92702 and 92720.

Results: Control in some of the areas inspected appeared to be weak.

Based on the inspection, the inspectors reached the following conclusions:

- Maintenance craftsmen/technicians appeared to be knowledgeable and conscientious in their work;
- Improvements made within the last two years were noted in several maintenance areas.

- Management involvement in maintenance was noted; however, the failure to recognize the significance of noted problems, determine problem causes and to take prompt and effective corrective action was evident. This was especially true of similar equipment in the same or adjacent unit. An example was the failure to determine the proper cause and correct the problem with Unit 2 steam jet air injector off-gas butterfly isolation valves after problems were noted with Unit 1 valves. Two violations were written in this area. One of these contained four examples and the other resulted in the inoperability of critical equipment for a substantial period of time.
- Plant management was deficient in allowing known problems to continue without correction or proper evaluations. This was reflected in the items on corrective action. An example involved operating for significant periods of time with known grounds in the 125 VDC system. This practice makes detecting and locating grounds that can defeat functioning of important equipment difficult. One additional violation was written on failure to perform a 50.59 review for an unanalyzed plant condition involving the DC grounds.
- The preventive maintenance program was incomplete and improperly implemented. Failure to perform PM on electrical switchgear is an example of improper implementation. Management controls for status, prioritizing, and tracking were not in place. Management was aware of this problem and had taken some action. One violation with two examples was written in this area.
- Design weaknesses resulted in one violation. This consisted of several examples of inaccurate drawings for electrical switchgear. The lack of design to provide the reactor operators with the operability status of an engineered safety feature was also a concern.
- Audits of maintenance appeared to be narrow in scope and shallow in depth. The failure to note preventive maintenance problems in audits of maintenance is an example. One violation was written in this area.
- Violations identified during this inspection are discussed in Paragraphs 3.1.3.1, 3.1.3.2, 3.1.5, 3.3.1.1.2, 3.3.1.1.3, 3.3.1.3, 3.3.1.4, 3.3.1.5, 3.3.1.6, and 3.3.2.2.

## DETAILS

### 1. Persons Contacted

#### Commonwealth Edison Company

- \*\*\*R. Bax, Station Manager
- \*\*\*D. Craddick, Master Electrician
- J. Fish, Master Mechanic
- \*\*D. Gibson, Supervisor Regulatory Assurance
- \*\*\*L. Petrie, Assistant Superintendent Maintenance
- D. Rajcevich, Master Instrument Mechanic
- \*N. Smith, Nuclear Licensing Supervisor, BWRs
- \*G. Spedl, Assistant Superintendent Technical Services
- \*\*H. Studman, Director of QA
- \*\*J. Wethington, QA Supervisor

\*Indicates those personnel who attended the exit meeting on May 11, 1988.

\*\*Indicates those personnel who attended the exit meeting on June 1, 1988.

\*\*\*Indicates those personnel who attended both the exit meetings.

Other personnel were contacted as a matter of routine during the inspection.

### 2. Licensee Action on Previous Inspection Findings

- 2.1 (Open) Violation (254/87009-01; 265/87009-01): Failure to determine the cause and take appropriate corrective action on several licensee event reports (LERs). The inspectors reviewed action taken by the licensee in this area. Procedures QAP 1200-3, Revision 2, "Licensee Event Report Investigation and Review Process" and QAP 1200-1, Revision 16, "Deviation Report Procedure" were reviewed. Both required an investigation for cause and corrective action as appropriate. In addition to this, a training program entitled "Root Cause Analysis" had been developed and presented to a large number of licensee personnel. The course appeared to be adequate; however, during this inspection several incidents were noted (reference Sections 3.3.1.3 through 3.3.1.6 of this report) which indicated lack of adequate or timely corrective action. This item remains open.
- 2.2 (Closed) Violation (254/87009-02; 265/87009-02): No procedure for documenting and controlling LERs. The inspector reviewed QAP 1200-3, Revision 2, "Licensee Event Report Investigation and Review Process" and found that it provides the necessary procedural control for LERs.

This item is closed.



- 2.3 (Closed) Open Item (254/87030-01; 265/87030-01): Discarding previous usage cards of mechanical M&TE after receipt of a calibration report. The inspector reviewed current practices regarding usage records for mechanical M&TE and noted that records are discarded only when equipment is found to be within specified calibration tolerances. If the equipment is found to be out of calibration, usage records are used to identify components tested in order that an evaluation can be performed for acceptability or possible retesting. The inspector reviewed evaluations of equipment for three pieces of M&TE found out of calibration tolerances. No problems were identified with the methods and process. Calibration data sheets are retained as permanent records. The inspector has no further concerns in this area. This item is closed.
- 2.4 (Closed) Open Item (254/87030-02; 265/87030-02): Possible inadequate evaluation of usage of a torque wrench found to be out of calibration. The inspector reviewed records for torque wrench QA No. 021159Q at the electrical maintenance department. There was no objective evidence in the file that one of the two usages had been evaluated after the wrench was found to be out of calibration. License personnel stated that some notations on the records indicated this review had been performed; however, it was not clear. This evaluation was performed during the inspection and the results provided to the inspector. No problems were indicated. Records of action taken in five other instances where torque wrenches were found to be out of calibration were reviewed and found to be acceptable. The inspector has no further concerns in this area. This item is closed.
- 3.0 Evaluation and Assessment of Maintenance

The purpose of this inspection was to evaluate and assess the accomplishment and effectiveness of maintenance activities at Quad Cities. The inspection coincided with a planned outage of Unit 2. The evaluation and assessment were accomplished by:

- Evaluation of maintenance backlog.
- Observation of maintenance activities
- Walkdown of Plant Systems
- Review of completed work requests
- Discussions with Licensee personnel

This inspection also assessed the quality verification processes related to maintenance, which was accomplished by:

- Review of audit reports
- Review of corrective action documents

### 3.1 Accomplishment of Maintenance

The inspectors verified that maintenance was accomplished by reviewing maintenance backlogs, the methods used for controlling maintenance activities (both corrective and preventive) and by reviewing completed work requests.

In preparation for this inspection, the inspectors reviewed a number of 1987 maintenance related Licensee Event Reports (LERs). No particular maintenance related weaknesses were noted with the technical assessment, timeliness and effectiveness of corrective action, or root cause analysis of the LERs.

Results of the inspection are documented in the following sections.

### 3.1.1 Maintenance Backlog

The inspector noted that near the end of the inspection, there were 1604 open corrective nuclear work requests (NWRs). Of these 929 were non outage related with 675 outage related. In addition to these, there were 680 open NWRs for PMs and there were 941 that were for modifications. Unit 2 NWRs should continue to decrease until the current Unit 2 outage is over. The number of open NWRs for corrective maintenance does not appear to be excessive; however, the number of open PM related NWRs appears to be high.

### 3.1.2 Corrective Maintenance

Corrective maintenance was performed utilizing the NWR. Methods for using the NWR and the control of corrective maintenance were described in QAP 1500-2, Revision 29, "Work Request Procedure for Station Maintenance." The procedure and implementation were reviewed and were noted to be acceptable. A number of problems were noted in activities supporting this area which are noted in other sections of this report. Methods for tracking and maintaining the status and priorities of open NWRs should be improved to provide more effective control.

### 3.1.3 Preventive Maintenance

Preventive Maintenance (PM) was described in QAP 500-9, Revision 2, "Preventive Maintenance." This procedure described the overall program which was divided in five basic areas; mechanical, electrical, instrument and control, operations and chemistry. Each of these areas had specific responsibilities which were described in individual procedures. Quad Cities was in the process of converting from a manual system of PM control to a computerized system. PM events were included in the new system, but no historical information was in the system at the time of the inspection. Presently, the system cannot track past due PM events due to the lack of historical information such as when the event was last performed. Detailed information of this type was available for the manual system, but it was time consuming and difficult to retrieve. The inspectors were informed that as PMs are performed they would be entered in the computerized system, but there are no intentions to enter historical data from past performances in the system. The PM program appeared to be difficult to track and control and was incomplete. Licensee personnel stated that a contractor had been hired to review the program and make recommendations for improvements.

This work was scheduled to be completed by December 31, 1988. There did not appear to be a method in place to periodically identify the status of overdue PMs to management. The changes currently planned should address this concern. This is an open item to be reviewed on a subsequent inspection (254/88011-01; 265/88012-01).

3.1.3.1 During the observation of maintenance repair activities, the inspector noted that the thrust bearing was replaced on Limitorque actuator for MOV 2-2301-9 (WR No. 65322). The inspector noted that little or no grease was on or in the bearings. A review of maintenance history for the limitorque actuator did not indicate that greasing of the bearing or other PMs had ever been performed. The Limitorque vendor manual recommends that greasing of the bearing and other PM tasks be performed every 18 months. Some PM tasks for these actuators were also recommended to be performed every 36 months. The failure to perform PMs on the limitorque operators is considered to be an example of a violation of 10 CFR 50, Appendix B, Criterion V (254/88011-02A; 265/88012-02A) in that, the procedures and instructions for PMs on the Limitorque actuators did not invoke the vendor recommendations or provide a technical justification for not performing the vendor recommendations.

3.1.3.2 In reviewing a computer listing of past due electrical PMs, the inspector noted that 47 of 93 horizontal 4KV breakers were overdue for the PMs required by procedure QEPM 200-1, Revision 1, "Inspection and Maintenance of 4KV Horizontal Circuit Breakers." Of these required PMs, 32 had never been performed. One of the above breakers was the Unit 2 EDG generator bus breaker which failed to close on October 5, 1987, due to dirty and sticking trip latch rollers. Cleaning and lubrication of these rollers were covered in this PM. The failure to perform the circuit breaker PMs as required is an example of a violation of 10 CFR 50, Appendix B, Criterion V (254/88011-02B, 265/88012-02B).

3.1.3.3 During the PM review, the inspectors noted that a number of PMs had been performed when PMs on what appeared to be more important components had never been performed. Discussions with licensee personnel indicated that no system existed to prioritize PMs considering the importance of the component involved. This is an open item (254/88011-03; 265/88012-03).

#### 3.1.4 Review of Completed Work Requests

Nineteen completed work requests were selected and reviewed. Of the nineteen reviewed, nine had been closed by cancellation without work being performed. Seven of the nine were cancelled because the work request had been duplicated. The other two were cancelled after it was determined that the problem did not exist. In discussing this matter with licensee personnel, the inspector was informed that there was no method in place to prevent duplication of work requests. The duplication is noted and corrected at the time the work requests are reviewed for issue to the field for work. Although the duplication of work requests does not appear to be a safety issue, the writing and processing of almost twice the required number of work requests has an impact on manpower requirements for control and processing of

maintenance work. In addition to this, the inspector noted that two of the work requests, cancelled because they were duplicated, were cancelled after several years. This matter was discussed with licensee personnel for their information since no regulatory issue was involved.

The inspector reviewed the ten work requests for which work was completed for identification of equipment, description of problem, adequacy of work instructions, description of work performed, replacement parts used, calibrated equipment used (if applicable), required approvals in required sequence, and required reviews and sign-offs. No problems or concerns were noted.

### 3.1.5 Engineering Support of Maintenance

The inspectors conducted a limited design and document control review of documents associated with maintenance and modification activities. In addition, the review included as built drawings compared to the actual plant configuration.

3.1.5.1 During the review and visual field inspection, the inspectors identified a number of drawing discrepancies. Control circuits shown on numerous 4.16 KV safety-related schematic diagrams have been duplicated on internal schematic and device location diagrams creating a system in which the same schematic circuit appears on two different drawings. The inspectors identified omission and errors on the duplicated schematics such as missing test switches, and the wrong 4.16 KV cubicle designations. For example, "Diesel Emergency Auto Start Relay" circuit shown on drawing No. 4E-1350B, revision AC, was also depicted on drawing No. 4E-1656H, Revision J. However, the test switch (TS) was omitted from the circuit on drawing No. 4E-1656H, while the relay designations for ASR-1 relay and the switchgear cubicle numbers for 127B14-1X3 (3-4) relay contact were not shown on drawing No. 4E-1350B. Identical errors were noted on the duplicated drawings associated with the Units 1 and 2 and 1/2 Diesel Generator Auto start circuits. The licensee was informed of the specific cases noted.

3.1.5.2 Wiring diagrams associated with 4.16 KV switchgear installation (i.e., W/D 4E1655A) depicted only a portion of the actual internal wiring. A small note on the drawing references other drawings for internal connections. This type of drawing leads to confusion whereby, one might assume from looking at the internal side of the termination blocks that no additional internal wiring exists.

3.1.5.3 The inspectors conducted a visual field inspection using the electrical design drawings associated with Units 1 and 2, 125VDC ground detection system. The following drawings contained discrepancies and did not conform to the field installations:

1. Drawing No. 4E-12685B, Revision Y and No. 4E-2685B, Revision S - did not represent the ground detection circuitry as it was installed in the field.

2. S/D 4E-25755, Revision E - Annunciator Window No. 54 "125V battery ground" circuitry did not depict the negative ground contact (11-12) in the alarm circuit.

10 CFR 50, Appendix B, Criterion 1.1 requires that design control measures verify the adequacy of design. The numerous design document errors described above are considered to be a violation of this requirement (254/88011-04; 265/88012-04).

### 3.1.6 Summary of Maintenance Accomplishment

- ° Licensee procedures described the overall maintenance process in sufficient detail; however, additional procedures or instructions were needed in some specific areas in order to provide adequate instructions for maintenance work.
- ° Management's ability to control some maintenance activities appeared to be limited because of the difficulty or inability in obtaining information on the status of maintenance items.
- ° Administration of maintenance work appeared to be inefficient as was evidenced by the excessive duplication of work requests.
- ° Considerable management attention must be directed towards expanding and improving the preventive maintenance area. More attention should be given to vendor recommendations for PMs as well as verifying that all necessary equipment and components are included in the program.
- ° The backlog of PM related NWRs appeared to be high indicating a possible lack of management attention in this area.
- ° Accuracy verification of design drawings appeared to be inadequate.
- ° Two violations and two open items were identified in this area.

## 3.2 Effectiveness of Maintenance

### 3.2.1 Observation of Work Activities

The inspectors reviewed work in progress for six nuclear work requests. Craft personnel performing the work were knowledgeable and skills exhibited appeared to be adequate. Calibrated tools, gauges and test equipment were used when required. Replacement parts appeared to be correct and the parts were adequately controlled.

During observation of the assembly of a limitorque valve actuator under work request Q62322, the inspector noted that a piece of pipe (approximately three feet long) was used on the wrench to tighten bolts during reassembly. The work request required that assembly

be performed per the vendor manual. Torquing or tightening of these bolts was not addressed in the vendor manual and there were no additional instructions in the work request. Failure to provide torquing instructions, especially in those cases where tightening is required in excess of normal hand use of a wrench, appeared to be inadequate work instructions. The inspector noted that in this case excessive force did not appear to be exerted on these bolts. During discussions with licensee personnel on this matter, the inspector was informed that the licensee was aware of this need for a torquing procedure and one was being developed. A draft copy of this procedure was provided to the inspector. In addition, the need for better work instructions had been recognized and plans had been made to increase the number of work analysts to provide improvement in the area. The possible inadequacy of maintenance work instructions, especially in the mechanical area, is an open item and will be reviewed during subsequent inspections (254/88011-05; 265/88012-05).

### 3.2.2 Systems Walkdowns

To assist in an evaluation of the material condition of the plant, the inspectors walked down selected portions of the emergency electrical systems and the residual heat removal (RHR) system for Unit 1. The Unit 1 emergency diesel generator; 250V, 125V, and 24/48V batteries and battery chargers; and 480V and 4160V switchgear and motor control centers were included in the walkdowns of the emergency electrical systems. The condition of the electrical systems appeared to be adequate, however, several questions and concerns were noted. These were satisfactorily resolved by the licensee.

During the walkdowns of the RHR system, the inspectors noted that the area in the vicinity of a Unit No. 1 RHR pump contained litter and debris. Scaffolding was also installed adjacent to some RHR piping. During discussions with licensee personnel, the inspectors were informed that the asbestos insulation was being replaced on the RHR piping and this was the reason for the poor housekeeping as well as the scaffolding. The inspectors have no further concerns in this area.

### 3.2.3 Summary of Maintenance Effectiveness

- ° Maintenance personnel performing repair work observed by the inspectors appeared to be knowledgeable and thorough in their work.
- ° The inspectors concluded that the housekeeping and material condition of the plant was adequate; however, attention is needed to clean up areas such as RHR when the insulation replacement is completed. There should be active plant management involvement in routine plant walkdowns to ensure that housekeeping and the material condition of the plant are acceptable.

- One open item was identified in these areas.

### 3.3 Licensee's Assessment of Maintenance (Quality Verification)

The inspectors reviewed audit records and records of actions taken on selected Licensee Event Reports (LERs) and Deviation Reports (DVRs) to evaluate licensee assessment of maintenance.

#### 3.3.1 Event Analysis and Cause Correction

Several operational events or equipment failures were reviewed to determine if maintenance was a contributing factor to the event and to verify that the cause was properly determined and corrected. An evaluation was also made of the timeliness and effectiveness of the corrective action. Events were selected for review because they either appeared to be repetitive or the nature of the event indicated a possible maintenance problem. In most cases, the events were documented on LERs or DVRs. Observations in this area follow.

##### 3.3.1.1 LER 87-01

Revision 1 of LER 87-01 documented the failure of the 1/2 emergency diesel generator (FDG) to automatically start during a test conducted January 3, 1987, while Unit 2 was in the refueling mode. This failure was the result of a blown negative fuse in the 125 VDC auto start circuit. The licensee identified the root cause as a ground at a tie point in 4 KV Switchgear, Bus 13-1, Cubicle 1. During the installation of Modification M-4-1/2-84-12, on February 3, 1986, wires were incorrectly landed on a terminal point that was also used in the ground circuit for a current transformer. The licensee stated in the LER, that the wires had been landed at that terminal point due to a design error on the electrical print used for the installation of the modifications. LER-87-01 also identified that the post modification test completed on March 1, 1986, was successful as the 1/2 DG auto start was expected.

The inspectors performed a detail review of various aspects of the event described in LER 87-01. As a result of this review, the following chronology was developed.

- May 1985 - Modification M-4-1/2-83-2 was made by the Quad Cities electrical maintenance (EM) department. This modification added annunciator relay 74-7 electrically in parallel with Auto Start Relay (ASR) 1/2-2. The 74-7 relay was meant to duplicate operation of ASR 1/2-2 and signal the control operator when the 1/2 DG automatically started from a Unit 2 auto start signal. During the installation, the EM staff noted a wiring termination point error on drawing No. 4E-1655A and initiated FCR 4-85-16 to correct the error.
- February 3, 1986 - Modification M-4-1/2-84-12 was made by the Site Substation Construction department and included the ASR 1/2-2 circuitry depicted on drawing No. 4E-1655A; however, FCR 4-85-16 had not been incorporated. It appears that the

Substation Construction work crew was not aware of FCR 4-85-16 and utilized the uncorrected version of drawing 4E-1555A to incorporate the modification. Substation Construction received drawings for modifications from S&L and was not required by procedures to verify with station's document control to determine if there were outstanding FCRs against the drawings. As a result, the ASR 1/2-2 circuitry was inadvertently modified as follows:

1. The 74-7 relay was removed from the circuit;
2. A negative leg of the ESS Div 1 battery was connected to station ground through the control fuse that supplied control power to the 1/2 DG ASR 1/2-2 relay coil.

- February 13, 1986 - Sargent & Lundy, the architect-engineer, forwarded by express mail a copy of Drawing No. 4E-1655A, which incorporated FCR 4-85-16 to the Quad Cities site. The transmittal letter noted the design error in the wiring termination points; however, no apparent action was taken by Quad Cities Site Substation Construction personnel to correct the errors previously made by the Substation Construction crew on February 3, 1986.
- February 27, 1986 - The 1/2 DG was returned to service (R/S) in preparation for the post modification testing of Modification M-4-1/2-84-12. Prior to the R/S of the 1/2 DG there was a 120 VDC positive ground indicated on the Unit 1 battery ground detector. Also, control room annunciator (901-8, B-9) "125 Volt DC Ground," was in the alarmed state. When the 1/2 DG was R/S the ESS Div 1 battery ground detector immediately indicated a 120 VDC negative ground because of the inadvertently installed ground on the ASR 1/2-2. However, since the 125 DC ground annunciator was already activated due to the existence of various other grounds, the operators were not aware that a 120 VDC negative ground existed in the circuitry of the 1/2 DG ASR 1/2 circuitry.
- February 28, 1986 - A post modification test was performed for Modification M-4-1/2-84-12. Step 17, in Part B, required verification that relays ASR 1/2-2 and 74-7 pickup (energize from a 1/2 DG auto-start signal). The test report indicated that relay 74-7 did not pickup; however, the test results were accepted by the reviewer because the ASR 1/2-2 did pickup and the 1/2 DG auto started. A note on the test data sheet indicated that the 74-7 relay was only to the annunciator for the 1/2 DG auto start. There was no apparent investigation by the licensee to determine why relay 74-7 did not pickup. It is surmised that an investigation would have revealed the wiring errors, including the one which resulted in the inadvertent grounding of the ASR 1/2-2 relay.



- ° June 26, 1986 - For approximately two hours the Unit 1 Ground Detector indicated approximately 20 V. The inspector could not determine the reason why the 125 VDC negative ground was not indicated for these two hours.
- ° July 11, 1986 - A review of the ESS DIV I 125 VDC Ground Detector strip charts showed that except for the two hour period on June 26, 1986, a 125 VDC ground existed on the negative bus of ESS DIV I from February 27 to July 11, 1986, when Ground Detector indication changed to approximately 20 VDC ground. This change coincided with replacing an ATWS inverter that had been previously identified in October 1985 as the cause of the 75 VDC negative ground in the inverter pre-filter circuit. A review of the Ground Detector strip charts from July 11-30, 1986, showed that a 125 VDC negative ground did not exist; therefore, it is concluded that the negative fuse for the ASR 1/2-2 circuitry was blown prior to July 11, 1986. The exact date the fuse blew could not be determined because of poor operating methods that allowed a series of various positive and negative grounds to exist, such as the ATWS inverter which masked the 120 VDC ground in the ASR 1/2-2 circuit.
- ° January 3, 1987 - At 0830, the 1/2 DG failed to auto start while performing Core Spray Logic testing. Cause of the failure was a blown fuse in the negative leg of ASR 1/2-2 control circuit 1/2-2.

Based on the facts in the chronology described above, the inspectors determined:

- 3.3.1.1.1. Sometime prior to July 11, 1986, the negative fuse for the ASR 1/2-2 control circuit blew. It is surmised that a momentary ground occurred in the positive leg of the 125 VDC battery. This momentary positive ground shorted the battery through the 15 amp negative ASR 1/2-2 circuit control fuse and caused that fuse to blow. This removed the ground and rendered the automatic start feature for the 1/2 DG Unit 2 inoperable. The control room operator was not aware of this condition since the design of the ASR 1/2-2 circuit did not identify a loss of power to the operators.

IEEE Standard 279, draft 1968, describes criteria for protection systems of nuclear power plants including signals that actuate engineered safeguards systems and components. Paragraph 4.20 of that standard requires that the design of the protection system provide the operator with accurate, complete, and timely information pertinent to the status of the protective circuit. Due to the initial design error, the loss of control power to the ASR was not made known to the control room operator. Loss of the auto-start capability would not have been detected under normal circumstances of

demonstrating DG operability manually, because the manual and automatic circuits were electrically isolated from each other. This is considered an open item pending further licensee and NRC review. (254/88011-06; 265/88012-06).

3.3.1.1.2

The hard ground, inadvertently installed during Modification 4-1/2-84-12, on February 3, 1986, was masked by various other negative grounds. From February 22 to July 11, 1986, the licensee did not periodically isolate these known grounds to ascertain if other grounds had developed on the 125 VDC battery system.

In summary, the 1/2 emergency diesel generator was incapable of automatically performing its intended safety function for greater than six months (July 11, 1986 through January 3, 1987) due to an undetected failure (blown control power fuse) in the circuitry of the automatic start relay (ASR). Technical Specifications 3.9 E.1 action requirement specifies reactor shutdown in 24 hours if DG operability cannot be restored in seven days. Therefore, operating Unit 2 without the auto-start feature of the 1/2 DG for greater than seven days is considered a violation of Technical Specification 3.9.E.1 (254/88011-07; 265/88012-07).

3.3.1.1.3.

In reviewing the various system grounding problems, the inspectors noted that FSAR Section 8.2.3.2.2 states: "The 125 volt battery system operates ungrounded with a ground detector alarm set to annunciate the first ground. In addition, the ground fault resistance and the time at which a ground fault occurs is recorded by a recording voltmeter. Thus, multiple grounds, the only reasonable mode failure are extremely unlikely." 10 CFR 50.59(b)(1), requires that licensee records include a written safety evaluation which provides bases for the determination that changes in the facility, as described in the safety analysis report, do not involve an unreviewed safety question.

Contrary to the above, the licensee did not have a written safety evaluation for various grounds which existed between February 22 through July 11, 1986, in the ESS DIV 1 125 volt battery system. These grounds masked the ASR 1/2-2 ground that ultimately caused the failure of the automatic start feature of the 1/2 Emergency Diesel/Generator and the inoperability of the Diesel/Generator for six months. This is a violation (254/88011-08; 265/88012-08).

The grounding problem is considered significant for the following reasons:

- ° Contingency actions were not performed to monitor grounds on the 125 VDC battery on a periodic basis between February 27, 1986 to July 11, 1986. Since various grounds

were known to exist, the licensee did not isolate these grounds to ascertain if other grounds had developed on the 125 YDC battery.

- No action was taken by the Site Substation Construction department in response to the S&L Express Mail transmittal that depicted the changes needed to correct the field wiring errors shown on Drawing No. 4E-1655A;
- Results of post modification tests of the ASR circuit indicated that something was wrong with the modification as made, but no investigation was made to determine the cause of the failure and the 1/2 DG was declared operable.
- The manual start feature of the 1/2 DG is not reliable since the starting of a RHR pump could trip the 1/2 DG on underexcitation when the DG is not in parallel with the grid (see Paragraph 3.3.1.3.).

Contrary to the FSAR commitment (Section 8.2.3.2.2), the licensee operated the 125 volt battery between February 27 and July 11, 1986, with various grounds without taking compensatory action.

#### 3.3.1.2 DVR 1-87-039

On May 6, 1987, Units 1 and 2 were at 98 and 100 percent power, respectively, when the "Diesel Generator (DG), 1/2 Relay Trip" alarm was received on the Unit 1 control room panel. It was determined that the lockout relay tripped and the "A" phase differential current relay had activated. This event was documented on DVR 1-87-039. The corrective action stated on this DVR referenced two Modifications, M-4-1(2)-85-26 and M-4-1/2-85-7. These modifications were initiated prior to this event to replace all the DG differential relays with Westinghouse type SA-1 relays which were seismically qualified and less susceptible to spurious trips due to vibration. DVR 1-87-039 identified a similar event which was reported on LER 86-007 on February 28, 1986. The inspector determined that the differential relays installed were General Electric (GE) Model 12CFD. These relays were addressed in NRC Information Notice (IN) 85-82 dated October 18, 1985. This notice stated that a GE test report showed the 12CFD differential relay had only been successfully tested for .75g in the de-energized mode. The inspector also determined that the GE Model 12CFD relay was a subject of INPO Significant Event Report (SER) 18-84.

Modifications M-4-1(2)-85-26 and M-4-1/2-85-7 were initiated to resolve IN 85-82 and INPO SER 18-24. These modifications required the GE 12CFD relays, to be replaced with Westinghouse type SA relays. The GE 12CFD differential relays were planned for replacement for the Unit 2 and Unit 1/2 DGs during the Unit 2 outage that was underway during this inspection. However, the licensee was planning to replace

the Unit 1 DG GE 12CFD differential relays during a June 1989, Unit 1 outage. The inspector was concerned that a potentially non-seismically qualified differential relay would be installed in the Unit 1 DG until June 1989. During discussion between licensee, NRC Region III and NRR personnel, the following was agreed upon:

- ° A letter from the licensee's engineering organization will be placed in Modification packages M-4-1(2)-85-26 and M-4-1/2-85-7 that states the installed GE 12CFD differential relays would perform during a seismic event.
- ° The Unit 1 DG GE 12CFD differential relays would be replaced with Westinghouse SA 1 relays at the first opportunity instead of during the Unit 1 June 1989 outage.

The replacement of the GE 12GFD differential relays in accordance with Modifications M-4-1(2)-85-26 and M-4-1/2-85-7 is considered an open item pending further NRC review. (254/88011-09; 265/88012-09).

### 3.3.1.3 LER 86-032

LER 86-032 documents an event which occurred on November 8, 1986, when the 1/2 DG was manually started and connected to Bus 13-1 to provide power to Unit 1 during modifications work in the electrical switch yard. When the 1A RHR pump was started to provide shutdown cooling flow, the 1/2 DG feed breaker to bus 13-1 tripped, due to the arming of the underexcitation relay.

Due to a change in personnel in the licensee's Technical Staff, the corrective action from the licensee's corporate engineering staff was not received until March 21, 1988. At the time of this inspection, the corrective actions had not been reviewed by the plant's technical staff. The inspectors reviewed the proposed corrective actions and determined that they were inadequate. The March 1988 proposed corrective action for LER 86-032 referred to a November 4, 1982 letter, that outlined the corrective actions for LER 82-012. The event described in LER 82-012 pertained to tripping of the 1/2 DG feed breaker to Bus 13-1 when the RHR Service Water Pump was started. However, the precursors to the event described in LER 82-12 were different than in LER 86-032. During the event in 1982, the 1/2 DG had auto started due to loss of offsite power whereas; the 1/2 DG was manually started during the event described in LER 86-032. The corrective actions to LER 82-012 consisted of the auto-start relay circuit being modified to "seal in," thus removing the protection feature of under excitation as required by the FSAR even if the conditions that caused the auto-start were removed. Therefore, the modification to the auto-start circuit was not acceptable corrective action for the event described in LER 86-032 since that event involved the manual starting of the 1/2 DG. The lack of having established corrective actions for LER 86-032 (November 1986) is untimely and is considered a violation of 10 CFR 50, Appendix B, Criterion XVI (254/88011-10A; 265/88012-10A).

#### 3.3.1.4 DVR 87-91

During a monthly surveillance test on October 5, 1987, 4 KV breaker 152-2329, which connects the 1/2 diesel with bus 23-1, failed to close. The root cause was identified as dirty and sticking trip latch rollers. The sticking trip latch in the breaker did not catch and hold the breaker closed. The corrective action included cleaning and lubricating the trip latch rollers of breaker 152-2329, per a electrical preventive maintenance (PM) procedure. The DVR stated that this preventive maintenance program was started in 1985 and all of the 4 KV breakers had not yet received their initial cleaning and lubrication. During this inspection, the inspector reviewed the status of the PM for 4 KV horizontal breakers as defined in procedure QEPM 200-1, Revision 1, "Inspection and Maintenance of 4 KV Horizontal Circuit Breakers." This procedure addressed the cleaning and lubrication of the trip latch mechanism.

The inspections in QEPM 200-1 were required every 300 operations or every three years, whichever occurs first. Based on information from the licensee, approximately 47 4 KV horizontal breakers were overdue. Of these 47, 32 had never been subjected to the requirements of QEPM 200-1. One of the 32 4 KV breakers was for the Unit 2 DG. Therefore, the corrective actions for DVR 87-91 was untimely since the licensee had not inspected the Unit 2 DG 4 KV breaker trip latch mechanism subsequent to October 1987 when the 1/2 DG breaker failed to close due to a dirty and sticking trip latch mechanism. This failure to provide timely corrective action to correct the latch mechanism problem is considered to be a violation of 10 CFR 50, Appendix B, Criterion XVI (254/88011-10B; 265/88012-10B).

During this inspection, the inspectors inspected the trip latch mechanism for the Unit 2 DG 4 KV breaker. The mechanism was clean and not sticky. The inspectors also inspected four other 4KV breakers. Three of these breakers had recently been cleaned and lubricated per QEPM 200-1. No problems were noted. However, the breaker for the 2B Core Spray Pump, which had not yet been subjected to the cleaning and lubrication requirements of QEPM 200-1, was inspected. Two of the three trip rollers that were accessible would not rotate due to hardened grease. These two rollers were not critical to the operations of the breaker per the vendor representative. However, the reliability of the trip latch mechanism was questionable. This breaker was scheduled for QEPM 200-1 during the Unit 2 outage. This failure to perform required preventive maintenance as defined in licensee's procedure QEPM 200-1 and the vendor's manual (VET1-C029) has been previously discussed in Section 3.1.3.2 of this report.

3.3.1.5 During a review of deviation reports, the inspector noted that several DVRs issued in 1987 pertained to auxiliary contacts in 480 volt motor control centers (MCC). In all cases, the cause was determined to be binding of the auxiliary contacts. The corrective

action further stated that Quad cities had experienced binding of auxiliary contacts in the past. LER 87-016 identified the previous events that were caused by binding of auxiliary contacts.

On July 30, 1987, the station electrical maintenance department received two General Electric (GE) Instructions for auxiliary contacts from the licensee's Dresden plant. GE instruction, GEJ-5277A, delineates steps for the changeout of the auxiliary contact plunger arm and insulation. This instruction was dated May 1984, and identified that the plunger guides should have a thin coat of Aero Shell No. 7 grease. The licensee stated that the previous lubrication used by GE had left a white film on the plunger guides that could cause binding of the auxiliary contacts. The other GE instruction, GEJ-2877D, pertained to the installation of Auxiliary Contact Kits. These instructions also stated that a fiber washer should be installed between the auxiliary contacts. Absence of this washer could also cause bonding of the auxiliary contacts. The licensee concluded that the binding of auxiliary contacts would be prevented if the plunger guides were lubricated with Aero Shell No. 7 and the fiber washers were installed between the auxiliary contacts. The inspector requested that the licensee submit a revision to LER 87-016 describing this corrective action to resolve the binding of the auxiliary contacts. Since the problem with the binding of the auxiliary contacts had been occurring for several years, the failure to identify the corrective action until July 1987 was untimely and is an example of a violation of 10 CFR 50, Appendix B, Criterion XVI (254/88011-10C; 365/88012-10C).

The licensee had initiated Nuclear Work Requests (NWR) in September 1987 for Unit 1 and January 1988 for Unit 2 for lubrication of the auxiliary contact plunger and the installation of the film washer. The inspector reviewed three NWRs and determined that proper instructions and post maintenance tests were included. The licensee's plan for implementing these NWRs was based on the EQ surveillance schedule for each of the MCCs.

#### 3.3.1.6 Improper Assembly of Butterfly Isolation Valves

On May 26, 1988, the licensee reported to the NRC that a Unit 2 butterfly isolation valve (No. 4501-B) for the steam jet air injector off-gas system had been improperly assembled and would have opened on an isolation signal rather than closed. Two of these valves were installed in parallel in the condensate system of each unit to isolate the condenser vacuum pump and prevent off-gas radiation release in case of a main steam line high radiation condition during startup. Due to operating difficulties, the originally installed gate valves were replaced with the existing butterfly valves by modification in 1984. Unit 1 valves were replaced in July and Unit 2 valves were replaced in February. No problems were noted with the Unit 2 valves after replacement; however, an inability to obtain condenser vacuum indicated a problem with Unit 1 valves. The Unit 1 valves were found to be improperly assembled. Valve position

indicators were located 90 degrees from the proper position. When the valves were indicating open, they were actually closed and when they indicated closed, they were open. The problem was corrected for the Unit 1 valves. Unit 2 was not considered a problem since no problems with condenser vacuum had been noted.

During discussions with licensee personnel, the inspector was told that a subsequent failure of the radiation sensor for Unit 2 resulted in actuation of these valves without a loss of condenser vacuum. This was attributed to leakage by the valve seat which initiated the valve disassembly and resulted in the discovery of the improperly assembled valve. The inspector was also told that there had been no maintenance performed on the four valves since the installation in 1984.

Because of this problem, Unit 2 operated from February 1984 until the present outage with an inability to isolate the condenser vacuum pump to prevent off gas radiation releases during reactor startup. The safety impact of the condition appeared to be minimal since the valves only provide isolation during startup when danger of fuel cladding damage is low. Also high radiation levels in the steam lines would close the main steam isolation valves providing isolation in this manner.

This problem appears to have been caused by several contributing factors. These are as follows:

- ° Inadequate work instructions which failed to require verification of valve position prior to installing position indicators. This has now been addressed for butterfly valves. This is another example of inadequate work instructions which is addressed as an open item (254/88011-05; 265/88012-05) in Section 3.2.1 of this report.
- ° Failure to properly verify operability of a component after installation. This is another example of a condition noted in Section 3.3.1.1 of this report.
- ° Failure to determine root cause and correct a significant condition adverse to quality. The lack of proper action occurred at the time the same type problem was noted on Unit 1 and also at the time of the failure of the radiation sensor sometime later. This is another example of a violation of 10 CFR 50, Appendix B, Criterion XVI (254/88011-10D; 265/88012-10D).
- ° Possible inadequate QC coverage of the installation. QC hold and witness points were primarily in the welding and fit-up area and did not seem to address the valve installation and connection. This matter is unresolved and will be reviewed during a subsequent inspection (254/88011-11; 265/88012-11).

As the result of this problem, the licensee took the following actions:

- ° Verified or established methods and short term schedules to verify proper operation of all safety-related butterfly valves for both units.
- ° Issued instructions for the installation and maintenance of butterfly valves for verification to ensure proper orientation of the valve position and the position indicator.

### 3.3.2 QA Audits of Maintenance

The inspectors reviewed records of nine QA audits conducted on maintenance or supporting activities during the past year. One of these audits (QAA-87-55) was an audit developed to cover overall maintenance activities; four of the audits were product audits which covered specific activities involving some maintenance related activities, the other two were surveillances which were upgraded to audits because of problems noted. During the review of the audit records the following observations were made.

#### 3.3.2.1 Audit QAA 04-88-43

Audit QAA 04-88-43 was conducted on March 3, 1988, and was originally a surveillance. The surveillance was upgraded to an audit because of the significance of the finding. Discussions with licensee personnel indicate that it is normal practice to upgrade surveillances to audits if significant findings are noted in order to provide higher management visibility of the problem. The inspector was assured that these audits are not substituted for normal scheduled audits.

During this audit, the auditor identified a problem with the failure to perform lubrication of electrical equipment. The finding states, "Review of the Electrical Maintenance Lubrication Program noted that approximately ten percent (10%) of the 1987 annual lubrication schedule and three percent (3%) of the biennial lubrication schedule had been performed." This means more than 90 percent of the electrical lubrications scheduled in 1987 were not performed. This item will be followed as an open item to be reviewed on a subsequent inspection (254/88011-12; 265/88012-12).

#### 3.3.2.2 Audit QAA 04-87-55

Audit QAA 04-87-55 was an audit of the maintenance program conducted November 30 to December 4, 1987. The scope of the audit, as described in the audit plan, included preventive maintenance (PM). There were no findings on PM and a statement in the report indicated that PMs were completed on time. This statement did not appear to be consistent with the inspectors findings on this inspection and the licensee finding described in Paragraph 3.3.2.1. A review of the checklists and other documents in the audit records did not indicate that implementation or performance of the PM program was reviewed.