

PHILADELPHIA ELECTRIC COMPANY

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PHILADELPHIA, PA. 19101

(215) 841-4000

January 5, 1988

Mr. R. E. Martin, Project Manager
Project Directorate I-2
Division of Reactor Projects
Attn: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Appendix R Compliance,
Peach Bottom Atomic Power Station

Dear Mr. Martin:

Enclosed is Inspection Report No. 87-30, dated December 4, 1987, regarding compliance with the fire protection requirements of Appendix R. Note the circled material which discusses four open issues identified by the inspector. The Region I inspector (Mr. A. Krasopoulos) requested at the exit meeting that the Licensee solicit a position from NRR on these issues. He suggested a meeting with Mr. Kudrich or Mr. Notley of NRR to obtain resolution. It is PECO's position that we are in compliance with the regulations on these issues.

We would appreciate an opportunity to meet with the appropriate NRC Staff members to close these unresolved items in a timely manner.

Please take the necessary steps to arrange such a meeting.



W. M. Alden
Director
Licensing Section

WCB:lc

Attachment

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PDR ADOCK 05000277
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UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION I
 631 PARK AVENUE
 KING OF PRUSSIA, PENNSYLVANIA 19406

RECEIVED

DEC 08 1987

DEC 04 1987

W. M. ...

Docket Nos. 50-277
 50-278

License Nos. DPR-44
 DPR-56

Philadelphia Electric Company
 ATTN: Mr. J. W. Gallagher
 Vice President
 Nuclear Operations
 2301 Market Street
 Philadelphia, Pennsylvania 19101

*FRANK
 CLEAR -
 MUST BE
 TO J W G
 BY
 DEC 30, 1987
 W M A...*

Gentlemen:

Subject: Combination Inspection Report Nos. 50-277/87-30 and 50-278/87-30

This refers to the routine safety inspection conducted by Mr. A. Krasopoulos of this office on October 19-23, 1987 at the Peach Bottom Power Station Units 2 and 3, Delta, Pennsylvania of activities authorized by NRC License Nos. DPR-44 and DPR-56 and to the discussions of our findings held by Mr. Krasopoulos with Mr. D. Smith of your staff at the conclusion of the inspection.

Areas examined during this inspection are described in the NRC Region I Inspection Report which is enclosed with this letter. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector.

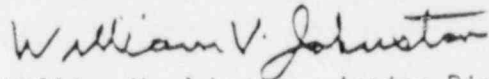
Based on the results of this inspection, it appears that one of your activities was not conducted in full compliance with NRC requirements, as set forth in the Notice of Violation, enclosed herewith as Appendix A. This violation has been categorized by severity level in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions", 10 CFR Part 2, Appendix C (Enforcement Policy). You are required to respond to this letter and in preparing your response, you should follow the instructions in Appendix A.

The deficiency identified in the Notice of Violation enclosed with this letter was identified during a previous inspection of your licensed activities on November 15, 1983, and was documented in the enclosure to our letter dated January 27, 1984. Your letter to this office dated February 23, 1984, stated that the noncompliance was caused by inadequate tracking systems. You stated that the Station Superintendent issued a directive emphasizing the importance of participating in the training and made a commitment to maintain fire protection training as a high priority item. You also stated that the Operation Engineers staff will ensure that each member of the fire brigade has received the required training. From our October 20, 1987 inspection it appears that the stated corrective action were not effective since this item has recurred. In your response to this letter, you should give particular attention to those actions taken or planned to ensure that the identified item of noncompliance will be completely corrected and will not recur.

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The responses directed by this letter and the accompanying Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511. Your cooperation with us in this matter is appreciated.

Sincerely,



William V. Johnston, Acting Director
Division of Reactor Safety

Enclosure:

1. Appendix A, Notice of Violation
2. NRC Region I Inspection Report Numbers 50-277/87-30 and 50-278/87-30

cc w/encl:

Dickinson M. Smith, Manager, Peach Bottom Atomic Power Station
John S. Kemper, Senior Vice President, Engineering and Production
Thomas S. Shaw, Jr., Vice President, Production
Troy B. Conner, Jr., Esquire
W. H. Hirsch, Director, Joint Generation Projects Department,
Atlantic Electric
G. Leitch, Nuclear Generation Manager
Eugene J. Bradley, Esquire, Assistant General Counsel (Without Report)
Raymond L. Hovis, Esquire
Thomas Magette, Power Plant Siting, Nuclear Evaluations
W. M. Aiden, Engineer in Charge, Licensing Section
Doris Poulsen, Secretary of Harford County Council
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Pennsylvania

APPENDIX A

NOTICE OF VIOLATION

Philadelphia Electric Company
Peach Bottom Atomic Power Station Units 2 and 3

Docket Nos. 50-277
50-278
Licence Nos. DPR-44
DPR-56

As a result of the inspection conducted on October 19-23, 1987 and in accordance with the "General Statement of Policy for NRC Enforcement Actions," 10 CFR Part 2, Appendix C, the following violation was identified:

10 CFR 50 Appendix R Section III.I.3.b. requires that fire brigade drills shall be performed at regular intervals with each fire brigade member participating in at least two drills per year.

Section III.I.1.a. requires that initial and periodic refresher training be provided to all fire brigade members.

Contrary to the above, on October 20, 1987, it was determined that at least 10 fire brigade members did not participate in the required two drills per year and five members did not attend either the initial or refresher training required for brigade membership. Also on October 20, 1987, it was determined that a similar type of fire brigade training deficiency was identified in 1983 by NRC as a violation and was allowed to recur in 1984, in 1985 and in 1986 as evidenced by the QA audits of the fire brigade training for those years.

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

Pursuant to the provisions of 10 CFR 2.201, Philadelphia Electric Company is hereby required to submit to this office within thirty days of the date of the letter which transmitted this Notice, a written statement or explanation in reply, including: (1) the corrective steps which have been taken and the results achieved; (2) corrective steps which will be taken to avoid further violations; and (3) the date when full compliance will be achieved. Where good cause is shown, consideration will be given to extending this response time.

~~8712090116~~ - 1p.

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-277/87-30 and 50-278/87-30

Docket No. 50-277/50-278

License No. DPR-44 and DPR-56

Priority -

Category C

Licensee: Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Facility Name: Peach Bottom Atomic Power Station Units 2 and 3

Inspection At: Delta, Pennsylvania

Inspection Conducted: October 19-23, 1987

Inspector:

A. Krasopoulos
A. Krasopoulos, Reactor Engineer, DRS

11/30/87
date

Also participating in the inspection and contributing to the report were:

K. Sullivan, Electrical System Specialist, BNL
R. Hodor, Mechanical Systems Specialist, BNL

Approved by:

C. J. Anderson
C. J. Anderson, Chief, Plant System
Section, DRS

12/2/87
date

Inspection Summary: Inspection on October 19-23, 1987, (Combined Report Nos. 50-277/87-30 and 50-278/87-30).

Areas Inspected: Special, announced team reinspection of the licensee's efforts to comply with the requirements of 10 CFR 50, Appendix R, Sections III, G, J, I and L, concerning fire protection features to ensure the ability to achieve and maintain safe shutdown in the event of a fire.

Results: One violation was identified. Three items remained unresolved at the end of the inspection.

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Details

1.0 Persons Contacted

1.1 Philadelphia Electric Company (PECo)

- *R. Lees, Chief Electrical Engineer
- *B. Clark, Site Administrative Engineer
- *A. Doneil, QA Site Supervisor
- *C. Swenson, Nuclear Operations
- *D. Smith, Plant Manager
- *W. Boyer, Electrical Supervising Engineer
- *D. Spamer, Electrical Engineer
- *W. Birely, Licensing Engineer
- *S. Yuill, Fire Protection Coordinator
- *G. Termine, Electrical Engineer
- *W. Brady, Mechanical Engineer
- *C. Gerdes, Mechanical Engineer
- *R. Dourte, QA Engineer
- *F. Adams, Engineering Designer
- *G. Cambell, Engineering Designer
- *R. Rock, Electrical Engineer
- *D. Thompson, Electrical Engineer
- *D. Brecker, Consultant (EPM)
- *J. McCawley, Electrical Engineer
- *M. Phillips, Public Service Electric and Gas
- *R. Dell Angelo, Engineering Designer
- G. Morley, Supervising Mechanical Engineer
- A. Melikian, Consultant (EPM)
- R. Pioff, Consultant (EPM)
- C. Brecken, Consultant (EPM)
- M. Lohr, Electrical Engineer
- J. Pizzola, QA Engineer
- J. Marinucci, Consultant (GE)
- M. Hammond, Construction Engineer
- J. Cleary, Mechanical Engineer

1.2 Nuclear Regulatory Commission (NRC)

- *T. Johnson, SRI
- *R. Urban, RI
- *L. Myers, RI

* Denotes those present at the exit interview.

2.0 Review of Previous Inspection Findings

Open (violation) 50-277/83-31-02 and 50-278/83-29-02: Failure to meet the Appendix R Fire Brigade training requirements.

During the above referenced inspection performed in 1983 the NRC determined that the licensee's Fire Brigade training was deficient because training requirements were not implemented. The deficiencies identified were the failure of brigade members to attend training meetings and failure to participate in the hands-on fire fighting practice.

The licensee in their annual and triannual fire protection program audits identified similar deficiencies during 1984, 1985, and 1986, calendar years. During 1986, in audit No. AP86-121PL the licensee's audit team issued a Significant Nonconformance Report (SNCR) to the Superintendent - Operations because actions taken in the past failed to prevent recurrence.

The NRC in inspection 277/278/85-44 reviewed the licensee's corrective actions in this area but was unable to resolve the issue because the licensee's corrective actions were inadequate. To assure the adequacy of the licensee's corrective actions, the inspector reviewed the following:

- Attendance records for quarterly training
- Attendance records for drill participation
- Attendance records for hands-on practice initial training and refresher instruction.

The inspector also observed a fire drill for training effectiveness, and reviewed the drill procedure. From the review of the relevant fire brigade training documents and correspondence, the inspector determined the following:

- The records review determined that at least 20 fire fighters did not participate in the required two drills per year and at least five did not attend the initial classroom and refresher instruction required by 10 CFR 50 Appendix R Section III.I.
- The inspector ascertained in discussions with licensee personnel that fire fighters responding to drills do not usually wear protective clothing or respiratory gear. Only in less than 20% of the drills do the fire fighters use protective clothing and respiratory apparatus.
- During the drill observed by the inspector, the brigade members were coached by the drill coordinator and told what to do. Drills performed thus lack realism and the team practice concept is lost.
- These training concerns were previously identified by the NRC and the licensee's own QA activities, however, they were allowed to recur.

10 CFR 50 Appendix R Section III.I. requires that the Fire Brigade training program consists of initial classroom instruction followed by periodic instructions.

Fire brigade drills are required per 10 CFR 50 Appendix R Section III.I.3. so that the fire brigade can practice as a team. These drills shall be performed at regular intervals not to exceed 3 months with each member participating in at least two drills per year. Each drill shall include an assessment of each Brigade member's conformance with the fire fighting procedures and use of fire fighting equipment including self contained breathing apparatus.

This is a violation of the above referenced Appendix R requirements (50-277/278-87-30-01).

Open (Unresolved Item) 50-277/84-40-01 and 50-278/84-19-01: Visual check of Fire Dampers does not provide assurance that Dampers will perform as required.

The licensee's T.S. require that fire dampers are inspected visually. The NRC raised the concern that a visual damper inspection does not provide assurance that the fire dampers will be able to function properly during a fire. This concern was raised because: A) The licensee could not provide Q.C. records indicating that the fire dampers were drop tested after installation, as called for in the engineering packages; and, B) a recently issued 10 CFR 21 letter highlighted the concern that the type of fire dampers used by the licensee may not close under air flow conditions.

The licensee addressed this concern by revising the fire fighting strategy procedures giving the fire brigade the option to de-energize the ventilation systems involved. With no air flow presumably the fire dampers will close. The licensee's actions did not satisfy the original NRC concern for the following reasons:

- 1) The inspector observed a fire brigade drill. Although an attempt was made to verify whether the fire jumped to areas above the hypothetical fire scene, no attempt was made to find and isolate the ventilation equipment.
- 2) Assuming that the brigade does turn off the air handling units there is no assurance that the dampers will fully close after the air handling units are turned off. This is because the dampers may drop and bind in a partially open position before the air flow is cut-off. To assure that the dampers close, the licensee must provide assurance that the dampers will close under air flow or that the air handling units are de-energized prior to dropping of the dampers.

This item continues to be unresolved. Considering the above concerns the inspector questioned the operability of the dampers.

Closed (Unresolved Item) 50-277/84-40-02 and 50-277/84-19-02: Triannual audit findings not formally resolved.

The NRC raised the concern that the American Nuclear Insurers (ANI) audits used by the licensee to satisfy the T.S. audit requirements may not satisfy the guidance issued by the NRC in Generic Letter (GL) 82-21. This is because these audits are performed to satisfy insurance requirements.

The G.L. sets forth the scope of the triannual audits which must be performed by an "outside" consultant.

The licensee committed to use an outside consultant henceforth to perform these audits. The inspector reviewed audit report AP 86-121PL which was performed by a qualified fire protection consultant. This audit was the first performed to satisfy the commitment. The review of this audit did not identify any unacceptable conditions.

This item is resolved.

Closed (Violation) 50-277/84-40-03 and 50-278/84-19-03: Degraded fire doors constitute a violation of Appendix R separation criteria.

The NRC identified several fire doors that were degraded. These fire doors were installed in walls separating redundant safe shutdown components. The deficiencies were: an inability to close because of an atmospheric pressure differential, Missing U.L. labels without other documentation to assure the fire rating of the door and delaminated doors.

The licensee's corrective actions included balancing of the ventilation systems so as not to affect door closure, replacing damaged or unlabeled doors and revising acceptance criteria of the door surveillance procedure. The inspector surveyed the doors identified in the violation and several other fire doors and did not identify any unacceptable conditions. This item is resolved.

Closed (Unresolved Items) 50-277/278/86-08-01, 86-08-02, 86-08-03, 86-08-04, and 86-08-05: Because of incomplete analysis compliance with Appendix R requirements could not be verified.

The unresolved items listed above were identified during the inspection validating the licensee's compliance with the 10 CFR 50 Appendix R Sections III G, III J, and III L requirements. These items were all administratively closed in consideration of the NRC reinspection of these issues discussed in Sections 4 through 6 of this inspection report.

Closed (Violation) 50-277/86-26-02: Fire watch inconsistent with T.S. requirements

The NRC determined that T.S. 3.14.B.4 was violated when the fire watch, posted as a compensatory measure for the inoperable Diesel Generator Room Cardox system, left the area under his watch. The Cardox system was inoperable because the Diesel Generator Full Load Test Procedure ST 8.1 requires that the Cardox system be by-passed during the test of the diesels.

The NRC reviewed the licensee's corrective actions in this area which are as follows: The licensee counseled the individual responsible for the event and also revised procedure ST 8.1 to include a statement regarding the fire watch requirements when the cardox system is defeated. Insofar as this is an isolated incident, the preventive measures taken by the licensee are adequate. This item is resolved.

3.0 Background

10 CFR 50.48 and 10 CFR 50, Appendix R, became effective on February 17, 1981. For Peach Bottom Units 2 and 3, the applicable portions of this regulation are the Appendix R Sections III.G, "Fire Protection of Safe Shutdown Capability," III.J, "Emergency Lighting," III.L, "Alternative and Dedicated Shutdown Capability," and III.I Fire Brigade Training.

Section III.G of Appendix R requires that fire protection be provided to ensure that one safe shutdown train remains available in the event of a fire. Section III.J requires that emergency lights are installed in all areas required for safe shutdown purposes and Section III.L specifies requirements for alternate shutdown capability. Section III.I specifies the required training for the Fire Brigade.

The NRC during March 17-21, 1986 performed an inspection to verify the licensee's compliance with the above requirements. During that inspection the determination was made that the licensee's facilities could not be adequately inspected because the supporting analyses, evaluations and procedures were found to be incomplete.

The licensee subsequently was requested to provide the NRC with a justification for continuing operations (JCO) after the licensee informed the NRC that about 50 instances of Appendix R violations were identified. This JCO also committed that Unit 2 would be in compliance at the end of the current refueling outage and Unit 3 at the end at their next refueling outage.

4.0 Post-Fire Safe Shutdown Capability

4.1 Systems Required for Safe Shutdown

In the event of a fire concurrent with the loss of offsite power, the following systems are used to provide the safe shutdown capability of the plant:

- High Pressure Coolant Injection (HPCI) System
- Reactor Core Isolation (RCIC) System
- Automatic Depressurization (ADS) and non-ADS Safety Relief Valves (SRVs)
- Residual Heat Removal (RHR) System-shutdown cooling mode, suppression pool cooling mode, and low pressure coolant injection (LPCI) mode
- Core Spray (CS) System
- High Pressure Service Water (HPSW) System
- Emergency Service Water (ESW) System
- Onsite AC Power Generation and Distribution System
- Onsite DC Power Generation and Distribution System
- Essential Ventilation Systems (for Emergency Diesel Rooms)

Safe shutdown is initiated from the control room by a manual scram of the control rods or automatically by the reactor protection system.

The support systems required for safe shutdown include the emergency service water system (ESW) for diesel generator cooling, high pressure service water system (HPSW) for RHR heat exchanger cooling, onsite AC emergency power system, onsite DC Emergency power system and essential ventilation systems.

The licensee uses four methods, A, B, C and D to achieve safe shutdown in the event of a fire. The method used depends on the location of the fire. The fire hazard analysis identifies the safe shutdown method for each fire area. These methods are described in the following paragraphs.

Method A

For Method A, RCIC is used to maintain reactor vessel coolant inventory. RHR and HPSW are used for suppression pool cooling which is required for decay heat removal. Heat is transferred from the vessel to the suppression pool via the ADS system and/or the RCIC steam turbine discharge.

Method B

For Method B, HPCI is used to maintain reactor vessel coolant inventory, RHR and HPSW are required as in method A for suppression pool

cooling. Heat is transferred from the vessel to the suppression pool via the ADS system and/or the HPCI steam turbine discharge.

Method C

For Method C, the reactor is depressurized using the ADS system to a point where either the Core Spray or the LPCI mode of the RHR systems can be used to maintain core inventory.

Method D

Method D, is the alternative shutdown method for a catastrophic fire in either the Control Room, Cable Spreading Room or the Emergency Shutdown Panel Area. This method is described in the following section.

4.2 Alternate Safe Shutdown Areas

The licensee provided alternate safe shutdown capability independent of the main control room, cable spreading room and the emergency shutdown panel area. The alternative shutdown stations are provided with circuit isolation capability using manual control switches, relays, breakers or fuse-disconnect switches, to ensure that no electrical connection exists between the alternative shutdown circuits and those affected by a fire in any one of the above-mentioned areas.

In the event of an unmitigated fire in these areas, the operators will proceed to alternative shutdown stations to initiate shutdown operations. Communications will be established between the operators who are at the alternative shutdown stations and the coordinating operator. The alternative control stations for Peach Bottom are in the following locations:

HPCI Alternative Control Station - This panel is located in each unit in the MG set room at elevation 135' - 0". The HPCI alternative control station is equipped with pump diagnostic instrumentation and transfer switches and alternative power supplies for the HPCI turbine. This panel is also equipped with the alternative process monitoring instrumentation which indicates reactor vessel pressure and level, suppression pool temperature, and condensate storage tank level.

Diesel Generators Alternative Control Station - These panels are located in Unit 2 4KV emergency switchgear rooms B/D and are common to both Units 2 and 3. The panels are equipped with transfer switches to isolate all main control room control circuits, and also diesel generator diagnostic instrumentation.

4KV Emergency Switchgear Alternative Controls - These controls are located in the 4KV emergency switchgear rooms in each unit. Transfer switches provide alternative local control and status indication for the motor control centers and for the ESW, RHR and HPSW pumps.

ADS Transfer/Isolation Station - Alternative control capabilities for 3 ADS valves and the associated nitrogen supply isolation valves are located on the HPCI Alternative Control Stations in the M-G Set Rooms. The transfer/isolation switches for these controls are located in the 4KV switchgear rooms. The remote locations for the transfer/isolation switches are necessary to preserve safe shutdown capability for the M-G Set Rooms.

RHR/HPSW Suppression Pool Alternative Control Stations - Alternative control capabilities and transfer/isolation switches for one loop of RHR/HPSW Motor Operated Valves (MOV's), needed to support Suppression Pool Cooling, are located at the HPCI Alternative Control Stations in the M-G Set Rooms.

4.3 Remaining Plant Areas

The licensee indicated that all other areas of the plant not required to have an alternate safe shutdown system, comply with the requirements of Section III.G.2 of Appendix R, unless an exemption request has been approved by the staff.

5.0 Inspection Methodology

The inspection team examined the licensee's provisions for separating and protecting equipment, cabling and associated circuits necessary to achieve and maintain hot and cold shutdown conditions. This inspection sampled selected fire areas which the licensee had identified as being in compliance with Section III.G.

The following functional requirements were reviewed for achieving and maintaining hot and cold shutdown:

- Reactivity control
- Pressure control
- Reactor coolant makeup
- Decay heat removal
- Support systems
- Process monitoring

The inspection team examined the licensee's capability to achieve and maintain hot shutdown and the capability to bring the plant to cold shutdown conditions in the event of a fire in various areas of the plant. The examination included a review of drawings, safe shutdown procedures and other documents. Drawings were reviewed to verify electrical

independence from the fire areas of concern. Procedures were reviewed for general content and feasibility.

Also inspected were fire detection and suppression systems and the degree of physical separation between redundant trains of Safe Shutdown Systems (SSSs). The team review included an evaluation of the susceptibility of the SSSs to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems.

The inspection team examined the licensee's fire protection features provided to maintain one train of equipment needed for safe shutdown free of fire damage. Included in the scope of this effort were fire area boundaries, including walls, floors and ceilings, and fire protection of openings such as fire doors, fire dampers, and penetration seals.

The inspection team also examined the licensee's compliance with Section III.J, Emergency Lighting.

6.0 Inspection of Protection Provided for Safe Shutdown Systems

6.1 Protection in Various Fire Areas

The team reviewed the protection provided to SSSs in selected fire areas for compliance with Appendix R, Sections III.G.1, 2 and 3. During the previous Appendix R inspection, compliance in this area could not be verified because the licensee's analysis was incomplete. Therefore, the team could not ascertain whether redundant safe shutdown components were within the same fire area. The licensee's current analysis identified the method to be used in each area. The licensee also verified that components relied upon for shutdown are either outside the area of concern or are protected. The system review and plant walkdown did not identify any unacceptable conditions. This review resolves the previously identified unresolved item 50-277/278/86-08-01.

6.2 Safe shutdown Procedure Review and Walk-down

The team reviewed the procedures used by the licensee in the event of a fire. Following a report of a fire the operators initial guidance is from procedure OK-114 "Actual Fire Reported in the Power Block, or, Diesel Generator Building, Emergency Pump, Inner Screen, or Emergency Cooling Tower Structures - Procedure." The operators are guided by this procedure to Procedure T-300 when symptoms indicate that fire damage threatens safe shutdown systems. The T-300 procedure is a symptomatic procedure which contains an index directing the operators to the proper T-300 series fire guide for the affected fire area.

For a fire in Fire Area 25 which includes the Main Control Room, Computer Room, the Cable Spreading Room and the Emergency Shutdown

Panel Area, Fire Guide T-325 directs the use of Procedure SE-10 "Plant Shutdown from the Alternate Shutdown Panel" if the Control Room shutdown systems are threatened by fire damage.

If the fire requires Control Room evacuation, the operators manually scram both Reactors and take control of the plant from the alternative shutdown panels. Shutdown Method D described in section 4.1 is used. Procedure SE-10 as reviewed by the team was found to be adequate.

The team commented that some steps in the procedure may need signature checks to assure control. For instance the steps monitoring the reactors' cooldown rate and other steps that operators perform in the attachments to the procedure do not have sign-off blocks that the operation was performed. The licensee in subsequent discussions committed to review the procedure and add sign-off spaces where needed.

The procedure walkdown was performed using three operators because the operations at only the Unit 2 Alternate Shutdown panel were observed. For an actual fire four operators would be used.

The walkdown identified that some operations performed during the hot shutdown phase are repairs. Since repairs are not allowed by the NRC guidance the licensee committed to seek an exemption from NRR. This is an unresolved item (87-30-02). Other observations during the walkdown of the procedure were that the breaker panel for the inboard steam isolation valve of the HPCI system has a cover fastened on with wing nuts. The team observed that if the wing nuts are too tight the operators may not be able to open the panel. The licensee stated that either bigger wing nuts or a tool will be provided to assure panel access.

Since the shutdown procedure was adequate, this resolves the previously identified unresolved item 50-277/278/86-08-02 regarding the lack of shutdown procedures during that inspection. During the walkdown of the procedure, the team also made observations on the adequacy of the emergency lights. The team did not identify any unacceptable conditions. This resolves item 86-08-05 concerning the adequacy of the emergency lights.

6.3 Protection for Associated Circuits

Appendix R, Sections III.G and III.L require that protection be provided for associated circuits that could prevent operation or cause maloperation of redundant trains of systems necessary for safe shutdown. The circuits of concern are generally associated with safe shutdown circuits in one of three ways:

- Common bus concerns
- Spurious signals concern
- Common enclosure concern

The associated circuits were evaluated by the team for common bus, spurious signal, and common enclosure concerns. Power, control, and instrumentation circuits were examined on a sampling basis for potential problems.

6.3.1 Common Bus Concern

The common bus concern may be found in circuits, either safety related or non-safety related, where there is a common power source with shutdown equipment and the power source is not electrically protected from the circuit of concern.

The team examined, on a sampling basis, protective relay coordination for 4160V and 480V buses and protection for specific instrumentation, control and power circuits. The coordination of fuses and circuit breakers was checked by examination of the licensee's fuse and breaker coordination curves. The licensee performs relay calibration during refueling outages on approximately 18 month intervals.

A deficiency was identified as follows:

- High Impedance Fault Protection

In lieu of performing a complete plant specific analysis of this concern, the licensee submitted for review test data which was obtained from a cable fault test. The objective of the test was to support the licensee's position that the occurrence of multiple high impedance faults due to fire will not have an adverse effect on the circuit coordination.

The test was performed by the licensee's staff during the month of October 1987. The test consisted of a Cable Tray which was filled to approximately 23% capacity with Nuclear Grade, IEEE 393 cables. The cabling was then exposed to a "Simulated Appendix R Fire Source." The flame source was ribbon in shape and located approximately 3" from the underside of the Cable Tray. The flame had a thermal output of 70,000 btu.

Based on the results of this test the licensee concluded that the occurrence of multiple high impedance faults will not affect the safe shutdown capability of the plant.

The licensee committed to submit the test procedure and results to the NRC for review. Pending review of the test data by NRC this item will remain unresolved. (87-30-03)

6.3.2 Spurious Signals Concern

The spurious signal concern is made up of 2 items:

- False motor control and instrument indications can occur such as those encountered during the 1975 Browns Ferry fire. These could be caused by fire initiated grounds, short or open circuits.
- Spurious operation of safety related or non-safety related components can occur that would adversely affect shutdown capability (e.g., RHR/RCS isolation valves).

The team reviewed documents, on a sampling basis, in the following areas to ascertain that no spurious signal concern exists:

- Current transformer secondaries
- High/low pressure interfaces
- General fire instigated spurious signals

A deficiency was identified as follows:

High/Low Pressure Interface Concerns

The high/low pressure interface analysis performed by the licensee has determined that spurious opening of the RHR Shutdown Cooling Suction Line Isolation Valves (MO-10-17 & 18) will not result in failure of the RHR Low Pressure Shutdown Cooling Piping. This determination is based on information contained in General Electric Co. Report NEDC-31339 "BWR Owners Group Assessment of Emergency Core Cooling System Pressurization in Boiling Water Reactors." By letter dated December 10, 1986, the licensee has submitted this report to the NRC for review. Pending final NRC review of the BWR Owners Group Report, this item will remain unresolved (87-30-04).

Fuse Replacement Controls

During the review of the licensee's circuit coordination study it was identified that the licensee does not have administrative control procedures in place to control future fuse replacement activities. The licensee stated that a procedure to control

fuse replacement is currently in the process of being written and implemented. The licensee further explained that fuse replacement is currently performed by either "replace in kind" or using the Control Room mark up drawings which call for the type of fuses to be used.

6.3.6 Common Enclosure Concern

The common enclosure concern may be found when redundant circuits are routed together in a raceway or enclosure and they are not electrically protected or when a fire can destroy both circuits due to inadequate fire barriers. The team reviewed a random sample of associated circuits routed together and found these circuits to be protected by coordinated electrical protection devices. The review of the common enclosure concern did not identify any unacceptable conditions.

7.0 Unresolved Items

Unresolved items are matters for which more information is required in order to ascertain whether they are acceptable, violations, or deviations. Unresolved items are discussed in Sections 6.2 and 6.3.

8.0 Exit Interview

The inspection team met with the licensee representatives, denoted in Section 1.0, at the conclusion of the inspection on October 23, 1987, and the team leader summarized the scope and findings of the inspection at that time.

The team leader also confirmed with the licensee that the report will not contain any proprietary information. The licensee agreed that the inspection report may be placed in the Public Document Room without prior licensee review for proprietary information (10 CFR 2.790).

At no time during this inspection was written material provided to the licensee by the team.