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Post Office Box 41
Lycoming, New York 13093

Facility: James A. FitzPatrick Nuclear Power Plant

Location: Scriba, New York

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Inspection Summary: The purpose of this special team inspection was to assess the status of corrective actions with regard to the fire protection issues the licensee took following the Diagnostic Evaluation Team (DET) inspection in October 1991, to evaluate the adequacy of its fire protection/prevention (FP/P) program and its implementation, and to assess its compliance with sections III.G, III.J, and III.L of Appendix R to 10 CFR 50. The purpose also included an assessment of the corrective actions for the licensee identified weaknesses and for previous NRC inspection findings in the fire protection area.

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EXECUTIVE SUMMARY

The NRC Diagnostic Evaluation Team (DET)* for FitzPatrick identified several fire protection weaknesses which were documented in its report dated December 3, 1991. Prior to the NRC evaluation, New York Power Authority (NYPA), the licensee, also had identified several fire protection weaknesses and made commitments to NRC to complete several short-term and long-term corrective actions as documented in letters dated August 15, 1991, and September 13, 1991. **Additionally, during 1991-92, NYPA reported fire protection weaknesses in nine Licensee Event Reports (LERs). NYPA was acting upon recognized weaknesses in its existing Safe Shutdown Analysis and was in the process of completing a reanalysis to assess compliance with the requirements of 10 CFR 50, Appendix R at the time of this inspection.

The scope and objectives of this safety inspection conducted on site from March 9-20, 1992, were: (1) to assess the status of the licensee's corrective actions for fire protection issues identified in the DET report; (2) to evaluate the adequacy of its fire protection and prevention (FPP) program and its implementation; and (3) to assess compliance with sections III.G, III.J, and III.L of Appendix R to 10 CFR 50. The scope and objectives also included an assessment of the corrective actions for the licensee identified weaknesses and for previous NRC inspection findings in the fire protection area.

The inspection focus was initially upon NYPA's substantive efforts to assess and reanalyze the FitzPatrick plant capability to achieve and maintain a shutdown condition in event of any fire. It became evident during the course of the inspection that implementation of the fire protection and prevention program was inadequate. At the time of the inspection, the plant was shutdown and defueled with considerable outage work in progress. The inspection team noted significant quantities of transient combustibles in many areas of the plant, weak control of ignition sources, inadequacies in firewatch training and performance, and weaknesses in an observed plant fire brigade drill and the fire brigade training program. NYPA responded to these immediate concerns by first halting work which involved ignition sources on March 18, 1992. A stop work order was issued for all outage activities later on March 18, 1992. NYPA then began a concerted effort to reduce the amount of combustible material in the plant and assure that individuals with responsibility for fire detection and suppression were well informed of their responsibilities. The NYPA effort continued after the conclusion of the onsite inspection described in this report. The effort and its results were followed by resident and region-based inspectors and will be reported upon in a future resident inspection report.

The inadequacies in the fire protection and prevention program are described in detail in Section 2.5 of this report. A sampling review of quality assurance (QA) audit findings dating from 1984 revealed that NYPA auditors had made repeated observations of several of the inadequacies the NRC inspection

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*Attachment 1 contains a list of abbreviations.

**Attachment 3 contains a list of documents and procedures reviewed during this inspection.

team observed. It is apparent that corrective actions for NYPA Quality Assurance audit findings were not comprehensive and effective. The inadequacies in fire protection and prevention and ineffective corrective actions are apparent violations of NRC regulations.

A fire protection audit performed at the FitzPatrick plant by NYPA Quality Assurance and its contractors in June and July 1991 found that compliance with the safe shutdown and fire barrier aspects of 10 CFR 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities" could not be demonstrated. An NRC inspection report also had identified penetration seal concerns. NYPA embarked on a program to address these findings in 1991. The program included a reinspection and repair of fire barrier penetration seals; significant progress on this program is reported in Section 2.4.1.3. A contracted effort to perform a reanalysis of safe shutdown in event of fires in specific areas was begun in November 1991. A draft of this reanalysis was completed in February 1992 and made available during the NRC inspection. Report Sections 2.3 and 2.4 provide some detail of this comprehensive licensee reanalysis which identified a number of non-compliances with Appendix R. Seven of these were formally reported to the NRC on March 17, 1992 by the FitzPatrick plant. Many of these issues require resolution before restart of the FitzPatrick plant from the current refueling outage. NYPA was asked to provide preliminary plans and identification of restart issues at the inspection exit on March 20, 1992 and did so by letter dated March 27, 1992. This letter commits to complete significant fire protection improvements and necessary modifications prior to plant startup.

In the area of emergency lighting required to assure safe plant shutdown, the inspection team found several inadequacies such as insufficient illumination on alternate shutdown panels and access routes, emergency lights not properly aimed, and inadequate test and maintenance procedures. These are described in detail in Section 2.4.3 and appear to be violations of NRC regulations.

The short-term and long-term corrective actions for fire protection issues, which were documented in NYPA's letters dated August 16, 1991, and September 13, 1991, were reviewed. These corrective actions are closely connected with the ones identified in the Appendix R reanalysis and will be completed in accordance with those commitments. The DET identified fire protection issues were also reviewed. The Appendix R issues are being appropriately addressed in the licensee's ongoing reanalysis. Fire protection program issues have been amplified by this inspection's findings. The corrective actions necessary to address the team inspection findings and committed to by NYPA encompass the DET issues. Follow-up of previous inspection findings on temporary modifications, fire damper operability, and fire barrier nonconformances found progress in corrective actions, but they had not yet been completed.

This report provides the details of significant shortcomings in the fire protection and prevention activities of the FitzPatrick plant. Many of these shortcomings have been identified and reported by NYPA as they have proceeded through a major reanalysis of the safe shutdown concerns arising from 1991 audit findings. Other shortcomings in the

industrial fire protection program had been identified by NYPA in various audits, but corrective actions taken were too limited or ineffective. The NRC team found and detailed shortcomings in many aspects of this fire protection program. NYPA has proposed corrective actions and program enhancements to address the concerns identified both by NYPA and NRC. NYPA appears to have a clear understanding of the extent of fire protection work to be done. The process of sorting the work on the basis of importance to safety and the timetables for completion has just begun. NYPA has committed to complete items necessary for safe operation and safe shutdown prior to startup from the current refueling outage.

REPORT OF THE FIRE PROTECTION TEAM INSPECTION AT FITZPATRICK

1.0 INTRODUCTION

1.1 Background

The NRC Diagnostic Evaluation Team (DET)* report on FitzPatrick identified several fire protection weaknesses which were documented in section 2.3.2 of the report dated December 3, 1991. Prior to the NRC evaluation, the licensee also had identified several fire protection weaknesses and made commitments to the NRC to complete several short-term and long-term corrective actions which are documented in its letters JPN-91-043, dated August 16, 1991, and JPN-91-050, dated September 13, 1991. **Additionally, the licensee reported several fire protection weaknesses in nine Licensee Event Reports (LERs) in 1991 and 1992. Further, the licensee recognized weaknesses in its existing Safe Shutdown Analysis (SSDA); and, at the time of this inspection, the licensee was in the process of completing a reanalysis to comply with the requirements of 10 CFR 50, Appendix R. This inspection was conducted to ascertain the status of these issues.

1.2 Scope and Objective

The scope and objectives of this inspection were to assess the status of corrective actions with regard to the fire protection issues the licensee took following the DET, to evaluate the adequacy of its FPP program and its implementation, and to assess its compliance with sections III.G, III.J, and III.L of Appendix R to 10 CFR 50. The scope and objective also included an assessment of the corrective actions for the licensee identified weaknesses and for previous NRC inspection findings in the fire protection area.

1.3 Methodology

The team consisted of six members and a team leader. The team completed one week of in-office preparation during March 2 - 6, 1992, and two weeks of onsite inspection during March 9 - 20, 1992. The onsite inspection included document review, plant tours, hardware inspections, observing a fire brigade drill, a simulated procedure walk-through, a demonstration of Appendix R emergency lighting under blackout conditions, and review of surveillance and test procedures.

On March 9, 1992, the team and the team leader had an entrance meeting with senior NYPA representatives to discuss the background, scope, objective, and methodology to be used in this inspection. The list of attendees is provided in Attachment 2 to this report.

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*Attachment 1 provides a list of all abbreviations used in this report.

**Documents reviewed during this inspection are listed in Attachment 3.

2.0 ASSESSMENT OF LICENSEE'S FIRE PROTECTION PROGRAM

2.1. Corrective Actions for DET Identified Issues

The DET identified several potential weaknesses, DET Items 1 through 10 in section 2.3.2.8 of the DET report, in NYPA's implementation of Appendix R (Report Section 2.1.1) and their onsite Fire Protection and Prevention Program (Report Section 2.1.2). The DET report identified additional concerns which were potentially related to the Fire Protection and Prevention Program (Report Section 2.1.3). The team, as part of this inspection, reviewed the status of the licensee's corrective actions initiated as a result of the weaknesses and concerns identified by the DET report. At the time of this inspection, none of these items had been fully resolved. The status of these items is detailed in report sections 2.1.1, 2.1.2, and 2.1.3 below and in other referenced report sections. These items will be initially tracked by the unresolved items numbers identified below.

2.1.1 Corrective Actions Fire Protection Weaknesses Related to Safe Shutdown (Appendix R)

The following summarize the licensee's corrective actions and current status for DET identified Appendix R weaknesses.

DET Item 1: The assumption was made that no offsite power is available for fire scenarios

The DET report identified that the licensee's original safe shutdown analysis did not consider that offsite power may not be lost as a result of a fire in the Control Room, Cable Spreading Room, or Relay Room. The special team found that the licensee's ongoing reevaluation of their Appendix R safe shutdown methodology is currently considering the possibility that offsite power may or may not be available. Report Section 2.4.1.1 provides further details on this issue.

DET Item 2: No high-impedance fault analysis

The DET identified that the licensee's original 1982 Appendix R safe shutdown analysis did not consider high-impedance faults. The special team found that the licensee is currently performing a high-impedance fault analysis as a part of its ongoing 1992 Appendix R reevaluation program. Report Section 2.3.1 provides further details on this issue.

DET Item 3: Lack of guidance to operators in fire response procedures to achieve safe shutdown and to assist with diagnosis of significant spurious actuation of equipment

The DET identified that the licensee's fire response procedures lacked guidance to assist operators in diagnosing the spurious actuation of equipment. The special team found that the licensee's 1992 reevaluation of Appendix R is currently evaluating the spurious signal concerns. The analysis will either recommend the implementation of modifications or manual actions to mitigate the potential consequences. The licensee has indicated that the manual actions required to mitigate spurious operations will be proceduralized. Report Section 2.4.2.3 provides further details on this issue.

DET Item 6: Failure to include spurious actuation vulnerabilities in fire response procedures for communications and indication circuitry

The DET identified that the fire response procedures failed to include spurious actuation vulnerabilities for communication and actuation circuitry. The special team found that the licensee's ongoing 1992 Appendix R reevaluation is currently reviewing the availability of communications and indication circuitry required to support the implementation of alternative shutdown capability. Report Sections 2.3.3 and 2.4.2.3 provide further details on these issues.

DET Item 7: Lack of original or subsequent verification of illumination levels of lighting

The DET identified that the emergency lighting illumination levels had never been verified. The special inspection team conducted various blackout tests and verified that the emergency lighting levels are not adequate to implement alternative shutdown capability outside the Control Room. The licensee's surveillance instructions are inadequate to demonstrate the operability of installed lighting units. Currently, the licensee, as a part of its ongoing 1992 Appendix R reevaluation, will be performing a complete assessment of its emergency lighting capability. Report Section 2.4.3 provides further details on this issue.

DET Item 9: Unreviewed potential common mode failures of electrical cables due to lack of Separation

The DET identified that the licensee's 1982 analysis had not reviewed the potential for common mode failures resulting from a lack of electrical cable separation. The special team found that systems and support systems necessary to achieve and maintain safe shutdown conditions are currently being reevaluated. The licensee has identified several cases where separation and spurious equipment operations could have impaired shutdown capability. The licensee is currently developing the required modifications and conducting the appropriate analyses to correct these discrepancies. Report Section 2.4.1.2 provides further details on this issue.

Summary

The items discussed in Paragraph 2.1.1 remain unresolved, pending completion of the licensee's ongoing reevaluation of Appendix R (URI 333/92-80-01) .

2.1.2 Corrective Actions for Identified Fire Protection Program Weaknesses (Non-Appendix R)

The following summarize the licensee's corrective actions and current status for DET identified non-Appendix R Fire Protection and Prevention Program weaknesses.

DET Item 4: Assignment of only one individual to walk down the plant part time for transient combustibles and evaluate the conditions of the fire protection system

The DET identified a shortage of onsite fire protection staffing based on the fact that only one individual was assigned to conduct part-time plant walkdowns. The special team found that the licensee is in process of reevaluating its fire prevention administrative controls. In addition, the licensee is proposing to increase the fire protection staffing on site and define the responsibilities of these individuals. Report Section 2.5.1.2 provides additional details on this issue.

DET Item 5: Lack of design basis document for fire protection

The DET identified that there was no current and adequate design basis document for fire protection at FitzPatrick. The special team found that the licensee is currently revising its Fire Protection Reference Manual. This document, once validated, will include the design basis for fire protection at the Fitzpatrick facility.

DET Item 8: No procedures governing firewatches

The DET found that there were no procedures governing firewatches. The special inspection team found that written instructions specific to each current compensatory firewatch post have been developed. Revisions to procedures associated with hot work firewatches are currently being performed. NYPA issued a stop work order for hot work and all outage activities on March 18, 1992. A procedure revision and associated training for firewatches will be completed prior to resuming hot work activities. NYPA is currently evaluating its firewatch program. Report Sections 2.5.2.2 and 2.5.2.3 provides further details on these issues.

DET Item 10: Uncontrolled storage of flammables in safety related pump rooms

Plant tours by the DET identified examples of uncontrolled storage of flammables in safety related pump rooms. During plant walkdowns, the special inspection team identified several examples of uncontrolled transient combustibles in safety related equipment rooms (described in Section 2.5.2.1). On March 18, 1992, NYPA began action to remove uncontrolled combustibles from the power station and is currently in the process of enhancing its control of combustibles program. Report Section 2.5.2.1 provides further details on this issue.

Summary

These items remain unresolved pending the licensee's completion of its ongoing fire protection program review which is described in the Attachment 6 to this report and completion of NYPA's corrective actions (URI 333/92-80-02) .

2.1.3 Corrective Actions for Other Fire Protection Concerns

In addition to the DET items 1 through 10 in Section 2.3.2 of the DET report discussed above, the teams also assessed the status of corrective actions for other fire protection concerns expressed in other sections of the DET report.

Concern 1

The DET identified weaknesses in the surveillance and testing program. Examples given were fire protection check valves which were never cycled, and principles of the As Low As Reasonably Achievable (ALARA) criteria were not considered when scheduling 1.5 year fire hose preventive maintenance (PM) in high radiation areas.

NYPA staff responded that it had committed to complete an initial overall fire protection (FP) root cause analysis by March 31, 1992. Several fire protection check valves will be selected for a physical inspection to determine if corrosion, microbiological induced corrosion, or silt deposits are present in the system. The licensee also responded that fire hose stations, including those in high radiation areas, are tested every three years in accordance with procedure MST-76.9**.

By letter dated March 27, 1992, Attachment 6, NYPA has revised their commitment and will now complete their Fire Protection and Prevention Program root cause analysis prior to startup from the current refueling outage. This item is unresolved pending licensee action to adequately address the ALARA issue, completion of the licensee's root cause analysis and the check valve inspections identified in the above paragraph. Report Sections 2.4.2.3.1, 2.5.4.1, and 2.5.6 provide further details on these issues. (URI 333/80-03A).

Concern 2

The DET identified that the Assistant Shift Supervisor (ASS) acts as the fire brigade leader and this limits the ability of the minimum shift crew to respond to a scenario involving activation of the fire brigade.

NYPA staff responded that it considers that a shutdown from outside the Control Room is the most limiting scenario for an on-shift crew of operators. The minimum shift crew required by the Technical Specifications (TS) can shutdown the plant in accordance with the Abnormal Operating Procedure (AOP-43) and man the fire brigade as required by TS and Emergency Action Procedure (EAP-3).

** Attachment 3 lists Documents and Procedures reviewed during this inspection.

The team noted that AOP-43 requires the ASS (fire brigade leader) to lead the reentry into the Control Room with the assistance of those operators not assigned to a shutdown panel (two fire brigade members). The licensee responded that this reentry would not be attempted until the fire was extinguished. During the observed fire drill (section 2.5.3.2), the team noted that additional nonlicensed operators were relied upon by the fire brigade to act as equipment runners. These individuals would not be available to perform this function during a fire requiring plant shutdown from outside the Control Room (Section 2.4.2.3.3). This item remains unresolved pending the licensee's revision of AOP-43 to take into account modifications needed to comply with 10 CFR 50 Appendix R (URI 333/92-80-03B).

Concern 3

The DET identified that the use of the QA Department's findings are limited, and the special inspection team questioned how this affected the fire protection program.

NYPA staff responded that Fire Protection and Prevention Program-related QA audits were reviewed, and a punch list of the findings was developed. NYPA is now in the process of resolving these findings.

The special inspection team found that, at the time of this inspection, a comprehensive punch list of findings was not available. This item remains unresolved pending further review (URI 333/92-80-03C). The effectiveness of QA audits is discussed in Section 2.5.4 and describes an apparent violation of NRC requirements.

Summary

URIs 333/92-80-03 A, B, and C discussed above together constitute a single unresolved item pending completion of licensee's corrective action (URI 333/92-80-03).

2.2 Corrective Actions for Licensee Identified Issues

Prior to the DET evaluation, the licensee had identified several fire protection weaknesses. The licensee's personnel met with the NRC staff on August 2, 1991, at the NRC Region I office to outline the weaknesses identified at that time. At that meeting, the licensee made a commitment to the NRC to submit a schedule for completing the short-term and long-term corrective actions for the identified weaknesses. The schedule was documented in the licensee's letters JPN-91-043, dated August 16, 1991, and JPN-91-050, dated September 13, 1991. The licensee also reported several fire protection weaknesses, including associated corrective actions, in nine Licensee Event Reports (LERs) in 1991 and 1992. The following is a summary of the status of these corrective actions, as of the date of this inspection.

2.2.1 Short Term Corrective Actions

A complete list of the short term action items and their scheduled completion dates are documented in the August 16, 1991, letter. The items are: (1) Modify (or replace, as appropriate) 19 fire dampers; (2) Compete evaluation of installed fire door closure and gaps, and complete any necessary modifications; (3) Complete evaluation to determine need for fire protection of exposed structural steel in the Battery Charger Rooms, and complete any modifications; (4) Install suppression system in the Battery Room Corridor (5) Complete evaluation of the Control Room and Relay Room ventilation and complete any necessary modifications; (6) Resolve audit findings on NFPA code compliance and design reviews; (7) Assure compliance with modification procedures for fire protection evaluations; (8) Complete a review of 20 randomly selected, previously installed modifications for fire protection and Appendix R concerns, and resolve any identified concerns; and (9) Install fire detection in Fire Area IE/Fire Zone TB-1, north of Electric Bays

In the August 16, 1991, letter, the licensee indicated that all short term corrective actions will be completed prior to startup from the current outage and confirmed this statement during this inspection. Since the plant is currently shutdown and these items will be completed prior to startup, the team did not have any further questions on this issue at this time. The completion of these corrective actions are subject to further inspection prior to restart and will be monitored with URI-333/92-80-02 (Report Section 2.1.2).

2.2.2 Long Term Corrective Actions

A complete list of the long term action items and their scheduled completion dates are documented in the September 13, 1991, letter. The items are associated with: (a) Branch Technical Position (BTP) 9.5.1-Appendix A; (b) Fire dampers, 10 CFR 50, Appendix R; (c) Modification Process; (d) Non-NRC Audit Open Items; and (e) Action Plan Items. These items are scheduled for completion on various dates in 1992 and 1993.

The licensee indicated that these items are enhancements to the program and that no safety significant item has been classified as a long term corrective item. Further, during the process of completion, if any potential safety significance in any item is identified, the item will be evaluated and appropriate compensatory measures will be established. These items are subject to further inspection and will be monitored along with the completion of the licensee Fire Protection and Prevention Program review, Attachment 6, URI 333/92-80-02 (Report Section 2.1.2).

2.2.3 Corrective Actions Associated with LER's

10 CFR 50.73(a)(2)(ii) and (a)(2)(v) requires that holders of operating licenses for nuclear power plants shall submit a Licensee Event Report (LER) for any event or condition that results in the degradation or prevents fulfillment of a safety function needed to shutdown and maintain the safe shutdown condition.

LER's which were reviewed and included Appendix R safe shutdown related issues include:

- LER 91-021-00, Potentially inoperable Emergency Diesel Generators due to potentially inoperable ventilation fire dampers, deficient penetration seals and cable separation.

- LER 91-023-00, Potential damage of both trains of safe shutdown equipment as a result of a common fire to motor control center feeder cable routed through a fire zone.

- LER 91-032-00, Potentially inoperable intake deicing heaters due to control room fire.

Fire protection events reported under 10 CFR 50.73(a)(2)(i)(b) as operations prohibited by the plant Technical Specifications include:

- LER 91-012-00, Fire door blocked open.

- LER 91-017-00, Fire doors left open.

- LER 91-020-00, Fire door latching mechanism taped open by station personnel render door inoperable.

- LER 91-024-00, Unsatisfactory penetration seals identified during the performance of an inspection.

- LER 92-001-00, Missed firewatches due to inadequate training and supervision.

- LER 91-006-00, Inadequate performance of firewatch duties.

Based on the review of the above written reports, the team determined that the reporting was timely, accurate, and the reports adequately describe the events. The safety implication and significance stated in the reports are consistent with the details of the events. A firewatch has been posted in each applicable area and will remain there until the problems are corrected. Root cause has not been not been determined for the Appendix R related issues. This analysis is still in progress. The results will be reported when completed. The fire protection issues have been addressed. The action taken by the licensee was determined to be less than adequate in the training and controls implemented for firewatch personnel as discussed in Report Section 2.5.2.

2.3 Results of Licensee's 1992 Reanalysis of Safe Shutdown Capability

2.3.1 Licensee's 1991 Triennial Fire Protection Audit Findings

The fire protection program currently in effect at Fitzpatrick is based on an analysis performed in 1982. This analysis was reviewed in an April 26, 1983, Safety Evaluation Report (SER) issued by the NRC, and was subsequently inspected for compliance to Appendix R during the period of June 17 - 21, 1985. During the period of June 3, 1991, to July 12, 1991, NYPA performed a triennial Quality Assurance audit of this program. The results of its review are documented in JAF Audit Report No. 91-07. The team's review of this document found it to include potentially significant findings related to the plant's existing post-fire safe shutdown capability. NYPA conveyed these findings to NRC as they were developed, beginning in August 1991.

Specifically, Finding No. 91-07-01 of NYPA QA Audit Report No. 91-07 was found to describe a number of deficiencies related to the licensee's existing method of compliance with the fire protection features required by Section III.G of Appendix R. Specific examples noted in this report include:

- The failure of the existing analysis to properly identify required cables associated with 5 out of 5 safe shutdown components reviewed. Examples noted in the report include cables associated with: Residual Heat Removal (RHR) Pumps 3A and 3D (10P-3A and 10P-3D), RHR Shutdown Cooling (SDC) Outboard Isolation valve (10MOV-17), and Reactor Water Level Indicator (02-3LT-85B), and RHR Service Water (SW) Pump 1D (10P-1D). This audit finding identified several examples of cables associated with these components that should have been identified in the 1982 analysis as being required for safe shutdown, but were not. Additionally, the existing analysis was found to identify certain cables as being required for safe shutdown which, in fact, are not. Based on the number and generic nature of such cabling deficiencies, QA Audit Finding 91-07-01 concluded: "The existing JAF Appendix R Analysis documentation is not adequate to clearly demonstrate that Appendix R Section III.G fire damage limitations are satisfied for redundant safe shutdown system trains and components."

- Procedures which enable NYPA design engineers to perform detailed Appendix R reviews for the impact of proposed modifications are not developed and available for use. It is important to note that, during this NRC inspection, licensee representatives stated that a number of the cable routing and separation deficiencies identified during its QA audit and subsequent reevaluation appear to be attributable to an inadequate review of modifications by NYPA design engineering for Appendix R concerns.

- Emergency Lighting Deficiencies

As a result of the Fire Protection Program findings identified during its July 1991 QA audit, NYPA determined that a complete reevaluation of its safe and alternative shutdown capability was warranted. This new analysis is currently documented in preliminary, "Draft," form as "NYPA James A. FitzPatrick Safe and Alternative Shutdown Analysis Report," dated February 12, 1992; this is the 1992 reanalysis referred to frequently in this report.

The inspection team found the NYPA reanalysis to be a reasonably comprehensive evaluation of the plant's existing safe and alternative shutdown capability. Due to its preliminary, "draft" status, a thorough evaluation of the assumptions, conclusions and recommendations for proposed modifications to achieve an acceptable level of compliance with Section III.G (i.e., compliance verification) was not performed by the team at this time.

The overall scope of the 1992 reanalysis concentrated on an evaluation of the level of separation between redundant trains of cables for equipment required to achieve safe shutdown (based on systems identified in the 1982 analysis) and a review of the potential impact of fire-initiated spurious signals on the operability of those systems. However, other potentially significant associated circuit concerns, including the Common Power Source and Common Enclosure concerns (described in Section 2.4.1.2 below) are not specifically addressed in this reanalysis. With regard to the Common Power Source concern, NYPA representatives stated that the 1982 analysis had considered this and the FitzPatrick plant is currently reverifying the adequacy of breaker and fuse coordination (selective tripping) provided for all buses, including nonsafety-related buses. Additionally, NYPA representatives stated that the Common Enclosure concern is adequately resolved since all nonessential circuits are provided with an acceptable level of electrical isolation. However, it should be noted that, since the team's review primarily focused on an assessment of the 1992 reanalysis findings to the existing methodology (as defined by the 1982 analysis), the adequacy of protection provided for these specific issues, including high impedance faults, was not verified during this inspection and will need to be addressed during a future inspection. These issues will be monitored by the closure of DET items 2, 3, 6, and 9 (URI 333/92-80-01, Report Section 2.1.1).

2.3.2 Fitzpatrick Occurrence Report No. 92-07

Based on its evaluation of the February 1992 reanalysis, NYPA determined that the plant was not in compliance with Appendix R. In accordance with the notification requirements of 10 CFR 50.72(b)(2), NYPA informed the NRC of Occurrence Report No. 92-07 on March 17, 1992, listing seven specific reportable deficiencies it identified to date. During this inspection, details of each finding were discussed with members of the NYPA staff. The reported findings include:

1. A postulated fire may result in a loss of motive power to RHR Heat Exchanger Bypass Valve (MOV-66A), resulting in a loss of cooling capability

A fire in Reactor Building Fire Areas VIII or IX may result in a loss of RHR Heat Exchanger Bypass valve MOV-66A due to a failure of the power cable to 71MCC-155. Motor Operated Valve (MOV)-66A is normally open and is required to close for long-term reactor and Suppression Pool Cooling. Low Pressure Coolant Injection (LPCI) Invertor 71INV-3A is the normal feed to 71MCC-155. An alternative feed may be supplied from MCC-153 via the maintenance feed. Abnormal Operating Procedure (AOP)-28 identified a manual action to re-power 71MCC-155 from the maintenance feed (MCC-153); however, this action will not isolate the normal feeder from the bus. Therefore, a fire-initiated fault on the normal feeder cable will not be isolated when the maintenance feeder is used, and could result in a loss of both the maintenance feed and the normal feed to 71MCC-155 (MOV-66A power source).

2. Loss of all remote reactor pressure indication

A postulated fire in Reactor Building Fire Area VIII may result in a loss of all reactor pressure indication due to fire induced cable faults. As specified in NRC Generic Letter 84-09, reactor pressure indication is required to be available. This deficiency was not identified in the previous (1982) analysis.

3. Potential spurious opening of multiple (up to seven) Safety Relief Valves (SRVs)

A Control Room or Relay Room fire may result in the spurious opening of multiple Safety Relief Valves (02-SOV-71A1 through 71L1) and result in rapid Reactor Coolant System (RCS) depressurization and inventory loss. As currently configured, since cables associated with the SRVs share a common cable tray, a single hot short may result in the spurious opening of an individual SRV. Core Spray, RHR LPCI, and High Pressure Coolant Injection (HPCI) can not be assumed to be immediately available due to potential fire-induced failures. The consequence of multiple SRV failures without the availability of a high volume injection system is unreviewed at this time.

4. Potential uncontrolled opening of Reactor Head Vent Valves (02-AOV-17 and 02-AOV-18)

Spurious opening of these valves would cause uncontrolled loss of reactor inventory and drywell heating. The Reactor Head Vent Valves were assumed to be maintained closed in the 1982 Appendix R analysis. The physical plant design does not support this assumption. Specifically, the NYPA response to NRC Question 2.b is documented in Section 5 of the 1982 analysis which states that cables associated with the Reactor Head Vent Valves are

separated in accordance with Appendix R requirements in plant areas other than the Control Room, Cable Spreading Room or Relay Room, but the Reactor Head Vent Valves actually share a common cable. A documented analysis of the acceptability of the spurious opening of these redundant valves has not been performed.

5. Potential for Administration Building fire to result in a loss of redundant divisions of safe shutdown systems

A fire in Fire Area IA of the Administration Building may cause multiple cable failures and result in a loss of redundant divisions (A and B) of required equipment. In the event of fire in this area, the current (1982) analysis relies on the availability of Division A safe shutdown systems. However, the 1992 reanalysis identified many Division A cables which may fail as a result of fire in this area. Additionally, the reanalysis found that Division B may also be affected, since the power cable to Division B RHR pump 10P-3D is also located in this area.

6. A postulated fire may result in a failure to isolate the HPCI steam line

To ensure HPCI steam line isolation during a Control Room, Relay Room or Cable Spreading Room fire, the 1982 analysis relied on the closure of motor-operated valves 23MOV-60 and 29MOV-77. Controls for these valves have been provided on the alternate shutdown panel. However, the 1992 reanalysis has identified that the power cable for these valves is routed through the Cable Spreading Room. Consequently, a fire in the Cable Spreading Room (part of Fire Area VII) may result in a loss of motive power to these valves, potentially resulting in an inability to achieve this shutdown goal.

7. Inadequate ESW pump isolation

In the event of fire in Fire Area VII (Control Room, Cable Spreading Room, or Relay Room), ESW Pump 46P-2B would be relied on to support the achievement of safe shutdown conditions. However, the 1992 reanalysis identified that a fire in Fire Area VII may also affect control cable 1FSWBBC098, resulting in Pump 46P-2B becoming disabled. Controls for this pump have been provided on the alternate shutdown panel. However, due to design errors, the isolation contacts, as currently configured, do not completely isolate the pump control circuits from Fire Area VII.

2.3.3 Open Items (43) Resulting from the 1992 Reanalysis

As a result of its 1992 reanalysis, NYPA has identified 43 issues to date which must be resolved in order to achieve full compliance with the post-fire safe shutdown capability criteria of Section III.G of Appendix R. The 1992 reanalysis also presents outlines of corrective actions currently proposed by NYPA in order to resolve each finding.

Depending on the specific nature of the problem, proposed corrective actions may include some combination of plant modifications, additional analysis, compensatory actions or manual operator actions governed by written procedures. This item remains unresolved pending completion of the licensee's ongoing Appendix R reanalysis and resolution of the 43 open items (URI 333/92-80-04).

2.3.4 Use of ADS/LPCI Method for Safe Shutdown

The team noted that the systems and methodology currently being proposed by NYPA as a result of its reanalysis represent a major change from those previously approved by the NRC staff in its April 1983 SER. Specifically, where the former analysis specified the use of a high pressure reactor coolant makeup system, HPCI or Reactor Core Isolation Cooling (RCIC) in the event of a fire in areas other than those requiring alternative shutdown from outside the Control Room, NYPA currently proposes the use of the Alternate Depressurization System (ADS) system to depressurize the reactor and RHR in the LPCI mode to provide a low head, high flow rate, makeup capability. The inspection team informed NYPA representatives that the acceptability of using ADS/LPCI for fire areas not requiring alternative shutdown would require additional review and approval by NRR. The detailed plan, schedule, and description of the resolution of these issues is an unresolved item (URI 92-80-05).

2.3.5 Licensee's Proposed Corrective Actions to Assure Alternative Shutdown Capability

In the event of a fire requiring Control Room evacuation, Sections III.G.3 and III.L of Appendix R require each licensee to demonstrate the ability to achieve cold shutdown conditions from outside the Control Room. Therefore, the licensee's analysis must assure that circuits and cabling of required equipment are electrically independent of fire areas requiring this alternative shutdown capability, and that fire initiated hot shorts, open circuits or shorts to ground which may occur as a result of fire within the area under consideration will not adversely affect the alternative shutdown capability. Specific guidance related to this issue has been provided by the NRC staff in Generic Letters 81-12, 84-09, 85-09, and 86-10.

During the inspection, the team reviewed corrective actions specifically related to the alternative shutdown capability of the plant. Of the 43 open issues NYPA has identified to date, 15 corrective actions were found to be related to its existing alternative safe shutdown capability. It should be noted that the actual corrective action to be implemented in order to resolve each issue is still under review by NYPA.

The NYPA identified deficiencies related to alternative shutdown capability and its proposed corrective actions are:

1. Isolation of Reactor Head Vent Valves (02AOV-17 and 02AOV-18)

Spurious opening of these valves would cause uncontrolled loss of reactor inventory and cause drywell heating. (Details discussed in Report Section 2.3.2 above)

The following modifications are proposed if additional analysis confirms that Drywell heat-up and inventory loss concerns are valid:

- Modification to isolate either valve from a new alternative shutdown panel to be located outside the Control Room; and

- Modify Control Room switch circuitry such that the negative leg is not normally connected.

2. Spurious Opening of ADS Valves (02SOV-71A1, B1, C1, D1, E1, F1, G1, H1, J1, K1, and L1)

Spurious opening would cause uncontrolled loss of reactor inventory. (Details discussed in Section 2.3.2 above)

NYPA currently plans to install a new alternative shutdown panel for the ADS valves. The electrical isolation provided by this panel will ensure that a single hot short will not cause the spurious opening of an individual ADS valve. This new panel will be located immediately outside the Control Room.

3. Torque/Limit Switch Override

This is a generic issue which was recently identified by other licensees (NRC IN 92-18, "Potential for Loss of Remote Shutdown Capability During a Control Room Fire"). As currently configured, a Control Room fire can potentially actuate the control circuits of numerous MOVs required for alternative shutdown. There is a potential for a hot short to occur on control circuits located downstream of MOV limit or torque switches. If this short were to occur prior to operator actuation of isolation transfer switches located outside the Control Room, severe damage (motor burnout) to the MOV may occur.

Currently NYPA intends to either:

- Perform circuit modifications necessary to reconfigure the existing limit/torque switch wiring arrangement such that hot shorts that may occur in the Control Room will not cause MOV limit or torque switches to be bypassed, or

- Resize thermal overloads provided for motor protection.

4. Containment Spray Isolation Valve Operability

Cabling associated with redundant containment spray isolation valves (10MOV-26B and 10MOV-31B) is located within Fire Area VII. The existing 1982 analysis was based on a review of cabling necessary to ensure these valves remained closed, not those required to ensure operability. NYPA is currently evaluating the need for Containment Spray (CS) during alternative shutdown, e.g., Containment Spray would be required in the event of a fire initiated spurious opening of reactor head vent valves.

The proposed corrective actions are:

- To ensure that the valve remains closed, install the capability to transfer and control either 10MOV-26B or 10MOV-31B on the alternate shutdown panel.

- If it is determined that containment spray is required, install both valves on the alternate shutdown panel.

5. RCIC Steam Supply Isolation Not Assured

Cables associated with normally closed valve 13MOV-131 are located in Fire Area VII (cabling associated with normally open valves 13MOV-15, 13MOV-16, and 13MOV-32, also located in Fire Area VII). Cable failures of 13MOV-131 may result in opening of this valve and result in a loss of RCS inventory prior to ADS actuation, thereby shortening the time for operator action.

Proposed corrective actions are:

- Demonstrate by analysis that the failure to isolate this line will not affect safe shutdown; or

- Reroute and protect cables necessary to assure isolation capability.

6. Isolation of Essential Service Water (ESW) Flow to Drywell Coolers

Isolation of ESW flow to drywell coolers is required when only one ESW Pump is available (as during alternative shutdown). Cabling associated with isolation valves 15MOV-102 and 15MOV-103 are located in Fire Area VII.

Proposed corrective actions are:

- Demonstrate by analysis that valve opening will not affect alternative safe shutdown capability, or sufficient time exists to perform required local operator actions; or

- Implement modification to protect circuitry of both valves, or
- Install both valves on alternate shutdown panel (This action may require significant modifications since one valve is a Division A valve).

7. Loss of Required 125VDC Power Source 71BMCC-2

Cable 1DMSBBK015 is located in this fire area. A loss of this cable would result in a loss of power to 71BMCC-2. This would preclude the closing of outboard steam to HPCI Isolation Valve (23MOV-60) and Main Steam Line Drain Outboard Isolation Valve (29MOV-77).

Proposed corrective actions are to reroute or protect cable 1DMSBBK015.

8. Spurious Opening of Containment Nitrogen Makeup Lines

A fire in Fire Area VII may result in the spurious opening of containment nitrogen makeup lines (27FCV-103A and B, 27MOV-131A and B, 27MOV-132A and B) and deplete nitrogen supply. Nitrogen is required for ADS valve operation.

Proposed corrective actions are:

- Demonstrate by analysis that sufficient time exists to manually isolate nitrogen flow; or
- Provide a backup source of Nitrogen (Nitrogen bottle).

9. Inboard and Outboard Main Steam Isolation Valves (MSIVs)

Inboard and Outboard MSIVs (29AOV-86A through 29AOV-86D) may spuriously actuate as a result of a fire in Fire Area VII.

Proposed corrective actions are to install isolation capability on new alternate shutdown panel to be located immediately outside the Control Room.

10. Loss of ESW Pump 46P-2B

ESW Pump 46P-2B is relied on to support safe shutdown in the event of fire in fire area VII. A fire in this area may cause the loss of control cable 1ESWBBC098 resulting in ESW Pump 46P-2B becoming disabled. Controls for this pump are located on the alternate shutdown panel. However, the isolation contacts currently provided do not completely isolate the pump control circuits from Fire Area VII.

Proposed corrective actions are to provide isolation capability on alternate shutdown panel.

11. Loss of DIV B Electric Bay Cooler

Division B Electric Bay Cooler (67UC-16B) may be lost as a result of fire in Fire Area VII.

Proposed corrective actions are:

- Demonstrate by analysis that portable ventilation is a viable alternative and adequate; or
- Install 67UC-16B on the alternate shutdown panel.

12. Loss of Battery Room HVAC

A fire in Fire Area VII could result in loss of cables and panels required for A and B divisions of Battery Room HVAC (72AHU-30B, 72FN031B and 72FN046B).

Proposed corrective actions are to provide portable ventilation in accordance with AOP-58.

13. Loss of RHR Service Water

A Control Room fire could disable 3 of 4 RHR pumps. Two pumps may be required to support safe shutdown.

Proposed corrective actions are:

- Demonstrate by analysis that reliance on one pump is acceptable to support safe shutdown; or
- Install required controls for an additional RHR Service Water pump on the alternative shutdown panel.

14. Instrumentation Tubing

Instrumentation tubing has not been included in Appendix R Analysis

Proposed corrective actions are to include instrumentation tubing in analysis and perform modifications as required to achieve compliance.

15. Emergency Diesel Generator (EDG) Overheating

A spurious start of an EDG, without ESW being available, may occur as a result of a Control Room fire.

Proposed corrective actions are to demonstrate by analysis that EDG overheat will not occur in the period required to establish ESW flow from alternative shutdown panel.

Summary

During the inspection, each issue described above and its corresponding corrective actions proposed by NYPA were discussed with representatives of the licensee. Based on the results of these discussions, the team found that the NYPA proposed corrective actions outlined here and in the discussions have the potential to provide an acceptable approach toward achieving compliance with the requirements of Appendix R to 10 CFR 50. Detailed plans and procedures and the results of the proposed analyses remain to be developed by NYPA and reviewed as necessary by the NRC. Apparent violations resulting from the failure of the licensee's 1982 analyses to meet 10 CFR 50, Appendix R, Section III.G.3 and III.L are discussed in Report Section 2.4 below.

2.4 Safe Shutdown Capability (Compliance with 10 CFR 50, Appendix R)**

2.4.1 Redundant Safe Shutdown Capability (Section III.G.2)

Section III.G of Appendix R to 10 CFR 50 "Fire Protection of Safe Shutdown Capability" describes specific design features necessary to assure an adequate level of protection for redundant trains of equipment relied on to achieve and maintain safe shutdown conditions in the event of fire. Where redundant trains of cables or equipment (including associated non-safety circuits that could prevent operation or cause mal-operation of required equipment due to hot shorts, open circuits or shorts to ground) are located within a common fire area, Section III.G.2 specifies the following protection alternatives:

- Separation of redundant trains of equipment by a three-hour rated fire barrier, or
- Provision of 20 feet of horizontal separation between redundant trains of equipment with no intervening combustibles and area wide, automatic suppression systems and fire detection capability, or
- Enclosure of cables or equipment in a one-hour rated fire barrier with automatic suppression and detection capability in the fire area.

For those fire areas which do not satisfy the protection alternatives (typical examples include the Control Room, or Cable Spreading Room), Section III.G.3 requires an alternative or dedicated shutdown capability which is physically and electrically independent of the fire area under consideration.

**Inspection procedures 64100 and 64150

In order to adequately demonstrate compliance with Section III.G of Appendix R, the licensee's analysis must consider the potential effect of fire on all cables and circuits necessary to assure operability of systems and equipment relied on to achieve a given safe shutdown performance goal (e.g., reactor coolant makeup and decay heat removal).

Additionally, Section III.G requires that this analysis also includes an evaluation of the potential effect of fire initiated hot shorts, open circuits and shorts to ground on all nonessential, or Associated Circuits." As defined by NRC Generic Letter 81-12, associated circuits of concern may be categorized into one of three distinct types:

- Circuits associated by common power source (i.e., nonessential circuits which share a common switchgear, MCC or distribution panel with circuits of equipment relied on to achieve post-fire safe shutdown)

- Circuits associated by common enclosure (i.e., nonessential circuits which share a common cable tray, conduit, junction box etc. with required circuits).

- Circuits whose spurious operation may adversely impact the achievement of a safe shutdown performance goal.

In Generic Letters 81-12 and 86-10, the NRC staff has provided acceptable protection alternatives for each type of associated circuit concerns defined above.

2.4.1.1 Funcuonal Requirements

The licensee's shutdown methodology is being revised from that described in the 1982 analysis to rely upon ADS and LPCI for all fire areas. This was discussed above in Report Section 2.3. The basic features identified in the 1982 analysis and the differences in the proposed 1992 analysis are:

Reactivity Control

Manual scram either from the Control Room or by alternate means outside the Control Room is available. Automatic scram remains available because the scram system is designed to fail in the safe condition upon electrical de-energization. Control Room indication of rod positions allows the operators to confirm rod insertion.

Reactor Coolant Makeup

In the 1982 analysis, Reactor Coolant System (RCS) makeup was provided primarily by the HPCI or RCIC systems. As a result of the preliminary 1992 analysis, HPCI and RCIC capability will not be assured in many of the fire areas. Therefore, safe shutdown may not have been achievable for fires in those areas, since, in addition, the appropriate division of ADS and LPCI may not be available or protected from spurious actuations.

Reactor Coolant Pressure Control

In the 1982 analysis, pressure control was provided by the HPCI or RCIC systems. The safety/relief valves can maintain a constant RCS pressure and the ADS valves can be used to maintain a relatively constant pressure or to reduce pressure to the point of the LPCI System initiation and operation.

A long term supply of nitrogen to operate the ADS valves is provided from the Containment Atmosphere Dilution (CAD) nitrogen tanks by opening two air operated valves; their associated solenoid operated valves (SOVs), and a downstream SOV. With the loss of HPCI and RCIC capability as identified in the 1992 reanalysis, the appropriate division of ADS and LPCI may not have been available or protected from spurious actuations.

Decay Heat Removal

Unavailability of HPCI and RCIC also affects decay heat removal capability as above. In the 1982 analysis, initial cooling was provided by the RCIC or HPCI systems. Extended cooling to achieve cold shutdown was by the shutdown cooling mode of the RHR system or the use of alternate shutdown cooling through one SRV together with the suppression pool cooling mode of the RHR system. In the shutdown cooling mode, the two normally closed motor operated RHR valves, MOV-17 and MOV-18, in the shutdown cooling line from one of the reactor recirculation lines, are opened to allow flow directly to the either set of RHR pumps. In the proposed 1992 analysis, the shutdown cooling line would not be used and cold shutdown would be achieved by continuing the suppression pool cooling mode of RHR except that water, rather than steam, would pass through the one SRV discharging to the Suppression Pool. This is known as the Alternate Shutdown Cooling Mode.

Process Monitoring

Reactivity control is normally monitored by the Source Range Instrumentation and by the position indications of the control rods. The scram air actuator positions also provide indication of reactivity control. Reactor pressure and water level indication are available in the Control Room. Similarly, Suppression Pool water level and temperature indication are also available in the Control Room. RHR flow and pressure are also monitored as well as RHR Service Water flow. Essential Service Water (ESW) flow indication is available both in the Control Room and locally at the Emergency Diesel Generators. Position indication of the ADS valves and the outboard MSIVs is available in the Control Room and locally.

Numerous problems concerning process monitoring have been identified in the proposed 1992 analysis, including possible loss of all reactor pressure indication, as discussed above in Section 2.3. Also, the licensee is in the process of performing an instrument sensing line study which will examine the effects of fire on the instrument readings. If HPCI and RCIC

are required, the power supply to the Condensate Storage Tank (CST) level instrumentation will need to be modified. In the 1992 reanalysis, drywell temperature indication is no longer considered necessary.

Support Functions

The primary support functions are RHR Service Water to cool the RHR Heat Exchangers and ESW to supply cooling water to various essential HVAC loads. In the 1992 reanalysis, the RHR pump seal coolers are no longer considered to be an essential load on the ESW System. The licensee's documentation consists of Modification Control Manual Form (MCM)-6A, Attachment 4.1, and Form MCM-6A, Attachment 4.4, of 1, and associated documents. In addition, Safety Evaluation No. JAF-SE-90-067, identifies the safety related components which require ESW support during and following a design basis accident (DBA), the minimum flow rates to those components required during a DBA, and the heat loads imposed upon ESW during the DBA. According to the documentation, failure of a seal on an RHR pump does not affect the expected hydraulic performance of the pump nor significantly affect maintenance of reactor makeup and Suppression Pool water level, but will result in extensive contamination of the Crescent Area of the Reactor Building in which the RHR pumps are located.

The essential HVAC loads include the Control Room and the Relay Room, the East and West Electrical Bays, the East and West Crescent Areas, the Screenwell Area containing the RHR Service Water and the ESW pump rooms, the Diesel Generator Room, and the Station Battery Rooms.

For the 1992 reanalysis, the licensee will assure that electric power will be available to support the ADS/LPCI mode of operation for all fire areas. Such electric power may include reliance upon the onsite and/or offsite power sources.

A preliminary review of the 1992 reanalysis show that modifications will be necessary to achieve compliance for many of the fire areas which do not require alternative shutdown. The 1992 reanalysis does identify the HPCI and RCIC components which would need to be protected in the event that the ADS/LPCI method is not acceptable for all fire areas.

2.4.1.2 Redundant Train Separation

For a selected sample of fire areas, the inspection team reviewed the licensee's current post-fire safe shutdown methodology (as determined from its 1982 analysis), and compared it to the results obtained from its 1992 reanalysis. Contrary to the requirements above, the 1992 reanalysis identified numerous deficiencies related to the adequacy of the separation of cables of required equipment, and the level of protection provided for fire initiated spurious operations. Deficiencies related to each Fire Area reviewed are described in Attachment 4 of this report. Specific examples of the licensee's apparent violation (EEI-333/92-80-06A) of the redundant train separation requirements of 10 CFR 50, Appendix R, Section III.G for

fire areas not requiring alternative shutdown capability include (also see items EEI 333/92-80-06 B, C, and D in Sections 2.4.1.3 and 2.4.2.2 for other apparent examples of other Appendix R violations):

1. Fire Area 1A

Fire Area IA, located on the 272', 286', and 300' elevations of the Administration Building, consists of seven Fire Zones; AD-1,3,4,5,6, AS-1 and MG-1. In the event of fire in this area, the existing 1982 analysis relies on the use of RCIC and Division A components of ADS, RHR, and Core Spray to achieve safe shutdown conditions. However, the 1992 reanalysis identified numerous A Division cables routed through this Fire Area. With a loss of Division A power, RCIC would not be available. Additionally, RHR capability cannot be assured since the power cable (1RHRDBH004) for the designated RHR pump (10P-3D) is also routed through this area (redundant RHR pumps may also be affected by fire in this area). The 1992 reanalysis recommends revising the current methodology to rely on use of Division B systems for a fire in Area IA.

2. Fire Area ID

Fire Area ID consists of a single Fire Zone, North Cable Run Room (CT-4). The 1992 reanalysis found that a fire in this area would result in a loss of ventilation to the Relay Room (an alternative shutdown fire area) which is located adjacent to this Fire Zone. Additionally, the availability of HPCI, which is currently relied on to provide RCS makeup, can not be assured for a fire in this area due to the potential for spurious equipment operations. The existing 1982 analysis also relies on Division B of RHR for Suppression Pool Cooling. However, the 1992 reanalysis determined that operability of this system also can not be assured due to spurious operations. The 1992 reanalysis recommends changing this area to an alternative shutdown fire area.

NYPA currently plans to achieve compliance with Appendix R prior to restart from the present refueling outage. Some of the activities needed for this effort are:

1. Complete and implement the 1992 reanalysis

2. Complete modifications, analyses, and evaluations

- Complete those modifications needed to achieve compliance where additional analysis shows modification to be the only acceptable alternative.

- Evaluate ventilation issues to determine requirements. Install required modifications or provide portable ventilation capability, including new or revised procedures.

3. Develop exemption requests and/or justifications for startup or continued operation, provide these to the NRC, obtain agreement, and provide appropriate compensatory actions for those items that can not be completed prior to startup.

The inspectors reviewed the licensee's tentative approach and schedule for resolving safe and alternative shutdown capability deficiencies identified by its revised analysis, and found them to be responsive to the technical issues.

2.4.1.3 Appendix R Fire Protection Features

10 CFR 50, Appendix R, Section III.G, requires that fire protection features shall be provided for structures, systems, and components important to safe shutdown. These features shall be capable of limiting fire damage so that one train of systems necessary to achieve and maintain hot shutdown from either the Control Room or emergency control stations is free from fire damage. In order to ensure that one train of safe shutdown capability (outside the containment boundary) is free from fire damage, Appendix R requires the protection alternatives outlined in Section 2.4.1.2.

In order to verify the adequacy of the implementation of these Appendix R fire protection features at the FitzPatrick facility, the team performed a walkdown (i.e., visual inspection of automatic fire detections and suppression systems, 1 and 3-hour rated fire barriers, and manual fire fighting equipment) of the following safe shutdown related areas:

- Elevation 255'-0", Screenwell House, Safety Related Pump Rooms (Fire Areas XII and XIII), and the Diesel Fire Pump Room;

- Elevation 258'-0", East and West Cable Tunnels (Fire Areas IC and II);

- Elevation 272'-0", Emergency Diesel Generator and Switchgear Rooms (Fire Areas V and VI), Electric Bays (Fire Areas IC and II), Battery Rooms and Battery Room Corridor (Fire Areas III and IV), Cable Spreading Room (Fire Area VII), and Reactor Building East and West (Fire Areas X and XI);

- Elevation 286'-0", Relay Room (Fire Area VII), and North and South Cable Tunnels (Fire Areas ID and XI); and

- Elevation 300'-0", Control Room (Fire Area VII), and Reactor Building (Fire Areas VIII, IX and X)

As a result of this walkdown, the team noted several discrepancies associated with various plant fire protection features. These discrepancies are discussed further in Section 2.5.5 of this report. In addition, the inspectors noted discrepancies associated with the required Appendix R features.

Several problems were associated with the installation of fire doors, dampers, and penetration seals (piping and electrical) in the required 3-hour Appendix R related fire barriers (walls, floors and ceilings). The team noted that some of the existing penetration seals in fire barrier walls were of a combustible urethane foam and fiberglass configuration. In addition, the team noted that several silicone foam type seals were degraded or were not well maintained. As a result of penetration seal related concerns identified in NRC inspection report 50-333/90-09, dated March 1, 1991, and the findings identified in the licensee's July 1991 Triennial Fire Protection Audit, the licensee had implemented a fire barrier reevaluation program. This program is being conducted in two parts. The first part, using the results of the Appendix R program reevaluation, consists of reverifying the location of the Appendix R required fire barriers. Concurrent with the reverification of the fire barrier locations, the licensee is conducting the second part. This part consists of a base line verification inspection of all fire barrier penetration seals associated with Appendix R and License Condition 2.C(3). The licensee, in their September 13, 1991, letter, committed to complete the fire barrier reevaluation program 30 days after startup from the 1993 refueling outage.

As of March 9, 1992, the licensee has inspected 12,881 penetration seals representing 98% of the installed fire barrier penetration seals in the plant. The licensee has completed 6,100 total seal evaluations (2 seal inspections per evaluation). Based on the results of these evaluations, 2,601 seals require repairs. Of the 2,601 seals requiring repairs, 2,003 seals have been declared inoperable. This condition has resulted in the posting of 34 firewatches. Of the 2,601 seal repairs, approximately 1,050 are associated with the Cable Spreading Room ceiling or the Relay Room floor. The licensee has completed 800 total repairs; all remaining repairs were currently scheduled to be completed by mid to end of May of 1992.

The licensee has indicated that it has started the engineering effort to define the necessary repairs and modifications to fire dampers. Currently, the licensee has identified approximately 30 fire dampers that need repair or upgrade. These fire damper repairs or modifications will be performed under the same schedule for the fire barrier reevaluation program.

The adequacy of the licensee fire barrier reevaluation program, fire barrier penetration and damper modifications, the schedule for completion, and the revised surveillance and testing program (additional concerns are noted in Section 2.5.4.1) to assure Appendix R compliance is considered unresolved pending NRC review of these Appendix R related fire barrier issues (URI 333/92-80-07A).

The team visually inspected the 1-hour electrical raceway fire barrier enclosures in the East and West Cable Tunnels. In the West Cable Tunnel, an A Division room, armored cable 1AH114BE (4160v feed to 600 B Division switchgear) is wrapped directly with Kaowool FP-60 Fire Blanket Protection System. The team identified concerns regarding the "as-built" application of this fire barrier material and requested the fire qualification test for this configuration. The licensee supplied the team with the following design and qualification

documentation: (1) Safety Evaluation No. JAF-SE-85-131, (2) Installation Procedure No. F1-85-065; and (3) Underwriters Laboratories Report R11044-1, Project 84NK8356, March 22, 1985. Based on the review of the UL test report, the team had the following concerns: (1) The UL test qualified the Kaowool FP-60 material on a 36 inch wide x 4 inch deep solid metal cable tray and a nominal 5 inch diameter conduit; armored cables wrapped with FP-60 were not included in the scope of this test; (2) The air drop cables (cables wrapped directly with FP-60 material, which were within the scope of the UL test, experienced a cold side temperature in excess of 600°F. The 600°F cold side temperature exceeds the NRC's 325°F maximum cold side temperature criterion. The air drop cables test is the closest configuration to the "as-built" armored cable configuration, and (3) The installation procedures were developed from an American Nuclear Insurers (ANI) acceptance of testing bulletin, dated April 1985. This ANI bulletin only approved the cable tray and conduit configuration and not the air drop test results.

Based on the team's review of the 1-hour electrical raceway fire barrier design documentation, the adequacy of this design to provide the level of fire resistive protection required by Appendix R, Section III.G.2.c, is indeterminate. Currently, the licensee as a part of their Appendix R reevaluation is verifying the adequacy of the design basis and the design of 1-hour raceway fire barrier systems. Therefore, based on the licensee's on-going reevaluation efforts in this area, the team consider the adequacy of the 1-hour electrical raceway fire barriers to be unresolved, pending completion of the licensee's evaluations (URI 333/92-80-07B). The two parts on the unresolved item on the fire barriers as discussed above (URIs 333/92-80-07A and B) together constitute a single item (URI 333/92-80-07).

During the inspection of the West and East Cable Tunnels, the team noted that an automatic water spray system was provided for the cable trays. In addition, the team noted that this system did not possess the capabilities to control and extinguish a floor based exposure fire. In the West Cable Tunnel, permanent storage of combustibles associated with electrical maintenance were located in the area directly under the 1-hour protected cables. Some of the combustible material was located in two cage type room enclosures. These enclosures were located in such a manner to present a direct fire exposure to the Appendix R required 1-hour fire rated raceway enclosure. The floor area in and around the raceway fire barriers was not protected by an automatic fire suppression system. Therefore, the existing design of the cable tray fire suppression system does not provide an equivalent level of fire protection to that required by Appendix R, Section III.G.2.c, and is identified as an apparent violation of Appendix R, Section III.G.2. (EEI 333/92-80-06B).

The team also visually inspected the automatic CO_2 fire suppression systems in the Electric Bays, Diesel Generator Switchgear Rooms, Cable Spreading Room, North and South Cable Tunnels and Relay Room. Based on this inspection, the team requested verification of the system design basis and initial performance testing for these systems. The licensee was unable to produce the engineering documentation necessary to determine the design basis for these systems. Therefore, as a result of the system observations and review of the limited design documentation, the team had the following concerns: (1) The fire detection and

actuation devices associated with the automatic CO_2 fire suppression systems are not installed at the ceiling; (2) The placement and the number of detectors does not meet the intent of National Fire Protection Association (NFPA) code 72E; (3) The current detection design layout associated with these systems could result in significant system actuation delays in the event of an actual fire condition; and (4) Verification of the design basis and system performance for each CO_2 system cannot be substantiated, e.g., CO_2 design concentration, system CO_2 flow rates, and rates of system discharge, etc. Based on the lack of CO_2 system design information available to the team, the adequacy of the fire detection and CO_2 fire suppression systems required to comply with Appendix R is indeterminate. The licensee indicated that, as a part of their ongoing Appendix R reevaluation, it is reconstituting the design basis for the CO_2 systems and reanalyzing the adequacy of the fire detection systems. The team considers the identified issues associated with the CO_2 fire suppression and the detection systems to be unresolved pending NRC's review of the licensee resolution of these concerns (URI 333/92-80-08).

On February 1, 1984, the NRC issued an Exemption to 10 CFR 50, Appendix R, Section III.G.2, for the FitzPatrick facility. This Exemption allowed fire area boundaries to be established in the Reactor Building through the use of automatic water curtains. The exemption allows the use horizontal (stairwell opening) and vertical water curtains. The team focused on the design adequacy of the vertical curtains to deliver a water density of 3 gallons per minute per linear foot of water curtain.

On elevation 227'-6," the Reactor Building Crescent Area is divided by a water curtain, at the T column line, into two fire areas. A second water curtain, installed along the T column line, divides the Reactor Building into two fire areas on elevation 272'-0". On elevation 300'-0", two additional water curtains are used to divide the Reactor Building into the three required fire areas. The team performed a visual inspection of the Reactor Building water curtains on 272'-0" and 300'-0" and reviewed the design documentation associated with these systems. The team reviewed the Stone and Webster (SWEC) hydraulic water spray system calculations (No. 14863.01-B-1) to determine the adequacy of placement, layout, and projected spray patterns for the Automatic Sprinkler type 187-F-62 and 218-F-60 nozzles. Based on the visual inspection and the basic hydraulic performance review, the team found the layout and design of the Reactor Building water curtains to meet the requirements established by the Exemption. The adequacy of the licensee's fire protection surveillance program, to assure that these curtains are not obstructed or breached and are maintained in an operable condition, will be further reviewed by the NRC (Report Section 2.5.4.1 provides further details).

2.4.2 Alternative Shutdown Capability

2.4.2.1 Functional Requirements

The basic method of relying upon ADS and LPCI followed by RHR Suppression Pool Cooling for both hot shutdown and cold shutdown remains the same as in the 1982 analysis. This method was needed for fires in the Control Room, Cable Spreading Room, and Relay Room.

However, at least two additional areas requiring alternative shutdown have been identified:

- Fire Area ID, Zone CT-4, North Cable Tunnel, which is equipped with CO_2 suppression and full area detection.

- Fire Area III, Zone BR-5, Battery Room Corridor currently does not have automatic suppression available.

For reactivity control, the alternate means of reactor scram outside the Control Room in order of preference in the existing procedure AOP-43 are:

- Opening RPS scram breakers in the Relay Room. The Relay Room may not be accessible due to the fire.

- Opening the output breakers for the RPS Motor Generator Sets in the East and West Electric Bays.

- Tripping the Main Turbine at the front standard which will result in a reactor scram if reactor power is greater than 30%.

- Isolating and venting the CRD instrument air header at the scram air filters.

Although the licensee would shed offsite power during implementation of the alternative shutdown procedure, the diesels would have already been started and synchronized to the bus prior to shedding offsite power, so that at no time should the safety buses lose power.

The process monitoring functions available on the existing remote shutdown panel (25RSP-1) for the shift supervisor are:

- Torus water level 23LI-204 torus temperature 27TI-101

- Drywell temperature

- RHR D Pump discharge pressure 10PI-279 and RHR B Loop flow 10FI-133

At ADS Relief Valve Control Panel 02ADS-71, seven ADS valves can be opened and their position monitored. At alternate shutdown panel 25ASP-1, the outboard MSIVs can be controlled and their positions monitored. However, the 1992 reanalysis indicates that there are potential spurious signal concerns with control of these components from these panels.

The documentation referred to in Section 2.4.1.1, concerning the loss of seal cooling normally provided by the ESW System to the RHR pump, does not specifically consider the Appendix R post-fire scenario in which the flow diversion path of the RHR Pump B minimum flow valve 10MOV-16B remains open, as intended by procedure AOP-43, while leakage of 23 gpms exists through the seal of the same RHR pump. The licensee, in their reevaluation, will assure that adequate RCS makeup is maintained. Additionally, this reevaluation will have to consider the potential environmental conditions at the alternate shutdown panel ASP-2, which is located in the Crescent Area, because ASP-2 contains the local/remote switch and the control switch for 10MOV-16B, which is located in the Crescent Area, and manual actions in the Crescent Area may be required to close 10MOV-16B.

2.4.2.2 Conformance with the Safety Evaluation Report (SER) of April 26, 1983

On April 26, 1983, the NRC issued the SER concerning the licensee compliance with 10 CFR 50, Appendix R, Section III.G.3 and III.L, Alternative Shutdown Capability. This SER evaluated the licensee's ability to bring the reactor to a cold shutdown condition in the event of a fire which caused significant fire damage to either the Control Room, Cable Spreading Room, or the Relay Room. The SER identified that the alternative shutdown capability for these areas is achieved by using ADS (Division B), RHR B in the LPCI mode. The licensee's alternative shutdown methodology depressurizes the reactor by opening the ADS valves and then re-floods the reactor using RHR/LPCI. RHR/LPCI is allowed to fill the reactor vessel with water. Reactor water is then discharged through the open ADS valves and flows from the valves to the Suppression Pool.

As a result of various issues arising from NRC Appendix R inspections, specifically in the area of the III.G fire protection features and III.L associated circuits concerns, the NRC issued Generic Letter (GL) 86-10. This letter provided additional Appendix R compliance guidance and supplemented the guidance provided by GL 81-12 and 83-33. GL 86-10 requested licensee to review this guidance and appropriately factor the guidance into their programs. There are no indications that NYPA evaluated its Appendix R program using the guidance of GL 86-10. As a result of concerns arising from the July 1991 Triennial Fire Protection QA audit and the fire protection issues identified in the NRC's December 3, 1991, Diagnostic Evaluation Team report, the licensee initiated a reanalysis of their FPP program and compliance with 10 CFR 50, Appendix R, Sections III.G, III.J, and III.L. The licensee's 1992 ongoing reevaluation has identified several shutdown-related vulnerabilities. The 1992 reanalysis has identified two additional areas (North Cable Tunnel/Fire Area ID and the Battery Room Corridor) of the plant where a significant fire would require the abandonment of the Control Room and the implementation of alternative shutdown capability. The vulnerabilities associated with the ability to achieve safe shutdown are discussed below.

Thus, a significant fire in either the Control Room, Cable Spreading Room, Relay Room, North Cable Tunnel, or the Battery Room Corridor would require the implementation of the plant's alternative shutdown capability.

For a fire which caused significant damage in either the Control Room, Cable Spreading Room, or Relay Room (Fire Area VII), the licensee's 1992 Appendix R reevaluation has identified the following potentially significant spurious operations or equipment failures which could have had an impact on the implementation of alternative shutdown capability. The result of a fire in Fire Area VII includes these, several of which were detailed in Section 2.3.2:

- Reactor head vent valves 02AOV-17 and 18 may open. The spurious opening of these valves would cause the loss of reactor inventory and drywell heating;

- ADS valves (02SOV-71A1, B1, C1, D1, E1, F1, G1, H1, I1, J1, K1, and L1) are subject to potential spurious opening failures. This could result in the rapid uncontrolled loss of reactor inventory prior to establishing RHR/LPCI from the alternative shutdown control panels outside the Control Room;

- RHR valves 10AOV-71B and/or 36B could potentially spuriously open. Spurious opening of these valves could divert LPCI flow to the CST and/or RCIC suction;

- Redundant containment spray isolation valves 10MOV-26B and 31B could fail. Spurious opening of these valves could divert LPCI flow;

- Loss of cable 1DMSBBK015 would cause the loss of power to 71BMCC-2 and preclude the closing of outboard HPCI steam isolation valve 23MOV-60 and Main Steam Line Drain Outboard Isolation Valve 29MOV-77;

- Spurious opening of containment nitrogen makeup lines could deplete the nitrogen supply. Actuation of the ADS valves is dependent on the nitrogen supply;

- Inboard and Outboard MSIVs may spuriously open. This could result in an uncontrolled loss of reactor inventory;

- Cable 1ESWBBC098 could be lost and this condition could disable ESW pump 46P-2B;

- Potential disabling of the Division B electric bay coolers;

- Three of four RHR SW pumps could be lost. Two RHR SW pumps may be necessary to support safe shutdown; and

- Spurious start of the Emergency Diesel Generator without ESW may occur as a result of a fire in the Control Room. The licensee is performing a timeline analysis to determine if ESW can be established from the alternative shutdown panel, prior to an engine overheat condition.

The impact of these potential spurious equipment operations or failures, either collectively or singularly, could have a direct effect on the implementation of procedure AOP-43, and plant shutdown from outside the control room. Appendix R, Section III.G.3.a, establishes the requirement to provide alternative shutdown capability for those plant areas not meeting the separation requirements of Appendix R, Section III.G.2. The performance goals for alternative shutdown capability are established by the requirements of Appendix R, Section III.L.1. Section III.L.7 requires that the safe shutdown equipment and systems for each fire area shall be known to be isolated from associated circuits in the fire area so that hot shorts, open circuits, or shorts to ground in the associated circuit will not prevent the operation of the safe shutdown equipment. Contrary to the requirements of Appendix R, Section III.L.7, the licensee's 1982 analysis failed to adequately analyze the effects that hot shorts, shorts to ground, and open circuits may have on alternative shutdown capability. In addition, the above potentially significant spurious operations or equipment failures, as identified by the licensee's 1992 Appendix R reevaluation, could have affected the ability of alternative shutdown capability to achieve the performance goals of Appendix R Section III.L.1. This is identified as an apparent violation of Appendix R, Section III.L.7 (EEI 333/92-80-06C).

The licensee's 1982 Appendix R analysis did not identify Fire Area ID (North Cable Tunnel CT-4) or the Battery Room Corridor as areas which required alternative shutdown and the implementation of Procedure AOP-43. The licensee's 1982 analysis indicated that the shutdown method available to the operators in the Control Room for a fire in the North Cable Tunnel was ADS Division B, RHR Division B, HPCI, ESW Division B, RHRSW Division B, and the necessary process monitoring instrumentation. As a result of the licensee's 1992 Appendix R reevaluation, the 1982 shutdown methodology for the North Cable Tunnel may have been affected because of fire-induced spurious equipment operations. The following is a summary of the fire-induced spurious signals which could have affected the ability to achieve and maintain safe shutdown conditions from inside the Control Room with a fire in Fire Area ID or the battery room corridor:

- Cables associated with Control Room operated ADS valve solenoids are subject to fire induced spurious failures. This could result in the spurious opening of ADS valves;

- Fire induced spurious operations could affect the HPCI bypass test valves. Closure of these valves could cause reactor makeup water flow diversion;

- The fire could cause a loss of CST level indication;

- Fire could affect the operation of HPCI torus suction valve and the CST suction valve;

- The operation of the HPCI steam admission valve and power to the valve could be affected by the fire. The fire could cause valve closure and a subsequent loss of power to the MCC powering the valve; and

- As a result of the fire, RHR suppression pool cooling valves (10MOV-34B and 39B) could spuriously close.

The licensee's 1985 analysis did not take into account that Division A and B safe shutdown cabling was routed through the Battery Room Corridor and into the Cable Spreading Room. Therefore, this corridor in the 1992 Appendix R reevaluation was considered an extension of the Cable Spreading Room. For a fire in the Battery Room Corridor, safe shutdown would be achieved outside the Control Room utilizing alternative shutdown capability.

10 CFR 50, Appendix R, Section III.G.3.a, requires alternative or dedicated shutdown capability be provided for those areas where the protection of systems whose function is required for hot shutdown does not satisfy the separation requirements of Section III.G.2. Contrary to the Appendix R Section III.G.2. requirements, the licensee in their 1985 Appendix R analysis failed to fully identify the required cabling, components, and systems in the North Cable Tunnel and Battery Room Corridor necessary to assure that post-fire safe shutdown can be achieved and maintained. This condition was identified as a result of the licensee's 1992 Appendix R reevaluation. The failure of the licensee's 1982 Appendix R analysis to adequately analyze the separation of safe shutdown functions in the north cable tunnel and battery room corridor, and to provide alternative shutdown capability is an apparent violation of Appendix, Section III.G.3.a (EEI 333/92-80-06D).

2.4.2.3 Surveillance, Training, Staffing, and Procedures

There are two abnormal operating procedures AOPs associated with fire-related safe shutdown, AOP-28 and AOP-43, Another procedure, AOP-58, has recently been considered by the licensee to support post-fire safe shutdown. The team evaluated the adequacy of training and staffing associated with the implementation of post-fire safe shutdown using these procedures. In addition, the team evaluated the scope of the surveillance testing and the adequacies of the AOPs associated with the implementation of alternative shutdown capability.

2.4.2.3.1 Surveillance

The licensee does have a procedure, ST-99C "Inventory and Testing of Safe Shutdown Panels and Equipment Cabinets, CRD Venting Rig Equipment Cabinets, and AOP Equipment Cabinets," Revision 4, September 30, 1991. However, the only purposes of the procedure are to test the safe shutdown panel door switches and communication circuit, and to inventory the equipment and procedures in the local shutdown cabinets. There is no actual

testing of the remote shutdown panel control switches. The remote shutdown panels were tested following completion of construction in 1985. These tests were documented in the following preoperational test procedures: (1) POT-25A, ASP-3, (2) POT-25B, 25ASP-1 & 2, (3) POT-25C, 25RSP.

The licensee had made a commitment to generate a new periodic surveillance test procedure and to perform a test of the remote shutdown panels prior to restart. The surveillance test procedure will conform to the requirements of Generic Letter 81-12. This item remains unresolved pending completion of licensee's corrective actions and its review by NRC (URI 333/92-80-09).

2.4.2.3.2 Training for Operators

The team's evaluation of the adequacy of operator training found that training on AOP-28 and AOP-58 consists of an annual review of procedural changes by the operators. There is neither procedural walk-through or classroom training. For AOP-43, a semi-annual walk-through is specified by Indoctrination and Training Procedure (ITP)-5. Construction of the alternate shutdown panels were completed in August 1985 and the training records were computerized towards the end of 1986.

Licensed operators receive formal classroom instruction in fire protection systems in the initial license training course. Plant modifications associated with the fire systems are included in annual modification training. The fire protection system was not included in routine requalification training prior to the change to a "systems approach to training" in 1990. Training on the fire systems is scheduled for every four years. It was originally scheduled for Cycle 6 in 1991. Due to requalification problems and additional training requirements that resulted, fire systems training was deferred until 1992. It is currently planned for inclusion in Cycle 5 of this year (1992).

During the inspection, a sampling of the training records for all four procedures were reviewed by performing a review of training records for four operators, two licensed and two non-licensed, for the period from 1985 to the present. In the case of one licensed operator, walk-through records could not be found for 1989. For the other licensed operator, the walkthroughs were conducted at least annually, but not semiannually in all cases as specified by ITP-5. For one of the nonlicensed operators, no records could be produced for the walk-through from 1985 to 1989. For the other non-licensed operator, no records could be produced for 1990 and 1991. This item remains unresolved pending completion of licensee's corrective actions and its review by NRC (URI 333/92-80-10).

2.4.2.3.3 Staffing

AOP-28 and AOP-43 require, for their implementation, one shift supervisor (SS), one senior nuclear control operator and two nuclear operators.

In accordance with EAP-3, the Fire Brigade includes one assistant shift supervisor (ASS) and two auxiliary operators. There are no apparent staffing problems. However, the two nuclear operators will not be available to assist the fire brigade (Section 2.1.3.3 and 2.5.3.2) during plant shutdown from outside the Control Room in accordance with AOP-43. The ASS is in charge of the fire brigade. Once the fire is extinguished, he will determine when control may be re-established from the Control Room.

According to AOP-58, attempts should be made to establish emergency ventilation for the operable Station Battery Room and the Charger Room within two hours of receiving indication of a fire to ensure continued operability of the operable charger and battery. Assuming the two hour period is correct, there were no staffing problems noted since additional personnel could be called upon from offsite to assist in the operation. Calculations to justify this two hour period based on the final temperature in the rooms were provided during the inspection but, due to their length and complexity, will be verified at a future time. The calculations provided were SWEC Calculations Nos. 02268.5004-US(N)-007, and 02268.5005-US(N)-005.

No consideration was given in the calculations for hydrogen generation if charging power remained available to the batteries while normal ventilation was lost. However, this should not be a concern since significant discharge of the batteries, which results in large hydrogen generation upon recharge, should not occur because battery charging capability would be available for the alternative shutdown scenario. This item remains unresolved pending completion of NRC review of the above calculations (UEI 333/92-80-11).

2.4.2.3.4 Procedures and Their Implementation

Because of changes arising from the 1992 reanalysis for alternative shutdown areas, the licensee has stated that the alternative procedural actions in AOP-43 in the event of response not obtained may not be valid due to potential fire damage. Numerous proposed changes consisting of additional manual actions and modifications will have to be made. Therefore, the alternative shutdown procedure would require an amendment to assure safe shutdown.

As a result of a walkdown of the existing AOP-28 and AOP-43, the licensee will consider revising AOP-43, so that isolating and venting the Control Rod Drive instrument air header is the first step taken by the operators to ensure reactor trip. This course of action is preferred since the location of the action is relatively close to the Control Room. In addition, the licensee will consider adding a step in the procedure to verify ESW flow to the B and D Emergency Diesel Generators (EDG) at the flow indicating gauges in the EDG rooms.

Several human factors problems were identified during the walkdown. For the actions to be taken in the Relay Room, the operator would need a screwdriver to ensure opening of Panels 05-6A and 05-6B which contain the Reactor Protection System breakers. In the East and West Electric Bays, which contain Panels 71RP-1B and 71RP-1A respectively for the RPS

Motor Generator Sets, the labeling of the ON/OFF switches for the breakers is difficult to read, although there are confirmatory ON ... F lamps. At ADS Relief Valve Control Panel 02-ADS-71, adjacent to 25 RSP, the ON/OFF labeling for the breaker switch is very difficult to read and there are no confirmatory lamps. Meters on the Emergency Diesel Generator (EDG) B and D control panels opposite remote shutdown panel 25ASP-3 in the North EDG Switchgear Room do not have acceptable band indicators for such readings as motor speed and generator frequency, etc. Also, some of the labels on the controls are small and not easy to read. The control switches on all of the remote shutdown panels are much smaller than those found in Control Rooms. Frequently the lettering is small, light, and only about one-eighth inch high. When combined with the emergency lighting deficiencies described in Section 2.4.3 of this report, these features detract from the ability of the operators to successfully implement the procedures. In addition, the team questioned the adequacy of communications. The licensee indicated that, as a part of its reevaluation, it would confirm the adequacy of communications and assure that the communication link is free from fire damage. These items remain unresolved pending completion of licensee's corrective action and its review by NRC (URI 333/92-80-12).

2.4.3 Emergency Lighting

10 CFR 50, Appendix R, Section III.J, "Emergency Lighting," requires that emergency lighting units with at least 8 hour battery supply shall be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto. To fulfill these requirements, the licensee, in its June 22, 1981, letter (JPN-81-45) to NRC, submitted plans and schedules for the implementation of Appendix R, Section III.J. Attachment I to this letter identified the emergency lighting requirements for those areas of the plant needed for safe operation of safe shutdown equipment as defined in the "Safe Shutdown Analysis" report dated September 1979 and revised in October 1980. The Attachment I also identified the emergency lighting required for access and egress to those areas. Section A.2 of Attachment I stated that lighting levels of approximately 1/2 to 1 foot candle would be maintained for access to equipment, and approximately 3 foot candles would be maintained for equipment operation. In addition, this section also stated that maintenance for the battery packs would be performed in accordance with manufacturer's recommendations. These requirements were addressed in the emergency lighting section 5.10 of the licensee's Fire Protection Reference Manual.

To meet the 8 hour requirement of Section III.J of Appendix R, the licensee installed the Exide Electronics type LEC-36, Model F-100, 6-Volt, lead-calcium, maintenance-free battery in the specified areas needed for operation of safe shutdown equipment and in locations to illuminate access and egress routes thereto, enabling operators to perform the required safe shutdown functions in the event that power is lost to the 120VAC/125VDC lighting. The capacity of the LEC-36 battery is 36 ampere-hours when discharged for 8-hours at 4.5 amperes to a final voltage of 1.75 Volts per cell (5.25 battery Volts) and an ambient temperature of 77 degrees F (25 degrees C). The Ampere-hour capacity available varies with the discharge rate in Amperes and the discharge time available. The units are designed

to provide 8 hours of illumination to 87.5% of the initial voltage with two 12-Watt halogen lamps; however, supporting test data was not available. The charger module is a solid state charger capable of restoring the battery to full charge following a rated discharge. The charger also contains a low battery voltage drop-out circuit and a brown-out protection circuit that energizes the lamps (connects the lamps to the battery) when the AC line voltage drops below 85 Volts. The model F-100 is equipped with a ready light, a red fast-discharge indicator light, a voltmeter and a test switch.

Verification of the adequacy of the installed configuration to provide sufficient lighting needed by an operator to perform the required safe shutdown functions was accomplished through a physical walkdown and blackout tests of specific areas for Appendix R safe shutdown equipment. The areas examined include the three alternate safe shutdown panels (25ASP-1, 2 and 3) and one remote shutdown panel (25RSP-1). The acceptance criteria used in determining the adequacy of the lighting at the shutdown panel was based on whether an operator, holding the procedures/instructions at arms length, could read and perform the functions listed therein. In addition, maintenance and surveillance test records for operability and periodic battery tests were reviewed for the years 1989, 1990, and 1991.

Following the blackout of all 120VAC/125VDC lighting in the general area of each alternate shutdown panel, the inspection team, accompanied by licensee personnel, determined that:

- Illumination at the Alternate Shutdown Panel 25ASP-1 was inadequate. Corrective action by the licensee to adjust lamp orientation is required to increase the illumination level at the panel.

- The remote lamps from RB-272-6/RB-272-7, oriented toward the access and egress stairway to the Reactor Building Crescent Area were blocked by C. ALARA shielding installed in 1986 (Log no. 86-021). Surveillance inspections performed by the licensee in accordance with procedure MST-76.5 in 1989, 1990 and 1991 did not identify this discrepancy.

- Illumination of Alternate Shutdown Panel 25ASP-2 appeared to be adequate. However, part of the illumination for this panel area was provided by remote lamp RB-242-3. Orientation of this lamp was not in accordance with drawing FE-67A. Re-directing orientation of this lamp in accordance with the drawing requirements could result in decreasing the available illumination level at this panel. In addition, the panel is mounted on the wall halfway up an adjacent stairway, placing an operator in a precarious position on the stairway in order to reach the upper right section of the safe shutdown panel.

- Two remote lamps, one each from RB-242-1 and TP-272-4 were observed hanging from their electrical conduit mounting box by their electrical wire connections.

- Illumination of the A and C EDG Switchgear Room, provided by lamp EDG-272-1, is inadequate. Illumination of the area is blocked by an auxiliary undervoltage relay panel (93AURP-01) standing next to EDG-272-1 and thus creating a darkened area to the left of the relay panel. Scaffolding in the area was not visible during the blackout conditions.

- Illumination of the B and D EDG Switchgear Room and panel 25ASP-3, provided by lamps EDG-272-2 and EDG-272-3, was determined to be marginal. Re-orientation of the lamps in the direction of the panels may increase the lighting level.

- Illumination of the Remote Shutdown Panel 25RSP-1 is inadequate. Orientation of RB-300-12 is not in accordance with drawing FE-67C. Instead, available lighting in the area is directed at access and egress routes to the panel and at the Instrument Rack 25-6(A), opposite the remote shutdown panel. There is no illumination of 25RSP-1 and its controls. The human factors aspects are discussed in Section 2.4.2.3.4.

In addition to the above, during the verification of AOP-43 for operator action to achieve and verify reactor scram outside the Control Room, the team noted that the battery-powered emergency lighting was inadequate or nonexistent at various locations needed by an operator to perform the safety functions. Areas without the battery-powered emergency lighting include: (1) the Relay Room Panels 05-6A and 05-6B; (2) the East/West Electric Bay Panels 71RP-1B/MCC-262 and 71RP-1A/MCC-252, and (3) the ADS Relieve Valve Control Panel 02ADS-71.

These deficiencies appear to be a violation of Appendix R, Section III.J, which states, in part, that: "Emergency lighting units...shall be provided in all areas needed for operation of safe shutdown equipment and access and egress routes thereto." On March 20, 1992, alternate safe shutdown equipment and access and egress routes thereto were not provided with adequate emergency lighting needed by an operator to perform the alternate safe shutdown functions (EEI 333/92-80-13).

Periodic testing (performed semi-annually) is included in surveillance procedure F-ST-16J, to demonstrate operability of the battery-powered emergency lighting. The test functions include verification that the voltage indicator is in the green band, ready light is on and charging light is blinking. Lamp illumination is checked by depressing the test button. Battery-powered emergency lighting surveillance testing (performed annually) is included in the surveillance procedure MST-76.5, to demonstrate availability of emergency lighting. Test functions include a visual inspection, battery float voltage check, response to loss of AC power and the return of AC power, and proper orientation of lamps. The team determined that these surveillance and test procedures were not adequate to maintain operability and availability of the emergency lighting units. The vendor manual, "Electronic Emergency Lighting Unit Equipment" recommends monthly, quarterly, and annual testing to assure a

functional emergency lighting unit. The licensee's Fire Protection Reference Manual, Section 5.10.6(c), recommends incorporation of the manufacturer's maintenance requirements.

This item appears to be a violation of 10 CFR 50, Appendix B, Criterion III, which states in part, that: "Measures shall be established to assure that applicable regulatory requirements and design basis...are correctly translated into specifications, procedures, and instructions." The requirement is also included in the Fire Protection QA Program of Licensee Condition, 2.3(c), Amendment 47. On March 20, 1992, emergency lighting surveillance and test procedures lacked vendor recommended maintenance and testing to ensure operability and availability of emergency lighting units (EEI 333/92-80-14).

2.5 Assessment of the Fire Protection and Prevention Programs**

An inspection was performed to determine if the licensee had adequately developed and implemented a fire protection and prevention (FPP) program consistent with the Fire Hazard Analysis (FHA), the Technical Specifications (TS), applicable TS amendments, and other licensing documents. The inspection included verification of procedure implementation; technical adequacy of programs, administrative requirements and procedures; inspection of plant facilities, fire brigade qualification and training; and review of previous licensee audit findings. Attachment 3 contains a list of the documents reviewed during this inspection.

2.5.1 Fire Protection Program Administration and Organization

2.5.1.1 Fire Protection Personnel Responsibilities and Qualifications

Discussions with licensee personnel and reviews of AP 1.6, fire protection procedures (FPPs), and other documents listed in Attachment 3 were conducted to ascertain that:

- Personnel were designated for implementing the fire protection program;
- Qualifications were delineated for personnel designated to implement the program;
- Site personnel are designated to review all proposed maintenance, or modifications which could adversely affect fire protection and the safety of the facility;
- Site personnel are designated to train site and contractor personnel in the appropriate administrative procedures which implement the fire protection program;
- Fire reporting instructions for general plant personnel are delineated; and
- Fire brigade organization and qualifications of brigade members are delineated.

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Through a review of procedures, the team found that these requirements, except the qualifications of the personnel designated to implement the program are generally identified in implementing procedures. After a review of the procedures controlling the review of modifications, the team questioned whether a mechanism exists to ensure that all modifications affecting fire protection are reviewed. The team also questioned why no instruction directs an assessment of the impact of modifications on existing procedures and if this type of review was occurring. The onsite licensee personnel (Supervisor of Fire Protection and the Fire Protection System Engineer) indicated that they review those modifications that are routed to them and that these reviews do consider the effect on existing procedures. However, the team identified examples where fire fighting preplans had not been updated to reflect changes in the plant. These are addressed further in Sections 2.5.3.4 and 2.5.4.1. A review of the Site Orientation handout revealed that there is an appropriate program for providing a general overview of the site Fire Protection and Prevention Program to general plant personnel.

The team found that the required Fire Protection and Prevention Program elements have been less than adequately identified and proceduralized in a large number of plant documents. The team was concerned that the fire protection and prevention Fire Protection and Prevention Program is fragmented because no single upper tiered procedure clearly identifies all of the program's license requirements and organizational responsibilities. The team found that this concern was evident by the absence of required program elements from the FP/P program documents and inadequate implementation of the licensee's current Fire Protection and Prevention Program elements. The team's concerns with respect to the fire protection program's programmatic and implementation deficiencies are addressed in the sections which follow.

2.5.1.2 Plant Inspections

Discussions with personnel and a review of Section 2.0 of the licensee's Fire Protection Procedures Manual (FPPM) were conducted to determine if adequate program and procedures exist to implement periodic inspections of the plant to:

- Minimize the amount of combustibles in safety related areas;
- Determine the effectiveness of housekeeping procedures;
- Assure the availability and acceptable condition of all fire protection systems and equipment, emergency breathing apparatus, emergency lighting, communication equipment, fire stops, penetration seals, and fire retardant coatings; and
- Assure that prompt and effective corrective actions are taken to correct conditions adverse to fire protection and preclude their recurrence.

Amendment 47 to Facility Operating License and Section 6 of the associated Safety Evaluation accepted the licensee's proposal to amend the existing fire protection administrative program to conform to the recommendations presented in the NRC's guidance document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance" (Administrative Controls). This NRC guidance document provided the attributes identified in the above paragraph.

The licensee's program was inadequate in implementing these license requirements. FPPM, Section 2.4, identifies periodic inspections within the power block (Reactor Building, Turbine building, and Screenwell). The remaining procedures in Section 2.0 of the FPPM specify monthly inspections of the remaining areas on the site. The Fire Protection Supervisor has been designated to make these inspections. FPPM, Section 2.4 does not specify a required periodicity for inspecting areas within the power block and no mechanism exists to ensure that all areas within the power block are inspected. Discussions with the Supervisor of Fire Protection (SFP) indicated that there was no set mechanism for accomplishing these inspections and that areas which happen to be visited during the normal course of the day are inspected. The team's review of a sample of completed Fire Protection Inspection Tour Report Forms found that no deficiencies were noted on any of these report forms. This is contrary to the team's findings of numerous examples of the improper storage of transient combustibles and flammable materials (Section 2.5.2.1); damaged, misaligned and blocked emergency lighting (Section 2.4.3), fire protection equipment deficiencies (Section 2.5.5), and poor maintenance of fire brigade equipment (Section 2.5.3.3). The SFP indicated that these inspections are only one of numerous responsibilities and there are currently no staff available to assist him with these duties. The licensee's organization chart identifies positions for two auxiliary operators budgeted to assist the SFP, but are not expected to be available until the end of 1992. The team also discussed the walkdowns of the plant conducted by the Fire Protection System Engineer. The System Engineer stated that he is not required to walkdown the entire plant, but he would identify for correction any deficiencies he observes during the normal course of his duties. The System Engineer would list these deficiencies on an informal handwritten memorandum which is submitted to the Work Control Center to request correction. The licensee's failure to implement a program of inspections to minimize the amount of combustibles in safety related areas, assure the availability and acceptability of fire protection equipment, and assure prompt and effective corrective actions for conditions adverse to fire protection is one of nine examples of an apparent violation of License Condition 2.C(3), (EEI 333/92-80-15A). (Note: Other examples of apparent violations of this license condition are denoted by numbers EEI 333/92-80-15B through F and are discussed in following sections of this report).

2.5.2 Fire Prevention Program

2.5.2.1 Administrative Controls of Combustibles and Flammable Materials

The team reviewed AP 1.6 and Work Activity Control Procedure (WACP) 10.1.10 and toured the plant to determine whether administrative controls had been established and implemented to minimize the amount of combustibles that a safety-related area may be exposed to. The team reviewed the licensee's program to ensure that controls provided by NRC guidance document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance" (Administrative Controls) were in place and implemented to govern:

- The handling of and limitation on the use of combustibles, flammables, and explosive hazards in safety-related areas and to assure that these items are not stored in safety-related areas;

- The control of transient fire loads during maintenance and modifications such as combustible and flammable materials. This control should require an in-plant review of proposed work activities to identify potential transient fire loads. The onsite staff member, having the responsibility for reviewing work activities for potential transient fire loads, should specify any required additional fire protection in the work activity procedure;

- All wastes, debris, rags, oil spills, or other combustible materials are removed upon completion of work activities or end of the shift, whichever is sooner;

- There are periodic inspections for accumulation of combustibles;

- All wood used in safety-related areas is treated with flame retardant.

The licensee's implementing procedures generally identify these requirements. However, contrary to the above, the licensee's implementation of these requirements for controlling combustibles has been inadequate as evidenced by the following examples:

- In excess of 4000 gallons of used turbine lube oil was stored in the turbine railroad bay. The storage location is adjacent to the access door leading to the Emergency Diesel Generator Rooms. The thermal energy associated with the lube oil if it were to be involved in a fire may be sufficient to degrade the diesel generator fire door.

- Combustibles associated with electrical maintenance were stored in the West Cable Tunnel. Some of the combustible material in this area was located in two cage type rooms. The cage enclosures are located in such a manner to present a direct fire exposure to the wrapped 1-hour fire rated raceway enclosure required to protect an Appendix R related safe shutdown cabling. This area is not in compliance with Appendix R, Section III.G.2. Fixed suppression is not provided to protect the 1-hour fire rated enclosure from an exposure type fire (Section 2.4.1.3).

- Poly-vinyl Chloride (PVC) pipe, gasket material, rolled plastic, and a wooden shipping crate were found in the south end of the West Cable Tunnel.

- Flammable liquid (mineral spirits) were being dispensed and used from flammable plastic containers in the D Emergency Diesel Generator Room.

- Wood scaffolding was stored directly under the hydrogen piping supplying the generator in the Turbine Building.

- In the Screenwell Building, on elevation 272'0", combustible plywood sheeting was found to be piled on one of the ventilation openings for the safety-related pump rooms located on elevation 255'0". It is noted that an exemption to Appendix R was granted for these openings. These openings are not provided with 3-hour fire dampers. The NRC's exemption was granted on the basis that there were no combustibles in the area above the pumps which could expose the pump rooms to a common fire.

- On Reactor Building, elevation 326'0", the flammable liquid cabinet door leafs were damaged at the latch. In addition, plastic containers were being used for the storage of combustible liquids.

- In the Cable Spreading Room, combustible waste was stored under cable tray stack 1TX078B, 1TX041B, 1TC167b, 1TC137B, 1TC188B, 1TK031B, and 1TL001B and cable tray stack 1XT065B, 1TX063B, and 1TX059B.

- Combustibles were found in cable trays, e.g., cotton gloves, rubber gloves, and masking tape.

- Control of wood in the plant areas and treatment with fire retardant was indeterminate based on a tour of the plant and a review of purchase orders.

- Four barrels of lube oil and scaffolding lumber were found stored together in the East Crescent Area. The barrels of oil blocked access to a fire extinguisher mounted on the wall.

- Flammable liquids and paint were found in the Control Room ventilation complex.

- No periodic inspection program had identified and recorded these conditions for tracking and a timely resolution could be determined.

- No permit system or review procedure existed to ensure that the onsite staff member, designated with the responsibility for reviewing work activities for potential transient fire loads, specified any required additional fire protection.

The licensee's failure to adequately implement the license condition requirements for the control of combustibles is the second example of an apparent violation of Licensee Condition 2.C(3), (EEI 333/92-80-15B).

2.5.2.2 Administrative Control of Ignition Sources

The team reviewed Welding Administrative Procedure WAP-04 to determine if an administrative program of ignition source control to protect safety-related equipment from fire damage or loss had been established and included the following attributes from the NRC's guidance document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance" (Administrative Controls).

- Smoking in safety-related areas is prohibited, except where "smoking permitted" areas had been specifically designated by management;

- Requirements have been established for special authorization (permits) by a responsible foreman or supervisor for activities involving welding, cutting, grinding, open flame, or other ignition sources. The responsible foreman or supervisor has received a basic industrial fire fighting and fire prevention course covering anticipated fires, such as electrical fires, fires in cables, cable trays, hydrogen fires, solvent fires, waste/debris fires, and record file fires.

- Before issuing the permit, the responsible foreman or supervisor physically surveys the area to ensure that moveable combustibles are removed and immovable combustibles have been protected.

- The designated firewatch is trained and equipped to prevent and combat fires and is present throughout operations in which there is a potential for fire and for at least 30 minutes after the work is completed.

- Leak testing is controlled to prevent the use of open flame or combustion smoke.

The licensee's implementing procedures and implementation of these license requirements for ignition source control has been inadequate as evidenced by the following examples:

- As a result of fire prevention and radiological concerns, the licensee has designated the West Cable Tunnel as a No Smoking area. The team located three cigarette butts in the area;

- Although normally managers, supervisors, or foremen will authorize ignition source control permits, the licensee's procedures also allow individual welders to sign these permits.

- There is no comprehensive list of individuals qualified to sign burn permits and no lesson plan for providing the required training. Procedure ITP-13 does not identify the requirement for basic fire fighting and fire prevention training, of the type described in the paragraph above, for these individuals.

- The team questioned four contractor personnel at a hot work site in the Emergency Service Water Room to determine who was the designated firewatch. None of these individuals accepted responsibility for being the firewatch and a review of the hot work permit revealed that the firewatches are not specified on the permit.

- The team questioned two contractor personnel designated as hot work firewatch personnel in the Relay Room about what actions they would take to respond to a fire which resulted from the ongoing hotwork. These individuals responded that they would notify the Control Room of the fire and then attempt to extinguish the fire. This is contrary to their training which instructs them to extinguish the fire and then notify the Control Room when it is out. The adequacy of firewatch training is discussed further in Section 2.5.2.3.

- The current Ignition Source Control procedure WAP-04 is the initial issue of this procedure dated July 30, 1986. From discussions with licensee personnel, the team found that this procedure had not received the biennial reviews required by Section 6.8 of the Technical Specifications for Fire Protection Program Procedures.

From a review of procedures and tours of the site, the team concluded that, with exception of the problems noted above, the licensee has generally implemented their current permit system to control ignition sources such as cutting, grinding, and welding. Hot work in progress was observed in the Control Room, Relay Room and the Reactor Building and the permits were posted. The team verified that the persons designated as the firewatch were listed on the training records as qualified firewatch personnel. The team concluded that the examples identified above constitute the licensee's failure to adequately develop a program for ignition source control and is the third example of an apparent violation of the License Condition 2.C(3)(EEI 333/92-80-15C).

2.5.2.3 Firewatch Training and Implementation

The team reviewed the related training procedure ITP-13, lesson plan FP-13.16, firewatch training records, toured the plant, and interviewed firewatch personnel, to determine if an adequate program had been established to train firewatch personnel to prevent and combat fires as required by the Administrative Controls guidance document. The licensee's implementing procedures and the licensee's implementation were found to be less than adequate, as evidenced by the following examples:

- From a review of the firewatch lesson plan (FP-13.16) and discussions with training personnel, the team found that "hot work" firewatch personnel are not provided hands-on training in the use of an extinguisher on a live fire. Discussions with firewatch personnel in the plant revealed that these individuals had not even discharged an extinguisher during training; however, these individuals are expected to extinguish fires which result from their hot work activities.

- The lesson plan and discussions with training personnel indicated that the training stressed that hot work firewatch personnel are to extinguish and prevent the spread of fires which occur during hot work. Once the fire is extinguished, the firewatch has been trained to notify the Control Room that a fire had occurred. In discussions with personnel standing firewatch duty, these persons stated that they would contact the Control Room to report the fire prior to attempting to extinguish the fire.

- From discussions with training personnel, the team found that no formal training requirements or lesson plan exist for personnel designated to act as TS required "compensatory" firewatches for inoperable fire protection equipment. The informal training program for these persons consists of completing the hot work firewatch training provided by lesson plan FP 13.16 which stresses that firewatches are to extinguish and prevent the spread of fires and then notify the control room that the fire was extinguished. Subsequent to this training the compensatory firewatches are trained to notify the Control Room of a fire prior to attempting to extinguish a fire, which is contrary to the training provided by FP 13.16. These individuals are also provided with additional instruction on the post instructions provided to them, and instruction on previous LERs concerning past inadequate performance by compensatory firewatches. They are also given a plant tour and they stand watch for two days under the supervision of a qualified compensatory firewatch.

- Firewatch training was found inadequate with respect to the selection, operation and use of fire extinguishers.

- During the observed fire drill (discussed in Section 2.5.3.2), the firewatch had to be coached on how to use the Gatronics paging system to notify the Control Room of a fire emergency.

- Several firewatches questioned could not identify the specific equipment (penetration(s), fire door(s), damper(s), etc.) that they were designated to watch.

- The team identified one compensatory firewatch outside the East and West Electric Bays whose station was surrounded by contaminated and radioactive materials. The team questioned the RES department and found that the individual could be expected to receive 5-10 mr/hr while stationed in this area. This firewatch station was relocated so that individuals could continue to perform the intended function in a lower dose rate area.

- No procedure was found to control the stationing of compensatory firewatches, the establishment of post-instructions and the level of detail required by these instructions, and the division of responsibilities between the Supervisor of Fire Protection and the Contract Services Department for developing post-instructions and maintaining compensatory firewatches.

Based on the above examples, the team considers the licensee's program for firewatch training and implementation to be inadequate. This is a fourth example of an apparent violation of License Condition 2.C (3), (EEI 333/92-80-15D).

2.5.3 Plant Fire Brigade

2.5.3.1 Fire Brigade Training

The inspector reviewed procedure ITP-13, the fire brigade training lesson plans, and training records to ascertain whether the fire brigade training program included the following attributes from the Administrative Controls:

- Fire brigade organization and qualifications of brigade members, including an annual physical exam, are delineated;

- Indoctrination to the plant fire fighting plan with specific individual responsibilities identified;

- Identification of the location of fire fighting equipment for each fire area and familiarization with the layout of the plant, including access routes;

- Proper use of available fire fighting equipment and the correct method of fighting each type of fire that could be expected to occur in a nuclear power plant;

- The proper use of communications, lighting, ventilation, and emergency breathing equipment;

- The training program is updated regularly to incorporate improved and advanced manual fire fighting techniques, review of the latest plant modifications and corresponding changes in the fire fighting pre-plans and other plant fire protection procedures;

- Brigade leaders are provided leadership training; and

- Practice sessions (separate from the brigade drills) are held on the proper methods of fighting fires of similar magnitude, complexity, and difficulty as those which could occur in a nuclear power plant. These sessions provide experience in extinguishing live fires.

The team found that the licensee's implementing procedures and the licensee's implementation of license requirements has been less than adequate as evidenced by the following examples:

- Most of these lesson plans were written between 1982 to 1988 and have not been updated to include plant modifications, procedure or pre-plan changes, and organizational changes which have occurred since that time. Only 5 of the 26 lesson plans have ever been revised.

- The licensee's program identifies the proper theory elements associated with fire fighting principles. However, the practical aspects of fire fighting techniques are focused on typical municipal fire fighting operations. The fire fighting techniques in power plants are in some respects similar; however, there are unique hazards. The lesson plans are weak with respect to control of in-plant hydrogen fires; control, confinement, and extinguishment of lube oil fires; hazardous materials confinement and control; mitigating the fire and smoke effects on safe shutdown and safety-related systems; smoke control in and outside radiological controlled areas, and fighting cable fires and fires associated with electrically energized equipment.

- The lesson plans are not performance based. They do not identify the minimum level of acceptable fire brigade member proficiency expected from practical applications of the techniques taught during the lesson.

2.5.3.2 Fire Brigade Drills

The team reviewed procedure ITP-13 and the fire brigade drill records to ve ,y that the fire brigade training program implemented the following minimum attributes from the Administrative Controls document:

- Fire brigade drills are performed in the plant so that the brigade can practice as a team;
- Drills assess brigade leader and members knowledge, fire alarm effectiveness, response time, and equipment selection, placement, and use;
- Drills are performed at intervals not to exceed three months for each brigade;
- At least one drill per brigade per year shall be performed on a "back shift;"
- Not less than one drill per brigade per year shall be unannounced;
- Each brigade member shall participate in two drills;
- Drills shall be preplanned and critiqued; and
- At three year intervals, drills are critiqued by qualified individuals independent of the licensee's staff.

The team found the fire brigade drill program inadequate as evidenced by the following examples:

- ITP-13 does not require drills at three month intervals.
- ITP-13 does not require one backshift and one unannounced drill per brigade per year.
- ITP-13 allows walkthroughs, classroom prefire exercises, and practice sessions to count as drills, which are contrary to the requirements for in-plant drills.
- The licensee's current brigade program has been inadequately implemented in that ten fire brigade members who did not meet the licensee's requirement to participate in two drills per year were allowed to continue to participate as fire brigade members. Subsequent to inquiries by the team, the licensee issued a memorandum which disqualified these individuals from continued brigade membership, pending completion of the required number of drills.

In order to evaluate the fire brigade's ability to mitigate the consequences of a fire emergency, the team requested the licensee to perform a fire brigade drill. The team witnessed a fire brigade drill in the West Cable Tunnel (Fire Area IC). The drill scenario postulated a cable fire, midway down the tunnel. In addition, in the scenario, the water spray fire suppression system on the trays had activated and, upon arrival of the brigade, flames were visible and smoke had filled the tunnel. The drill scenario requires the brigade to utilize a hose line for fire attack and implement smoke removal techniques for the area.

During the drill, the inspection team observed and evaluated the following attributes of the brigade's performance:

- Protective clothing properly utilized;
- Self contained breathing apparatus was properly utilized;
- Hose lines properly deployed;
- Entry into the fire room done properly;
- Assess fire brigade leader's direction, thoroughness, accuracy, and effectiveness during the fire fighting effort;
- Communications within the fire brigade and with Control Room and adequate;
- Whether the fire brigade checked for fire and smoke extension into adjacent plant areas;
- Whether the fire brigade utilized the fire fighting strategies for the affected area;
- Whether the fire brigade utilized proper fire fighting techniques;
- Whether adequate smoke removal operations were implemented; and
- Whether there was adequate fire fighting equipment at the scene to properly perform fire fighting operations.

The alarm was turned into the Control Room by the firewatch which was posted in the area. The team noted that the firewatch had to be coached to properly call in the alarm. Seven minutes after the alarm, the brigade assembled at the stairs leading to the tunnel. Four minutes after arrival on the scene, the fire brigade initiated a fire attack utilizing a CO_2 fire extinguisher. Fourteen minutes from the time of the alarm, the fire was declared out.

The inspectors observed the following drill performance weaknesses:

- The brigade did not fully implement the required scenario actions (e.g., use of a hose line, implementation of smoke removal techniques);

- The fire brigade leader did not have the established fire fighting pre-plans (strategies) available for use. Therefore, the pre-plan was not used to guide fire fighting operations in this area. The unavailability of pre-plan guidance to the fire brigade leader resulted in the failure to implement: (1) smoke removal operations, (2) protecting exposed safe shutdown related equipment located in the area from fire and smoke damage, (3) checking for possible fire and smoke propagation into other plant areas, and (4) coordination with the Control Room obtaining assistance in controlling and deenergizing energized equipment in the area of fire fighting operations;

- Some fire brigade members were observed not using their personal protective equipment properly (e.g., turnout boots not pulled up fully and nomex hoods not utilized);

- A manual fire fighting hose line was not employed to back up the brigade members attempting to attack the fire with a CO_2 fire extinguisher;

- No personnel safety life line was established. (Note: Fire fighters entering a smoke filled area without a fire hose line should be tethered from the safe point of entry with a rope life line. This life line can be followed by fire fighters back to the point of entry into the area, in the event that prompt egress from the area is necessary);

- Communication between the fire brigade leader and members fighting the fire, was established by runners. Fire brigade members were running between the fire and the brigade leader in order to communicate. Portable radios for communication between the brigade leader, the fire fighters, and the Control Room were not brought to the fire scene. Therefore, the brigade leader used the Gatronics to communicate with the Control Room. As a result of fire damage in this area, this communication path to the Control Room may not be available; and

- The security guards assigned to fire brigade duty reported to the fire scene with their weapons and ammunition under their fire fighting turnout coats. (Note: Live ammunition has been known to discharge under actual fire conditions).

In addition to the above weaknesses, the team was also concerned with fire brigade equipment logistics problems. The fire brigade members responded to the fire in their personal protective equipment. However, they did not bring any special fire fighting equipment, e.g., spare SCBA air cylinders, forcible entry tools, smoke removal equipment, fire hose, or special fire fighting nozzles to support fire fighting operations. Two extra responding fire brigade members (nonlicensed operators) were used as runners during the drill to transport support equipment. These individuals would not be available during a fire scenario resulting in shutdown from outside the Control Room (Sections 2.1.3.3 and 2.4.2.3). Support equipment was manually carried to the fire. This method of transportation resulted in unnecessary physical stress to fire brigade members, above the physical stress of actual fire fighting. Rapid manual fire fighting equipment deployment is a key factor to the success of fire brigade's ability to limit fire, smoke, and water damage. The licensee should evaluate the fire brigade equipment logistics problems and develop a method which would rapidly deploy the necessary fire brigade equipment, concurrently with the response of the fire brigade to a plant fire emergency. In addition, the team noted that the communication between the fire brigade members was limited and difficult as a result of the SCBA face masks. The team noted that this could be a safety concern and could lead to miscommunications between the brigade leader and the brigade members. The licensee committed to evaluate the methods available to improve interfire brigade voice communications (e.g., voice amplifiers or speaking diaphragms in the SCBA face masks).

2.5.3.3 Fire Brigade Equipment

The team reviewed the readiness of the fire brigade equipment and made the following observations:

- The confined space rescue equipment cabinet located adjacent to the elevator and the Locker Room on Elevation 272'-0" was not organized in the cabinet in a manner which would lead itself to rapid deployment in the event of an emergency. The equipment was dusty and dirty. In addition, the equipment was haphazardly piled in the storage cabinet.

- The portable fire fighting foam equipment stored in the Turbine Building was dusty and dirty. The foam nozzles were an eductor-nozzle combination. These nozzles are generally not well suited for interior foam fire fighting operations. One in-line 95 gpm foam eductor was observed on the cart. However, the compatible end-of-hose-line nozzle was not found on the bulk foam cart. The self-contained foam cart appeared ready; however, the material condition (dirty and dusty) gave evidence that routine preventative maintenance and inspection of this equipment were not being performed. From the material condition of the hose on the self-contained foam and hose cart, it appeared that the hose had not been pulled off these carts and inspected for damage or deterioration, and repacked on the carts for some period of time.

- Fire brigade personal protective equipment in the Turbine Building lockers was inspected. Some of the turnout boots had signs of deterioration (dryrot) in the upper leg portion which presents a personal safety hazard. In addition, breathing apparatus provided for the fire brigade did not have the capability to support emergency breathing or rescue techniques for assisting other individuals. The team also noted that the volume of fire fighting pre-plans kept in this locker for the brigade leaders use did not contain the latest revisions of some of these documents.

The team expressed concern that the licensee is not taking advantage of the advances in manual fire fighting technology. The equipment is not current "state-of-the-art". This is an example of program weakness in the area of fire protection. Additionally, the team noted that the plant fire protection inspections (Section 2.5.1.2) and periodic fire brigade equipment inventory, inspection, and maintenance procedures had not identified the poor material conditions and corrective actions had not been taken.

Based on the examples provided in sections 2.5.3.1, 2.5.3.2, and 2.5.3.3, the team concluded that NYPA had failed to develop and implement an adequate fire brigade program. This is a fifth example of an apparent violation of License Condition 2.C(3), (EEI 333/92-80-15E).

2.5.3.4 Fire Fighting

The team reviewed various fire pre-plans from sections 4.0, 5.0, and 6.0 of the FPPM, and procedures AOP-28 and EAP-3 to ensure that the pre-plans included the following minimum attributes:

- Fire Hazards
- Extinguishants
- Direction of Attack
- Systems to be managed to reduce loss
- Heat sensitive systems
- Fire brigade specific duties
- Potential hazards and toxic radiation
- Smoke control management
- Special operational instructions

- Instructions for general plant

Based on a review of the fire fighting pre-plans, the adequacy of the level of detail contained in these procedures was questioned. The intent of these pre-plans, i.e., to analyze the most likely fire(s) in the fire zone and provide a detailed strategy for responding to each of these potential fires, had not been accomplished. The fire pre-plans were developed by the fire protection group without input, evaluation, and review by Engineering or Operations departments. The adequacy of the interface and coordination between the FP/P pre-plans and procedures AOP-28 was also questioned. Several general examples of these questions are described below:

- The Administrative Controls require identification of the fire extinguishants best suited for controlling the fires associated with the combustible loadings in that zone and the nearest location of these extinguishants. None of the pre-plans reviewed contained this information. The pre-plans provided some general information concerning combustibles in the area. The pre-plans also provide a list of suppressants in the area and their location. However, no specific information was included concerning the best extinguishant(s) for the specific combustible loading was given.

- The Administrative Controls require the pre-plans to include ventilation system operation that assures desired plant pressure distribution when the ventilation flow is changed for fire containment or smoke clearing operations. The sampling of procedures reviewed only indicated where smoke might spread. Those pre-plans that did discuss ventilation only described the ventilation available, but did not provide specific smoke exhaust methods for the various fire scenarios. Additionally, AOP-28 requires the operators to shut down ventilation in areas affected by fire; this may not be the best course of action for the particular fire scenario and the need for smoke ejectic .

- The Administrative Controls require the pre-plans to provide the most favorable direction from which to attack a fire in each area, in view of the ventilation direction, access hallways, stairs, and the best station or elevation for fighting the fire. The inspector found that the pre-plans listed the various accesses, but did not identify the direction of most favorable attack.

Additionally, the team expressed concern that these procedures have not been adequately reviewed and updated as required to correct deficiencies and to show the addition of modifications to the plant. The current revisions of these procedures do not show important safety-related equipment such as the alternate shutdown panels. The Diesel Fire Pump and the associated three hour barrier room installed in 1989 also have not been added to the applicable fire pre-plan. Other modifications which have not been incorporated are discussed in Section 2.5.4.1.4. The licensee's failure to develop and maintain adequate fire fighting pre-plans is a sixth example of an apparent violation of License Conditions 2.C(3), (EEI 333/92-80-15F).

2.5.4 Fire Protection Quality Assurance

The licensee is required to perform three types of audits of the fire protection program. Technical Specifications (TS) 6.5.2.8.i and 6.14.a require an independent fire protection and loss prevention program inspection and audit annually by qualified offsite personnel or an outside fire protection firm. TS 6.5.2.8.h requires an audit of the facility fire protection program and implementing procedures at least once per two years. TS 6.5.2.8.j and 6.14.b require an inspection and audit of the fire protection and loss prevention program by a qualified outside fire consultant at an interval no greater than three years. All of these audits are to be conducted under the control of the Site Review Committee (SRC). The team reviewed previous audits required by the various TS to assess the adequacy of the corrective actions associated with the audit findings and recommendations, and to assess the adequacy of the audits in assessing the fire protection program.

2.5.4.1 Corrective Actions

After the majority of the inspection was complete, the team began to review the audits listed in Attachment 3 to determine if these audits had been effective in identifying and resolving the types of significant conditions adverse to quality identified in other sections of this report. 10 CFR 50, Appendix B, Criterion XVI, requires that:

Measures shall be established to assure that conditions adverse to quality such as failures, malfunctions, deficiencies, deviations, defective material and equipment, 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. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

The team identified numerous examples of problems which are identified in this report and were previously identified in licensee audit reports. Several of these examples are listed below:

QA audits of the Fire Protection and Prevention Program conducted in 1989 and 1991 identified (finding JAF-FPA-89-F03 and recommendation JAF-FPA-91-07-R11) the failure to resolve previous audit findings in a timely manner. The team observed that corrective actions have not been provided in a timely manner and have been limited and ineffective in assuring that the NYPA's Fire Protection and Prevention Program meets NRC regulations, licensee commitment, and industry codes and standards as evidenced by the other examples which follow.

A 1983 audit found (finding JAF-FA-83-3) that the control of combustibles needed to be improved to meet internal requirements. The specific example given was 26 barrels (55 gallon) oil drums stored outside the oil storage room in the Turbine Building. This item was

revised and updated as finding FPA-JAF-84-10. The response to this finding was "This item is being reviewed in conjunction with the site hazardous waste guide and the WPO computerized hazardous materials list. The topic will be resolved by June 15, 1985. This corrective action response was documented as having been reviewed, accepted, and implementation verified by Tenara (an outside consultant) on July 15, 1988. The team noted (Section 2.5.2.1) that the accumulation of waste oil in this area continues to be a problem. Additional findings concerning the accumulation of combustibles are as follows:

- FPA-JAF-84-16: Large quantity of combustibles between the turbine building heater bays;
- FPA-JAF-84-12: Control of flammable and combustible liquids within the plant is unsatisfactory;
- JAF-FPA-87-R02: Considerable quantities of flammable and combustible liquids within the plant is unsatisfactory;
- JAF-FPA-87-F16: Accumulation of combustible liquids and waste oil;
- JAF-FPA-87-F17: Accumulation of transient combustibles;
- JAF-FPA-88-R12: Waste and lube oil outside designated storage areas; and
- AQCR-89-167: Accumulation of combustibles in the Chiller Room and the West Cable Tunnel

A 1987 audit recommended (JAF-FPA-87-R03) that changes be made to the fire protection plant inspection tour procedure performed by the Supervisor of Fire Protection to increase the procedure's effectiveness. These recommendations included sending the responsible department a copy of the tour deficiency report and specifying a required response date, providing a copy of the tour deficiencies to upper management at the time they are found, and a summary of outstanding item still open at the end of each month. A review of the 1988 audit revealed that a response to this recommendation had been requested by April 1, 1988 and that, by June 24, 1988, no acceptable response had been provided. The team found that these recommendations had not been incorporated into the inspection procedure at the time of this inspection and that the plant fire inspections have been inadequate (Report Section 2.5.1.2).

A 1984 audit found (finding FPA-JAF-84-21) that security officers responded to fire alarms with their gunbelts and weapons. The finding stated that this hinders the officers wearing of turnout gear and SCBA, and recommended that lockboxes be provided for the security officers on the fire brigade to lock up their weapons when responding to a fire alarm. A response was requested by February 1, 1984. The initial response indicated that this item would be resolved by June 1985. This item was closed out on February 12, 1990, by a

response dated the same day which stated that "this finding is closed out based on no binding commitment for security officers to carry weapons to fire response." The team noted that, during the unannounced drill conducted during the inspection (Section 2.5.3.2), that security officers wore their gunbelts and weapons to the fire alarm. The team was concerned not only about the hinderance to wearing their turnout gear but also that the ammunition could be discharged during a live fire.

Some Additional findings concerning the fire brigade are as follows:

- JAF-FA-83-1: Only persons currently trained and drilled should be on the fire brigade
- JAF-FPA-88-R02: Brigade practice sessions more indicative of municipal firefighting vs. nuclear power plant evolutions
- JAF-FPA-85-002: Management needs to promote conformance with NRC guidelines concerning quarterly training sessions

4. A 1984 audit (FPA-JAF-84-14), recommended that the PVC piping utilized to store the portable ventilation ductwork on elevation 326'0" of the Reactor Building should be included in the fire hazard analysis and the fire pre-plans (FP/P 4.13), since this piping represents an increase in the area's fire loading and is a hazard to the fire brigade, should it become involved in a fire. The response to this issue stated that the material would be included in the next fire hazards analysis revision. This response was reviewed and accepted, and implementation was verified by October 14, 1985. The team noted that this response did not address the fire pre-plans (Section 2.5.3.4) and this particular item was identified again in a 1991 audit report and the team found that it has not been corrected on the currently issued pre-plan.

   Some additional findings concerning fire protection program procedures which continue to be a problem are as follows:

- NRC-NOV-90-08-01 Fire pre-plans require updating for hydrogen lines installed by modification in the turbine building
- FPA-JAF-91-07-04 Fire pre-plans require review and updating to reflect current as-built conditions in safety related areas
- JAF-88-F05 No surveillance test to confirm integrity and operability of cable wrap
- JAF-FPA-87-R11 & JAF-FPA-87-F12 F-ST-76U does not meet the intent of TS 4.12A.1.f and should be revised to provide objective pass/fail criteria

- JAF-FPA-87-F15 Water curtains should be added to TS Table 4.12.1 and the appropriate surveillance procedures should be written

Based on the examples above, the team found that the licensee failed to implement an adequate corrective actions program. This is an apparent violation of 10 CFR 50, Appendix B, Criterion XVI (EEI 333/92-80-16).

2.5.4.2 Audit Adequacy in Evaluating the Fire Protection Program

To determine whether the audit program was effective in assessing the fire protection program and verifying compliance with regulatory requirements and commitments, the team reviewed past audits to determine if they had identified the license requirements which were missing from the fire brigade drill program (section 2.5.3.2). The team found that the audits reviewed were generally good. Most of the audit reports reviewed were detailed and the findings and recommendations were thoughtful and indicative of the audits having been performed by personnel knowledgeable of fire protection. However, it did not appear to the team that the audits had compared the fire brigade and the fire brigade drill programs with the license requirements, i.e., Amendment 47 and the 1977 guidance letter "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance." Specifically, the 1984 and 1991 audits stated only that the brigade was in compliance with NRC commitments. The 1985 and 1986 audits stated only that the brigade was in compliance with BTP 9.5-1 Appendix A. The 1989 audit stated that the drills were conducted in accordance with TS requirements. Therefore, the team concluded that the programmatic elements, missing from the fire brigade drill program, were not identified because the auditors did not verify all of the NRC requirements.

2.5.5. Plant Tour and Inspection of Fire Protection Equipment

The team walked down accessible vital and nonvital areas of the plant and visually inspected fire protection water systems, fire pumps, fire water piping and distribution systems, post indicator valves, hydrants, and contents of fire hose houses. The inspection included area fire detection and alarm systems, automatic and manual fixed suppression systems, interior hose stations, fire barriers, penetration seals, and fire doors. Inspection tags on portable fire extinguisher and hose reels were examined to verify that the required monthly surveillance inspections were performed. Additionally, the team interviewed licensee and contractor personnel. The following concerns were identified:

- material condition of Diesel Fire Pump (apparent oil leaks, fuel leaks on fuel oil day tank). The team noted that the annual preventive maintenance and TS required surveillance inspection for this pump was last completed in November 1991.

- Inadequate orientation of water spray nozzles on cable tray suppression systems in the East and West Cable Tunnels.

- Fire door operability concerns (closing mechanism concerns in Backup Fire Pump Room and West Electric Room; latch concerns in safety related pump rooms and South Cable Tunnel).

- Inappropriate sprinkler spray nozzle application in the Diesel Fire Pump Room.

- Nonelectrically safe nozzles used on manual fire fighting hose stations in areas containing energized electrical equipment (Cable Tunnels and Electric Bays).

- Mercury switches used in the CO_2 suppression systems. The consequence is potential inadvertent operation of these systems in the event of a seismic event.

- Plant designated fire doors are required to perform their intended function by being maintained in the closed position or closed by an automatic closing device which will react to a fire condition in the area. The team identified two cases where cables were routed through fire doors (welding cable routed through the fire door separating the safety related pump rooms in the Screenwell Building; power cable through the fire door leading to the Foam Room);

- Fire protection equipment (e.g. spanners from hose stations at 326'0", Reactor Building; smoke ejector from the south cable tunnel) were being used for other plant operations.

- Sprinkler protection provided in the old Maintenance Shop area on elevation 272'0" is located above the false ceilings for the offices and shops now located in this area.

- CO_2 wheeled fire extinguishers in the Relay Room were chained in place (no break away locks on chain), precluding movement and deployment.

- Fire damper in the West Electric Bay exhibits signs of physical damage which may affect its fire resistive characteristics.

- Thermal detectors installed to activate the stairwell water curtains in the Reactor Building are installed on vertical wall surfaces without horizontal heat collectors installed over the thermal detector itself. Without a heat collector canopy installed over the heat detector, significant detection or water actuation delays can be expected.

- The current list of work requests for fire protection systems includes 352 items dating back to 1983.

As previously noted in Section 2.5.1.2, the team expressed concern with NYPA's failure to identify and correct problems through their fire protection tour program.

2.5.6 Fire Protection Equipment Surveillance Testing

The team reviewed a copy of the licensee's TS surveillance requirement to surveillance test matrix to ascertain whether the licensee had developed procedures to meet the TS surveillance requirements. During the review of this matrix, the team noted that there was no procedure to meet the TS 4.12 A.1.j requirement, for inspecting the Diesel Fire Pump engine each 18 months. From discussions with the licensee, the team found that this requirement is accomplished by MP-76.1. The team verified that MP-76.1 was a Plant Operations Review Committee (PORC) approved procedure. The licensee indicated that this procedure would be added to the TS requirements matrix. The team also noted that the matrix identified a non-PORC approved procedure, to satisfy the requirement 4.12.D.1, for inspecting hose stations and hydrostatically testing the fire hoses each three years. The licensee indicated that a PORC approved procedure, MST-76.9 was actually used to satisfy this requirement. The inspectors did not review the adequacy of these tests. Based on these examples, the inspectors questioned the accuracy of the TS matrix and whether all the TS requirements are being met. The licensee stated that a NFPA code compliance review was scheduled and this review would verify that all TS surveillance requirements were being accomplished with procedures which met NFPA code standards. This item remains unresolved pending the completion of the licensee's NFPA code compliance review (URI 333/92-80-17).

2.6 Follow-up of Previous Inspection Findings

2.6.1 (Open) Unresolved Item (91-01-04)

This item dealt with inadequate control over temporary modifications and fire damper inspection covers. The specific items of concern were: (1) The B DC Equipment Room was used as a space for charging spare batteries; and (2) The inspection cover for the fire damper in the A Battery Room exhaust fan discharge line was open, allowing the A Battery Room to vent to the A DC Equipment Room, as opposed to the outside atmosphere. The licensee has initiated corrective actions on this item, but has not completed all required actions. This item has been assigned to the responsible engineer and will involve revision of the WACP 10.1.3 procedure. This item remain unresolved, pending completion of licensee's corrective actions.

2.6.2 (Open) Violation (90-09-03)

This violation dealt with non-conformances in the area of fire barrier three-hour penetration seals. The violation was associated with 10 CFR 50, Appendix B, Criterion XVI (Corrective Actions), and Criterion XI (Test Control). The licensee responded to the Notice of Violation (NOV) by letter 91-0359, dated June 14, 1991. The following corrective actions were taken prior to the response to the NOV: (1) The identified electrical cable penetration deficiencies were corrected to establish their required three-hour rating; and (2) the electrical and mechanical penetration seal installation specifications were revised to more clearly specify the requirements for permanent dams.

The response to the NOV indicated certain corrective actions to avoid further violations in this area. These actions are in various stages of completion. The status of these actions are as follows. A permanent engineering position to address fire protection system and program technical issues has been established in the Technical Services Engineering Group. Two engineers are presently assigned to address fire protection issues at the corporate office.

Additionally, three new fire protection engineering positions have been established as of the end of February 1992 and expected to be filled expeditiously. The performance of the fire barrier surveillance test, as committed in the response to the NOV, is essentially complete. However, the penetrations seal repairs are not complete as of the date of this inspection, but are planned to be completed by end of May 1992. This item remains open, pending completion of all corrective actions.

2.7 Summary and Conclusion

2.7.1 Restart issues

Considering the extent and safety significance of the team's findings with respect to plant restart, continued operation and safe shutdown, the team requested NYPA to submit its plan and schedule for the expeditious resolution of these findings. By letter dated March 27, 1992, Attachment 6 to this report, NYPA submitted a preliminary plan and schedule.

The March 27, 1992, letter also indicated that NYPA will complete significant fire protection programmatic improvements, including a root cause analysis, prior to restart from the current refueling outage. Specifically, any modifications or program improvements necessary to assure that the plant can be safely shutdown in the event of a fire will be completed prior to restart. The material condition of the plant will be improved to reduce the probability of a fire. The deficiencies in the fire brigade equipment, training, and procedures will be corrected.

2.7.2 Non-Restart Issues

During the inspection, the licensee also indicated that all fire protection issues which are to be implemented after restart will be reviewed for potential safety significance and justified for their deferral. Such justification will also be submitted for NRC review prior to restart.

2.7.3 Conclusion

In summary, the team findings (a total of 17 items, including 5 apparent violations and 12 unresolved items) in the 5 areas of inspection are:

- Corrective DET identified issues: 3 remain unresolved, pending completion of NYPA's corrective actions

- Follow-up of corrective actions for licensee identified issues. No significant findings in this area.

- Compliance with Appendix R: One apparent violation of III.G with several examples, and two apparent violation for inadequate emergency lighting (Section III.J and 10 CFR 50, Appendix B, Criterion III), two unresolved items on the reanalysis for safe shutdown in the event of fire, and six other unresolved items.

- Assessment of the Fire Protection and Prevention Program: One apparent violation of License Condition 2.C(3), Fire Protection, Amendment 47, Fire Protection and Prevention Program for identified weaknesses and inadequacies in the program; and one apparent violation of 10 CFR 50, Appendix B, Criterion XVI, for lack of prompt and effective corrective action for weaknesses identified in several QA audits, and one unresolved item.

- Follow-up of previous inspection findings: two items remain open, pending completion of licensee's corrective actions.

Considering the extent and safety significance of the team's findings with respect to plant restart, continued operation, and safe shutdown, the team requested NYPA to submit its plan and schedule for an expeditious resolution of these findings. By letter dated March 27, 1992, Attachment 6, to this report, NYPA submitted a preliminary plan and schedule which is currently being reviewed by the NRC staff. During the inspection, NYPA indicated that all issues which are to be implemented after restart will be reviewed for potential safety significance and justified for their deferral. Such justification will also be submitted, for NRC review and approval, prior to the restart.

The March 27, 1992, letter also indicated that NYPA will complete significant fire protection programmatic improvements, including a root cause analysis, prior to startup from the current refueling outage. Specifically, any modifications or program improvements

necessary to assure that the plant can be safely shutdown in the event of a fire will be completed prior to startup. The material condition of the plant will be improved to reduce the probability of a fire. The deficiencies in the fire brigade equipment, training and procedures will be corrected.

As evidenced by the recent initiatives NYPA has undertaken in the area of fire protection, it appears that it has recognized the importance of this area towards plant safety. The proposed corrective actions and enhancements, when completed, should adequately address all concerns identified by NRC and NYPA and should improve plant safety. NYPA appears to have a clear understanding of the extent of work to be done. Many corrective actions and enhancements remain to be done. In this context, it is also prudent to sort them out based on their relative importance to safety and implement them in a timely manner, consistent with their relative importance. All items required for safe operation and safe shutdown of the plant are to be completed prior to restart from the current outage.

3.0 EXIT MEETING

On March 20, 1992, the Chief, Operations Branch, Division of Reactor Safety, NRC Region I, the Team Leader, and the team met with senior licensee managers and summarized the findings of this inspection. The list of attendees in the meeting is provided in Attachment 5.

ATTACHMENT 1

LIST OF ABBREVIATIONS

ADS	Atmospheric Depressurization System
ALARA	As Low As Reasonably Achievable
ANI	American Nuclear Insurers
AOP	Abnormal Operating Procedure
AOV	Air Operated Valve
ASP	Alternate Shutdown Panel
ASSD	Alternative Safe Shutdown
BTP	Branch Technical Position
CA	Corrective Action
CFR	Code of Federal regulations
CO^2	Carbon Dioxide
CRD	Control Rod Drive
CS	Core Spray
CST	Condensate Storage Tank
DET	Diagnostic Evaluation Team
EAP	Emergency Plan Implementing Procedure
EDG	Emergency Diesel Generator
EEI	Escalated Enforcement Item
ESW	Essential Service Water System
FA	Fire Area
FHA	Fire Hazard Analysis
FZ	Fire Zone
FP	Fire Protection
FPP	Fire Protection Procedures
FPPM	Fire Protection Program Manual
FP/P	Fire Protection/Prevention
FPRM	Fire Protection Reference Manual
GL	Generic Letter
HPCI	High Pressure Coolant Injection
HVAC	Heating, Ventilation, and Air Conditioning
IN	Information Notice
ITP	Indoctrination and Training Procedure
JAF	James A. FitzPatrick
LER	Licensee Event Report
LPCI	Low Pressure Coolant Injection
LT	Long Term
MCC	Motor Control Center
MCM	Modification Control Manual
MOV	Motor Operated Valve
MSIV	Main Steam Isolation Valve
NFPA	National Fire Protection Association

NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
NYPA	New York Power Authority
PORC	Plant Operations Review Committee
PVC	Poly-Vinyl Chloride
QA	Quality Assurance
RCIC	Reactor Core Isolation Cooling
RCS	Reactor Coolant System
RHR	Residual Heat Removal
RHR SW	RHR Service Water
RPS	Reactor Protection System
RSP	Remote Shutdown Panel
SCBA	Self Contained Breathing Apparatus
SOV	Solenoid Operated Valve
SFP	Supervisor of Fire Protection
SPC	Suppression Pool Cooling
SRV	Safety Relief Valve
SSDA	Safe Shutdown Analysis
ST	Short Term
SWO	Stop Work Order
SWS	Service Water System
URI	Unresolved Item
VIO	Violation
WACP	Work Activity Control Procedure
WAP	Welding Administrative

ATTACHMENT 2

LIST OF ATTENDEES AT THE ENTRANCE MEETING

ON MARCH 9, 1992

NAME	TITLE
USNRC	
S. Pullani	Sr. Reactor Operator Engineer, AEOD
W. Cook	Sr. Resident Inspector, DRP
B. McCabe	Project Manager, NRR
P. Madden	Sr. Fire Protection Engineer, NRR
K. Sullivan	Electrical Engineer, BNL
J. Stang	Project Manager, NRR
F. Bower	Reactor Engineer, DRS
A. Fresco	Mechanical Engineer, BNL
H. Blumberg	Section Chief, DRS
R. Paolino	Sr. Reactor Engineer, DRS
J. Caruso	Operations Engineer, DRS
J. Haverkamp	Chief, Reactor Projects, DRP
NYPA	
R. Daviot	Fire Protection System Engineer
S. Zulla	Vice President Nuclear Engineering
J. Gray, Jr.	Director, Nuclear Licensing - BWR
G. Tasick	Quality Assurance
D. Lindsey	General Manager - Maintenance
R. Liseno	General Manager - Operations
A. Bartlik	Fire Protection
K. Mavrikis	Director, HQ, Engineering and Design
D. Holliday	Configuration Manager
A. Ettinger	Director, Configuration Management and Engineering Programs
B. Bostian	Sr. Comm. Specialist
D. Torkin	Building and Grounds Supervisor
P. Lotempio	Manager, Finance and Administration

NYPA

J. Rogers	MIS Manager
J. Fitzgerald	Construction Manager
E. Conger	Acting Material Control Manager
D. Kieper	I&C Manager
J. Flaherty	Planning Manager
R. Kolp	Fire Protection & Technical Services
N. Williams	Nuclear Engineering Coordinator
K. Vehstedt	Manager of Technical Services
S. Wilkie	Fire Protection Engineer
T. Dicesaro	Project Engineer
A. Bleiweis	Nuclear Generation
R. Locy	Operations Manager
J. DeSantis	Project Engineer
T. Dougherty	Director, Project Engineering
M. Licitra	Supervisor, Project Engineering
D. Ruddy	Site Engineer Manager
R. Heath	Site Fire Protection Supervisor
G. Hofer	BWR Licensing Engineer
M. Colomb	General Manager - Support Services
A. Zaremba	Org. Licensing Manager
J. Ellmers	Supervisor, Nuclear Licensing Eng.
R. Converse	Resident Manager
R. Thomas	Assistant Shift Supervisor

ATTACHMENT 3

LIST OF DOCUMENTATION REVIEWED

1.0 Technical Specifications

Sections 3, 4, and 6

2.0 Program Documents

Work Activity Control Procedure (WACP) 10.1.10 Control of Combustibles and Flammable Materials, Rev.4, dtd 09/11/91

Fire Protection and Prevention Procedures (FP/P) Manual, Sections 1, 2, 3, 4, 5, and 6

Fire Protection Reference Manual (FPRM) (Draft) Volumes 1, 2, 3, 4, and 5, Rev. 0, (Impell) dated November 29, 1991.

Administrative Procedure (AP) 1.6, Fire Protection Program, Rev. 5, dated February 21, 1990.

Welding Administrative Procedure (WAP-04), Control of Cutting, Grinding, and Welding, Rev. 0, dated July 30, 1986.

WACP 10.1.7, Housekeeping and Cleanliness Control, Rev. 7, dated January 9, 1991.

3.0 Surveillance Procedures

Maintenance Surveillance Test (MST) 76.5, Emergency Battery-Powered Lighting Surveillance Test, Rev. 5, dated October 11, 1989.

Surveillance Test (F-ST) 16J, Emergency Battery Lighting Operability Test, Revision 2, dated February 14, 1990.

MST 76.9 Modification Control Manual Form (MCM) 6A, Attachment 4.1, Rev. 0, November 1989, Sheets 18-20 of 106

MCM 6A, Attachment 4.4, November 1989, Sheet 1 of 1

ST-99C, "Inventory and Testing of Safe Shutdown Panels and Equipment Cabinets, CRD Venting Rig Equipment Cabinets, and AOP Equipment Cabinets," Revision 4, September 30, 1991.

Nuclear Safety Evaluation No. JAF-SE-90-067, Clarification of Design Basis Requirements for the JAFNPP Emergency Service Water System (46), Rev. 1, March 6, 1991

Stone and Webster Hydraulic Water Spray System Calculation No. 14863.01-B-1, Initial Rev., dated October 16, 1984.

4.0 Technical Reports

NYPA James A. FitzPatrick Safe and Alternate Shutdown Analysis Report, EPM, Volumes I, II, III, IV, V, VI, and VII dated February 12, 1992.

Occurrence Report 92-07

NYPA/J. A. FitzPatrick Nuclear Plant - Battery Charger and Battery Room Temperature at Normal Operations," Stone & Webster Engineering Corp. (SWEC) Calculation No. 02268.5004-US(N)-007, Revision 1, August 1, 1991.

NYPA/J.A. FitzPatrick Nuclear Plant - Charger Room BR-4 and Battery Room BR-3 Temperatures Based Upon Appendix R Fire in Corridor BR-5," Stone & Webster Engineering Corp. (SWEC) Calculation No. 02268.5005-US(N)-005, Revision 0, August 6, 1991.

NYPA Nuclear Safety Evaluation No. JAF-SE-85-131, Rev. 0 and 1, original issue date September 16, 1985

NYPA Installation Procedure No. F1-85-065, Appendix R - Fire Wrapping of Selected Electrical Raceways, original issue date October 2, 1985

Underwriters Laboratories (UL) Inc. Report on Electrical Circuit Protective Materials, Babcock and Wilcox, UL File R11044, UL File R11044-1, Project 84NK8356, March 22, 1985

4.0 Maintenance and Equipment and Operating Procedures

Operating Procedure (OP)-33, Fire Protection, Rev. 20, dated August 1, 1991

Abnormal Operating Procedure (AOP)-43, Plant Shutdown from Outside the Control Room, Rev. 13, dated August 14, 1991

AOP-28, Operation During Plant Fires, Rev. 2, dated August 9, 1991

AOP-58, Station Battery Room Emergency Ventilation, Rev. 1, August 15, 1991.

Maintenance Procedure (MP)-76-1, Diesel Fire Pump Engine, 76P-1 (ENG) Maintenance, Rev. 8, dated January 2, 1991.

MP 76.7, 6-Volt Battery Pack Emergency Light Maintenance, Rev. 1, dated May 9, 1991.

POT-25A, "Appendix R Safe Shutdown Modification Preoperational Test (Mod. F1-83-018) ASP-3." Rev. 0, April 8, 1985.

POT-25B, "Appendix R Safe Shutdown Modification Preoperational Test (Mod. F1-83-018) 25ASP-1 & 2, Rev. 0, April 24, 1985.

POT-25C, "Appendix R Safe Shutdown Modification Preoperational Test (Mod. F1-83-018) 25RSP," Rev. 0, May 2, 1985.

5.0 Audits

JAF Nuclear Power Plant 1991 Triennial Fire Protection Audit (91-07)

JAF 1989 Fire Protection Audit (JAF FPA 89) dated January 22, 1990

JAF Nuclear Power Plant 1988 Triennial Fire Protection Audit dated December 6, 1988

JAF Nuclear Power Plant Audit No. 684 dated January 9, 1990

JAF Nuclear Power Plant Audit No. 687 dated January 8, 1990

JAF Nuclear Power Plant 1987 Annual Fire Protection Audit, Revision 1, dated February 25, 1988

JAF Nuclear Power Plant Triennial Fire Protection Audit Report 1975 dated March 10, 1986

JAF Nuclear Power Plant Annual Fire Protection Audit Report 1984 dated January 16, 1985

6.0 Miscellaneous Documents

NYPA Letter to NRC, dated June 21, 1981, (JPN-81-45), Regarding Emergency Lighting

NYPA Letter, R. E. Beedle to NRC, dated August 16, 1991 (JPN-91-043), regarding a schedule for the short term fire protection actions

NYPA Letter, R. E. Beedle to NRC, dated September 13, 1991, (JPN-91-050), regarding a schedule for the long term fire protection actions

NYPA Letter, R. E. Beedle to NRC, dated March 27, 1992, (JPN-92-014), regarding the fire protection program

NRC Information Notice (IN) 92-18, Potential For Loss of Remote Shutdown Capability During a Control Room Fire

7.0 Training Documents

Indoctrination and Training Procedure (ITP)-13, Fire and rescue training, Rev 11, dtd 8/22/91

Instructor Lesson Plan (FP) 13.16, Firewatch, Rev. 3, dtd 1/20/92

Site Orientation Student Handout, Rev. 11, 1/4/92

Indoctrination and Training Procedure ITP-5, "Licensed Operator Requalification," Rev. 10, May 23, 1990.

ATTACHMENT 4

LIST OF DEFICIENCIES IDENTIFIED BY FIRE AREA

Fire Area/Zone	Fire Area/Zone Location	1982 Analysis Methodology	1992 Reanalysis Methodology	Discrepancies Based on 1992 Data
1D/CT-4	North Cable Tunnel 286'-0" El.	ADS Div."B" From Local Control Pnl 02ADS-071 RHR Div."B"- SPC & SDC HPIC - With Man. Ops ESW - Div B RHRSW - Div B	ADS -Div. B RHR - Div. B ESW - Div. B Rx. Vessel Inst. @ Alt SD Pnl.	• Cables associated with the Control Room operated ADS valves may spuriously open ADS valves • HPCI Operation - HPCI Test By-Pass valves (23 MOV-21 and 23MOV-24 may close. - CST Lvl indication not avail. - HPCI Suction Vlv (23MOV-58) will CLOSE and CST Suction (23MOV-17) will OPEN due to cable failures - Manual operation of HPCI Steam Admission valve (23MOV-15) via remote control at MCC may is not a viable action. Valve may have closed and power is not available at MCC-153 (Train "A" Power Source) • RHR - SPC Operation - 10MOV-34B and 39B may spuriously close

Fire Area/Zone	Fire Area/Zone Location	1982 Analysis Methodology	1992 Reanalysis Methodology	Discrepancies Based on 1992 Data
1A/Zones AD-1 thru AD-6, AS-1, MG-1	Admin Bldg. 272', 286' and 300' El.	ADS - Div.A RHR - Div.A CS - Div A RCIC	ADS - Div B RHR - Div B (LPCI, SC) ESW CR HVAC Reactor Vessel Iso System (RVIS)	• Numerous A Train cables routed thru ductbank in AD-3 (1992 anal recommends revising methodology to use "B" Train Systems) • RCIC not avail due to loss of "A" Train Power

Fire Area/Zone	Fire Area/Zone Location	1982 Analysis Methodology	1992 Reanalysis Methodology	Discrepancies Based on 1992 Data
1E/Zones FP-2, TB-1, OR-1, OR-2 and OR-3	Turbine Bldg El. 252 & 272	ADS - Div.A RHR - Div.A - SPC - SDC - LPCI CS -Div. A RCIC	ADS - Div.A RHR - Div.A - LPCI - SC ESW CR Ventilation	• HVAC systems do not appear to be adequately addressed in 1982 analysis. - Electric Bay Unit Coolers (67UC-16A) are lost - no analysis to determine HVAC requirement. - Control Room HVAC Equip. Room Cooling not available - 70AHU-3A &12A would need to be manually aligned to ESW per OP-55A if required

Fire Area/Zone	Fire Area/Zone Location	1982 Analysis Methodology	1992 Reanalysis Methodology	Discrepancies Based on 1992 Data
02/Zones: CT-2 SW-2	Cable Tunnel East and Swgr Room	ADS-Div.A RHR-Div.A -SPC -SDC -LPCI CS-Div.A ESW-Div.A RHRSW-Div.A	ADS-Div.A RHR-Div.A -SPC -CS ESW-Div.A RHRSW-Div.A CR HVAC RVIS	• HVAC systems and components may be affected (70AHU-19A,73FN-3A,and 92CD-1,3) 1982 analysis does not appear to adequately address vulnerability of HVAC.

Fire Area/Zone	Fire Area/Zone Location	1982 Analysis Methodology	1992 Reanalysis Methodology	Discrepancies Based on 1992 Data
9/Zones RB-1E, RB-1A AND SG-1	Crescent Area and Portions of Rx. Bldg	ADS-Div.A, Control Div-B ADS from 02ADS-71 Pnl at 300' El of Rx Bldg RHR-Div.A - SPC - SDC - LPCI RHRSW-Div.A CS-Div.A ESW-Div.A	ADS-Div.A RHR- Div.A -LPCI -SC ESW CR HVAC RVIS	* DIV-B ADS valves can not be operated from 02ADS-71 Pnl due to cable failures * 1982 anal. relied on manual oper of RHR SD cooling suction valve 10MOV-18. - Action may not be feasible due to location inside drywell * 1982 ana identified loss of LPCI Invertor 71INV-3A due to fire; power to 71MCC-155 to be provided by alternate maintenance feeder(MCC-153). However,present configuration will not permit isolation of fault on Normal feed to 71MCC-155. Maintenance feed will not repower MCC-155 if normal feeder cable fails. Loss of MCC-155 may prevent operation of LPCI Supply Valve MOV-25A and RHR Hx Bypass Valve MOV-66A.

Fire Area/Zone	Fire Area/Zone Location	1982 Analysis Methodology	1992 Reanalysis Methodology	Discrepancies Based on 1992 Data
FA-7 Zones: CR-1 RR-1 CB-1	Control Room Relay Room Cbl.Sprd.Rm	ADS-Div.B RHR-Div.B -LPCI -SPC Note: Suppression pool cooled by filling Rx solid and establishing RHR flow through open ADS valves. ESW-Div.B RHRSW Process Monitoring from Local Stations	ADS-Div.B RHR-Div.B -LPCI -SPC Note: Suppression pool cooled by filling Rx solid and establishing RHR flow through open ADS valves. ESW-Div.B RHRSW Process Monitoring from Local Stations	Failure of 1982 to consider spurious actuation due to fire initiated "Hot Shorts" resulted in the identification of numerous potential spurious actuation. For example: * Cables which could spuriously open Rx Depress. SRVs (inc 6 ADS) valves not properly isolated; single hot short would result in spurious opening of a valve * Control of Inboard and Outboard MSIV's is not isolated from this Fire Area. Additionally, MSIV Position Indication on Alternative SD Pnl may be lost due to routing of power supply cable * Rx Head Vent Isolation Valve (02AOV-17) not isolated

ATTACHMENT 5

LIST OF ATTENDEES AT THE EXIT MEETING

ON MARCH 20, 1992

NAME	TITLE
NRC	
S. Pullani	Sr. Reactor Operations Engineer
F. Bower	Reactor Engineer
P. Madden	Sr. Fire Protection Engineer
N. Blumberg	Chief, Performance Programs Section
A. Fresco	Research Engineer
K. Sullivan	Electrical Systems Engineer
C. Anderson	Chief, Electrical Section
R. Paolino	Sr. Reactor Engineer
B. McCabe	Project Manager
W. Cook	Sr. Resident Inspector
L. Bettenhausen	Chief, Operations Branch
NYPA	
R. Gallo	Curr. Specialist
P. Brozenich	Assistant Operations Manager
D. Nacamuli	I&C General Supervisor
J. DeRoy	Maintenance Manager
T. Landers	Material Control Manager
D. Holliday	Configuration
J. Foley	Director, Safety & Fire Protection
D. Bregman	Fire Protection Engineer
A. Bartlik	Fire Protection Engineer
G. Tasick	Quality Assurance Manager
R. Kyle	Fire Protection Engineer
A. DiCesaro	Project Engineer
R. Drake	Sr. Circ. Structural Engineer
J. Balla	Fire Protection Engineer
R. Lauricella	Fire Protection System Engineer
F. Brocce	Senior I&C Engineer
C. Davis	Electrical Engineer
R. Kalantari	Technical Consultant

NYPA

J. Dwyer	Technical Consultant
R. Kolp	Tech. Svcs/Fire Protection Consultant
W. Berzins	Manager of Communications
C. Gannon	Radiological & Environmental Svc. Mgr.
J. Hamblin	Training Support Supervisor
R. Dowiot	Fire Protection System Engineer
R. Thomas	Assistant Shift Supervisor
S. Wilkie	Fire Protection Engineer
R. Heath	Fire Protection Supervisor
J. Romano	Acting Training Manager
T. Baileys	Configuration Management
U. Witte	Manager, Conf. Mgr. Program
G. Mavrikis	Director, NED
P. Latempio	Finance Manager
R. Liseno	General Manager of Operations
J. Rogers	Computer Manager
J. Flaherty	Planning Manager
T. Dougherty	Director, Project Engineering
D. Ruddy	Site Engineer Manager
R. Converse	Resident Manager
R. Beedle	Exec. Vice President - Nuclear Gen.
M. Colomb	General Manager - Support Services
J. Gray	Director, Nuclear Licensing - BWR
J. Ellmers	Supervisor, Nuclear Licensing Engineering
W. Childs	Sr. Nuclear Licensing Engineer
D. Tonkin	Building & Grounds Supervisor
G. Hofer	Nuclear Licensing
F. Catella	Operations Training Supervisor

ATTACHMENT 6

NYPA LETTER JPN-92-014, DATED MARCH 27, 1992

Attachment 6

123 Main Street
White Plains, New York 10601

914 681 6846

NewYorkPower Authority

Ralph E. Beedle
Executive Vice President
Nuclear Generation

March 27, 1992
JPN-92-014

Regional Administrator
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

SUBJECT: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
Fire Protection Program

REFERENCES: 1. NYPA letter, R. E. Beedle to the NRC, dated August 16, 1991 (JPN-91-043), regarding a schedule for the short term fire protection actions.

2. NYPA letter, R. E. Beedle to the NRC, dated September 13, 1991 (JPN-91-050), regarding a schedule for the long term fire protection actions.

Dear Sir:

The Authority has been conducting an extensive review of the Fire Protection Program at the FitzPatrick plant. As a result of this ongoing effort, the Authority has identified deficiencies in the program. Recently the NRC conducted a Special Team Inspection (92-80) of the FitzPatrick Fire Protection Program. During the exit meeting on March 20, 1992, the NRC identified sixteen open items. This letter briefly summarizes the Authority's actions to resolve these open items.

The Authority will complete significant fire protection programmatic improvements, including a root cause analysis, prior to startup from the current refueling outage. Specifically, any modifications or program improvements necessary to assure that the plant can be safely shutdown in the event of a fire will be completed prior to startup. The material condition of the plant will be improved to reduce the probability of a fire. The deficiencies in the fire brigade equipment, training and procedures will be corrected.

Work on these improvements has already started. To improve the physical condition of the plant, all work was stopped until unnecessary transient combustibles were removed from the plant. Hot process fire watch personnel and station fire watch personnel are being retrained. A new Safe/Alternative Shutdown Analysis is being completed. The draft analysis and its recommendations were discussed with the NRC inspection team.

All the elements of the FitzPatrick Fire Protection Program have not been finalized. Specifically, issues identified by the new Safe/Alternative Shutdown Analysis are being evaluated by Engineering and resolutions are being developed. Technically justifiable interim compensatory measures may be developed for some of the issues and implemented for modifications requiring long lead times. A description of the issue and the associated compensatory measures will be submitted to the NRC for review.

Attachment 1 is the Authority's schedule for resolving the sixteen open items discussed at the exit meeting. In addition, the Authority will provide a comprehensive plan and schedule to address fire protection issues by April 15, 1992. The plan will include the above sixteen open items; the long term and short term actions discussed in References 1 and 2; and a schedule for the completion of each issue.

If you have any questions, please contact Mr. J. A. Gray, Jr.

Very truly yours,

Ralph E. Beedle
Executive Vice President
Nuclear Generation

cc:

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SCHEDULE FOR COMPLETION OF THE SIXTEEN OPEN ITEMS DISCUSSED AT THE EXIT MEETING FOR THE NRC SPECIAL INSPECTION (92-80) ON THE FITZPATRICK FIRE PROTECTION PROGRAM

NUMBER	DESCRIPTION		SCHEDULE
1	This item consists of the following:		
	a)	No high impedance fault analysis [NYPA identified item]	Note 1
	b)	Lack of guidance to operators in fire response procedures to achieve a safe shutdown and to assist with diagnosis of significant spurious actuations of equipment [Discussed in DET Section 2.3.2.8 (3)]	To be resolved and corrective actions to be implemented prior to startup.
	c)	Failure to include spurious actuation vulnerabilities in fire response procedures for communications and indication circuitry [NYPA identified item; discussed in DET Section 2.3.2.8 (6)]	To be resolved and corrective actions to be implemented prior to startup.
	d)	Lack of original or subsequent verification of illumination levels of lighting [Discussed in DET Section 2.3.2.8 (7)]	To be resolved and corrective actions to be implemented prior to startup.
	e)	Unreviewed potential common mode failures of electrical cables due to lack of separation [Discussed in DET Section 2.3.2.8 (9)]	Note 1

NUMBER	DESCRIPTION	SCHEDULE
2	This item consists of the following:	
	a) Assignment of only one individual part time to walk down the plant for transient combustibles and evaluate the condition of the fire protection system [Discussed in DET Section 2.3.2.8 (4)]	Additional personnel will be assigned prior to startup.
	b) Lack of a design basis document for fire protection [NYPA identified item; discussed in DET Section 2.3.2.8 (5)]	See Reference 2.
	c) No procedures governing fire watches [Discussed in DET Section 2.3.2.8 (8)]	Additional procedures will be developed and implemented prior to startup.
	d) Uncontrolled storage of flammables in safety-related equipment rooms [Discussed in DET Section 2.3.2.8 (10)]	Appropriate controls will be developed and implemented prior to startup.
3	Short and long term fire protection action lists	See References 1 and 2.

NUMBER	DESCRIPTION	SCHEDULE
4	Corrective actions for the 43 items presently identified by the new Safe/Alternative Shutdown Analysis	A schedule will be provided by April 15, 1991. Also see Note 3.
5	Use of ADS/LPCI shutdown methodology in the new Safe/Alternative Shutdown Analysis	A decision on the methodology to be used will be provided by April 3, 1992.
6	Validity of present shutdown methodology due to the different systems used to achieve safe shutdown in the old Safe/Alternative Shutdown Analysis and the new Safe/Alternative Shutdown Analysis [10 CFR 50, Appendix R, III.G]	See schedule for Item 4.
7	In walking down AOP-43, the labeling and lighting was inadequate	To be resolved and corrective actions to be implemented prior to startup.
8	Configuration of the one-hour fire barriers	Note 3
9	Inadequacies in the suppression and detection systems, especially the design basis of the carbon dioxide system (i.e., sensors not installed at ceiling, system not designed to NFPA 72E, etc.)	Note 2

NUMBER	DESCRIPTION	SCHEDULE
10	No periodic testing of the safe shutdown panels	Revise procedures and complete surveillance tests prior to startup.
11	Operators require walkthrough training of the AOP-43 at least twice a year	Training schedules will be implemented and operator an walkthrough will be conducted prior to startup.
12	Establish the basis for the two hours allowed after a fire to begin the implementation of AOP-58	Information that was provided to the NRC during the inspection is presently under NRC review. No further information is required from the Authority at this time.

NUMBER	DESCRIPTION	SCHEDULE
13	Inadequate emergency lighting due to physical problems (i.e.,poor or no illumination, aimed incorrectly, inadequate mountings, etc.) [10 CFR 50, Appendix R, III.J]	To be resolved and corrective actions to be implemented prior to startup.
14	Inadequate emergency lighting due to failure to include manufacturer recommendations in the maintenance and surveillance procedures [10 CFR 50, Appendix R, III.J]	Revise procedures and complete surveillance tests prior to startup.
15	Inadequacies in the Fire Protection Program including Fire Plans, no qualified personnel to issue burn permits, control of combustibles, weakness in ignition source control, weakness in fire watch training, weakness in fire brigade training, little hands-on training (i.e., actual fires, equipment use, etc.), inadequate pre-fire plans, outdated equipment, etc. [Amendment 47 of the FitzPatrick Operating License]	Weaknesses and inadequacies to be resolved and corrective actions to be implemented prior to startup.
16	Failure to take adequate corrective actions on the findings from the QA audits of the Fire Protection Program [10 CFR 50, Appendix B]	Note 4

NOTES:

1. This information is included in the new Safe/Alternative Shutdown Analysis.

NOTES:
(cont'd)

2. The following actions will be completed prior to startup:

   a) Install a Battery Room Corridor Suppression System;

   b) Install a Fire Detection System north of the Electric Bay; and

   c) Evaluate the adequacy of the Automatic Fire Suppression and Detection Systems required to support Appendix R and implement compensatory actions as required.

   In addition, the following actions will be completed after startup:

   a) Perform an NFPA Code review and compile the design basis for existing Fire Suppression and Detection Systems and complete the NFPA Code review one year after startup;

   b) Evaluate, justify or modify the systems as required. Complete the evaluations, justifications, and/or modifications one year after the completion of the NFPA Code review; and

   c) Implement required compensatory actions prior to any required modifications.

3. Although the Authority will make every reasonable effort to complete these items prior to startup, these items must be evaluated by Engineering before the most effective solution or modification can be identified. Technically justifiable interim compensatory measures may be developed and implemented for modifications requiring long lead times. A description of the issue and the associated compensatory measures will be submitted to the NRC for review.

4. The QA findings are being revieweded. This action will be completed prior to startup. Training and procedural changes recommended by the review will be implemented prior to startup. Modifications recommended by the review will be completed as discussed in Note 3.