U.S. NUCLEAR REGULATORY COMMISSION REGION I

Report No.: 50-286/91-09

Licensee: New York Power Authority 1633 Broadway New York, New York 10019

Facility: Indian Point 3 Nuclear Power Plant

Location: Buchanan, New York

Dates: April 14 to June 1, 1991

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<u>Areas Inspected</u>: This inspection report discusses routine and reactive inspections of plant activities in the following areas: plant operations; radiological controls; maintenance and surveillance; security; emergency preparedness; engineering and technical support; and safety assessment/quality verification.

Results: Inspection results are summarized in the attached executive summary.



EXECUTIVE SUMMARY

Indian Point 3 Nuclear Power Plant

NRC Region I Inspection Report No. 50-286/91-09

<u>Plant Operations</u>: NYPA successfully conducted a pre-planned maintenance outage in order to replace the seal on reactor coolant pump 34. NYPA appropriately declared an unusual event on May 14, 1991 due to a potentially contaminated injured worker being transported offsite. The individual was subsequently determined not to be contaminated. The resident inspector discovered safety injection valve 856D indicating open while tagged shut under a mid-loop protection operating order. This issue is unresolved (91-09-01) pending the completion of NYPA's investigation and subsequent NRC review. An indicated quadrant power tilt ratio greater than the technical specification limit was properly investigated and corrected.

<u>Radiological Controls</u>: Health physics personnel activities during the transportation of the potentially contaminated injured individual to the hospital facility were considered noteworthy. Radiological controls were excellent during the reactor coolant pump seal replacement outage. The discovery of short-lived isotopes in the sediment of the B-train of the storm drain system on site has been expeditiously investigated by the chemistry department.

<u>Maintenance and Surveillance</u>: The maintenance department's repair and analysis of the reactor coolant pump 34 seal failure was considered noteworthy. NYPA technicians failed to remove the shipping caps from the secondary fuel filters of emergency diesel generator 31 prior to installation and retest. Although the maintenance procedure was modified, the event was indicative of weak training and maintenance supervision. Both hydrogen recombiners successfully passed procedure 3PT-SA1. Weaknesses were identified by NRC in the performance and review of certain fire protection surveillance tests.

<u>Emergency Preparedness</u>: The post-accident sampling system drill and critique was considered noteworthy. Effective coordination between the health physics and chemistry department staffs was a strength.

<u>Engineering and Technical Support</u>: During mid-loop preparations, NYPA successfully tested the audible and visual alarm indications for low reactor coolant system level and core exit thermocouple high temperature. The ultrasonic level measuring system failed the calibration and functional check. Future system modification is required.

<u>Safety Assessment and Quality Verification</u>: An extensive review of fire protection and prevention activities was conducted. One finding is unresolved (91-09-02) pending NYPA's resolution of electric fire pump surveillance and retest discrepancies. NYPA displayed inadequate or ineffective corrective actions in two instances which constituted a violation (91-09-03). The plant operating review committee and safety review committee were performing adequate reviews and meeting technical specification requirements.



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1.0 SUMMARY OF PLANT ACTIVITIES

1.1 <u>Plant Activities</u>

The plant was operating at full power at the beginning of this inspection period. NYPA operators began to reduce power on May 11 for a pre-planned maintenance outage to replace the seal on reactor coolant pump 34. On May 12 the turbine and the reactor were shut down. The plant entered cold shutdown on May 13. The reactor coolant pump seal replacement is discussed in section 4.1. NYPA declared an unusual event on May 14 due to a potentially contaminated injured worker being transported offsite. This is discussed in section 2.2. On May 15 the inspector discovered safety injection valve 856D indicating open although the valve was tagged shut. This is described in section 2.4. On May 21, at the end of the maintenance outage, the plant entered hot shutdown. The plant was started up on May 23. Power was held at 75% while an indicated quadrant power tilt condition was investigated and resolved as discussed in section 2.3. The plant reached full power on June 1.

1.2 NRC Activities

The resident inspection activities during this period included inspection during normal working hours, as well as during portions of backshifts (early morning and evening shifts) and deep backshifts (weekend, holiday and night shifts). Inspection coverage was provided for 23 hours during backshifts and 11 hours during deep backshifts.

The electrical distribution system functional inspection (EDSFI) began on March 19, 1991 and ended on April 19, 1991 (Inspection Report 91-80).

F. Williams, NRR Project Manager, visited the plant on April 18, 19, and 29, 1991.

Self-assessment activities were described for NRC during a presentation by NYPA on April 29, 1991.

A specialist inspection of the inservice inspection program was conducted from May 6 to May 10 (Inspection Report 50-286/91-11).

A specialist inspection of engineering was conducted from May 13 to May 17 (Inspection Report 50-286/91-12).

A specialist inspection of radiological controls was conducted from May 20 to 23 (Inspection Report 50-286/91-13).

A specialist inspection of security was conducted from May 20 to 23 (Inspection Report 50-286/91-10).

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2.0 PLANT OPERATIONS (71707, 71715, 93702)

2.1 <u>Routine Operations Reviews</u>

Using the Probabilistic Risk Assessment (PRA) inspection guidance and applicable drawings and checkoff lists, the inspectors performed a system walkdown on the following systems:

- Containment Fan Cooling System
- Recirculation System
- Reactor Coolant System
- Secondary System
- Accumulator System

All systems were properly aligned for the existing plant conditions.

The inspectors routinely observed plant operations. The inspectors verified that the plant was being operated safely and in accordance with procedural and regulatory requirements.

2.2 Notification of an Unusual Event (NUE) Due to Potentially Contaminated Injured Worker

NYPA declared an unusual event at 1740 on May 14, 1991 due to the transport offsite of an injured, potentially contaminated individual. A maintenance mechanic, working on the pressurizer manway, collapsed from apparent heat exhaustion on the ninety-five foot level of the vapor containment (VC). An emergency medical technician responded immediately and requested ambulance assistance. Although an initial frisk conducted by the health physics supervisor prior to exiting the VC did not detect any contamination, the individual was conservatively considered potentially contaminated and treated as such by the ambulance crew and receiving hospital facility. In accordance with the site emergency plan, an NUE was declared.

Upon stabilizing the patient and performing a thorough frisk at the receiving hospital, the patient was determined not to be contaminated. The NUE was closed out at 1815 upon receipt of this information in the control room.

The resident inspector responded to the site in order to monitor the licensee's response. No abnormalities or radiological incidents were noted in this event. The inspector considered NYPA's response effective and expeditious. The handling of the potentially contaminated individual and the required radiological controls activities were conducted with expertise.

2.3 <u>Reactor Coolant Pump Seal Replacement Outage</u>

Seal return flow from reactor coolant pump 34 had been running high (5.1 gpm) since the plant was returned to service in April. Normal flow is about 1.6 gpm and procedures require that the plant be shutdown if flow reaches 6 gpm. In response, NYPA planned an outage to replace the seal.

The plant was shutdown on May 12. The shutdown was observed by an operations selfevaluation team and a quality services technician. On May 14, 1991, all reactor coolant system (RCS) draindown preparations were accomplished and draining to mid-loop was completed at 11:30 a.m. The inspector conducted a review of NYPA's preparation and conduct of mid-loop Two findings were noted in this review. During a walkdown in the vapor activities. containment (VC), the inspector noted a mispositioned open high head safety injection valve which was tagged shut under an operating order written to isolate the RCS for mid-loop operation and maintenance. The valve misposition is discussed in section 2.4. Additionally, the inspector observed the draindown of the RCS and the inability of NYPA to calibrate the Ultrasonic Level Measuring System (ULMS) provided as the second independent RCS level indication. The ULMS failure is further discussed in section 7.2. The reactor coolant pump seal replacement was completed successfully as discussed in section 4.1. The plant was heated to hot shutdown conditions on May 21 and was brought critical on May 23. During power ascension, a quadrant power tilt ratio of 1.05 was indicated. The Technical Specification limit is 1.02. NYPA performed a flux map which showed that there was in fact no tilt. In accordance with Technical Specifications, NYPA reduced the high flux trip setpoint to 85%, performed daily flux maps, and limited power to 75%. NYPA determined that the indicated tilt was the result of having replaced micro ammeters in nuclear instrumentation channels 31 and 33 in combination with the expected drift prior to routine calibrations. New full power calibration factors were established, a full incore-excore calibration was completed, and the high flux trip setpoint was reset. There were no further flux tilt concerns. The plant reached 100% power on June 1. The inspector concluded that the above activities were conducted safely. Appropriate Technical Specification limits and procedural requirements were followed.

2.4 <u>Misposition of the Loop 32 Cold Leg High Head Safety Injection Line Boron Injection</u> <u>Tank (BIT) Header Stop Valve, SI-856D</u>

On May 15, 1991, during a walkdown of the vapor containment (VC), the resident inspector found the loop 32 cold leg high head safety injection line BIT header stop valve, SI-856D indicating fully open, while tagged in the shut position under Operating Order No. 2826. Operating order No. 2826 provided protection to the RCS integrity during mid-loop operations by positioning 96 components. The plant was in cold shutdown and drained to mid-loop at the time of the finding. SI-856D is a motor-operated limitorque valve with disconnected motor leads and with a chained and locked handwheel. This valve is routinely operated by hand through a clutch mechanism and only has local indication. This valve is throttled to a preset position (7/16") prior to plant operation for proper ECCS flow balance.

The inspector reported the finding to the shift supervisor. The shift supervisor informed the inspector that the stem markers on the valve were considered unreliable. A plant operator, sent to investigate the situation, attempted to operate the valve and stated to the inspector that the valve was shut. After discussion with the inspector, the plant operator again attempted to operate the valve. This time the valve went shut and the associated indicator verified the closed valve position. The inspector, NPO, and an HP technician then verified the positions of the other 856 series valves located in a nearby high radiation area. No other abnormalities were noted at that time, although the ability to determine the position of some of the valves was hampered by the unsatisfactory condition of the valve stem markers.

The operations department immediately commenced an investigation into the event. Additionally, operating order 2826 was reverified. No other mispositionings were noted in the reverification of the operating order. The subsequent report revealed the following:

- 1. At 4:20 p.m. on May 14, 1991 an NPO had completed operating order 2826. The operator found valve SI-856D indicating "fully open." The valve should have been in the 7/16" throttled position. When the operator attempted to close the valve, the clutch was difficult to engage. The valve operator was rotated about two turns and the NPO considered the valve shut.
- 2. Surveillance procedure, 3PT-CS23, which provided the positional check of the high head safety injection valves prior to plant operations had a temporary change (TPC 90-848-SV) which stated that the valve stem markers were unreliable for the valve position indication of the high head safety injection valves.
- 3. A review of the last performance of surveillance test 3PT-CS23 on April 6, 1991, indicated that valve SI-856D was properly positioned and verified by actual measurement (of stem travel) at its required throttled position of 7/16".
- 4. Investigation revealed that valve SI-856D required nine turns from the fully shut position to reach the 7/16" throttled position which is required for plant operations. An additional twenty turns was necessary in order to reach the full open position. The fully shut and open positions were located on the existing valve stem marker indications.
- 5. Since the valve was found fully open by both the NPO on May 14, 1991 and the NRC inspector on May 15, 1991, the time at which the valve was improperly placed in the full open position was still unclear.

Due to their inability to determine when the valve was mispositioned, NRC requested that plant management investigate the event further in order to determine the position of valve SI-856D during plant operations from April 6, 1991 to May 14, 1991. Additionally, the safety significance of the mispositioned valve and the associated effect on the performance of the safety injection system needed to be assessed.

The operational experience review group (OERG) commenced an investigation on May 24, 1991 and NYPA reported its initial findings to NRC during a conference call with Region I management on May 30, 1991. Although the exact timing of the mispositioning of the valve was still unknown, NYPA management asserted that the valve was properly throttled and positioned on April 6, 1991 prior to plant operation and most probably the valve was mispositioned after the shutdown on May 12, 1991. The mispositioned valve after plant shutdown would not have resulted in loss of shutdown cooling or overfill of the reactor vessel. This does not, however, mitigate the importance of valve position control on safety systems in the plant. Further NRC review of NYPA's complete findings, analysis, and corrective actions was delayed pending OERG's completion of their investigation of the event. This is an unresolved item (91-09-01).

Due to the concerns raised by NRC regarding the performance of 3PT-CS23 and the indicators and operation of the high head safety injection valves, the inspector observed the setting of the high head safety injection valves on May 22, 1991 during the performance of 3PT-CS23 prior to plant startup. The inspector noted the operators' strict adherence to the procedure and the second-verification requirements which were newly added by TPC 91-262-SV. All valves were properly positioned, verified, and locked in accordance with the procedure.

3.0 RADIOLOGICAL CONTROLS (71707)

3.1 <u>Routine Radiological Controls Reviews</u>

Radiological controls were under routine review during plant tours throughout this inspection period. The activities inspected were effective in meeting the objectives of the radiological protection program. The inspectors toured the vapor containment during the RCP seal replacement and considered the radiological controls in place to be excellent. Health physics personnel activities during the transportation of the potentially contaminated injured individual to the hospital facility were considered noteworthy and are described in section 2.2.

3.2 Contamination of Storm Drain Sediment

During routine sampling of the storm drain system on April 5, 1991, NYPA discovered the presence of a short-lived isotope (Co 58) in the sediment of the B-train of the storm drain system on site. A complete survey verified the presence of the isotope and defined its source to one of the supply pipes within storm drain B-1. All activity levels were well below those allowed by site procedures or NRC guidelines. Additionally, no activity was found in the effluent from the system into the discharge canal. Further technique development and analyses are necessary in order to locate the actual source which is supplying the short-lived isotope to this pipe.

The chemistry department expeditiously conducted a detailed monitoring program and completed remedial action on potential sources. The status of this program and the corrective actions currently underway were presented to the NRC regional specialist and discussed in detail in NRC Region I Inspection Report 50-286/91-13.

4.0 MAINTENANCE AND SURVEILLANCE (62703, 61726)

4.1 <u>Maintenance Activities</u>

4.1.1 <u>Routine Maintenance Reviews</u>

The inspector reviewed the following maintenance activities:

MWR 28511	Repair No. 34 accumulator sample valves SP-AOV-955E&F
MWR 28263	Repair RCS elbow leak downstream of valve SI-124
MWR 28330	Replace instrument air compressor No. 32 suction and discharge valves
MWR 28331	Flush instrument air compressor No. 33 cooling system

The inspector concluded that these activities were effective with respect to meeting the safety objectives of the maintenance program.

4.1.2 No. 34 Reactor Coolant Pump Seal Replacement

On May 12, 1991, the unit was shutdown in order to commence a planned outage to inspect and replace the No. 34 reactor coolant pump (RCP) seal package. The seal package, which had been in service for one year, had a leak-off rate greater than 5.0 gpm. The work was conducted under MWR 28267 utilizing procedures PMP-015-RCS and ELC-010-TER.

NYPA replaced No. 1, 2, and 3 seal runners, inserts, o-rings, and gaskets. The seal housing was then torqued, RCP motor aligned and oil collection system reinstalled. Upon disassembly of the seal package and detailed inspection of the three seal assemblies, NYPA determined the cause of the high No. 1 seal leakoff rate to be excessive wearing of the D-D channel seal on the No. 1 seal ring. This wear allowed leakage past the interface of the seal ring and insert, resulting in higher leakoff flows. The cause of the excessive wear on the D-D seal was the buildup of foreign particle contamination (crud) around the D-D seal causing flow imbalances and hydraulic oscillations of the No. 1 seal ring. These oscillations (vertical movements) caused excessive, premature wear and fretting of the D-D seal and the high leakoff rate.

The inspector observed the maintenance activity on the RCP and reviewed the work package. The inspector considered the maintenance department's analysis and final report comprehensive. The inspector considered the overall conduct of the outage and RCP seal repair to be good.

4.1.3 <u>Failure to Remove Shipping Caps from Emergency Diesel Generator 31 Secondary Fuel</u> <u>Filters During Maintenance</u>

On April 30, 1991, during the retest of emergency diesel generator (EDG) 31 upon the completion of semi-annual preventive maintenance, EDG 31 was shutdown due to the lack of governor control. While the EDG was idling prior to the shutdown, an operator noticed that the pressure out of the secondary fuel filters was reading zero.

NYPA's subsequent investigation found the secondary fuel filters partially blocked by red plastic caps covering the inlet opening to the filters. These plastic caps are designed to prevent the entry of foreign material into the filters during shipment. The maintenance technicians had failed to remove the shipping caps prior to the installation of the new secondary fuel filters during the preventive maintenance activity.

The inspector discussed the occurrence with the maintenance superintendent. The maintenance superintendent considered the maintenance procedure, Diesel Generator Semi-annual Inspection, (GNR-005-ELC), inadequate and had it revised in order to caution technicians of the existence of the caps and have future technicians sign for the removal of the caps from the filters prior to installation.

The inspector reviewed significant occurrence report (SOR) 91-3-90, the associated work package, and the revision to procedure GNR-005-ELC. The event was properly documented and the procedure was revised. Additionally, the inspector examined a newly received EDG fuel filter in order to assess the magnitude of the oversight by the maintenance technicians. Although the inspector considered the newly added precautions in procedure GNR-005-ELC acceptable, he regarded the failure of the technicians to remove the shipping caps as an example of weak training and maintenance supervision.

4.1.4 EDG 31 Jacket Water Hose Rupture

On April 6, 1991, EDG 33 cylinder 6L jacket water hose ruptured causing significant diesel jacket water leakage. The rupture occurred during the performance of surveillance test 3PT-V16, Diesel Generator Functional on No. 33 EDG. The local operator immediately terminated the test, unloaded and shutdown the diesel generator.

Further investigation by NYPA revealed an elbow leak on the 6L cylinder jacket water hose. Analysis of the rubber jacket water hose displayed signs of dry rot. The hose, elbow, and gaskets were replaced under MWR 27560 and clearance No. 6011. The inspector reviewed SOR 91-3-66 and the associated maintenance work package. No discrepancies were noted in this review.

4.2 <u>Surveillance Activities</u>

4.2.1 (Update) Unresolved Item (90-20-02) Hydrogen Recombiner Corrective Actions

On May 16, 1991, both hydrogen recombiners passed surveillance test 3PT-SA1. This semiannual control system test was performed 43 days after the last surveillance due to a long history of test failures with the control systems of both recombiners. Hydrogen recombiner No. 32 had last failed this test on April 2, 1991. Hydrogen recombiner No. 31 had failed the previous test on February 7, 1991. (For a complete history, see NRC Region I Inspection Reports Nos. 50-286/90-07, 90-20, 91-03, and 91-08).

The inspector reviewed the surveillance documentation and discussed the test results with the electrical engineering supervisor. The inspector intends to closely monitor the future performance of the equipment in order to further evaluate its reliability. Additionally, the inspector will continue to observe NYPA's hydrogen recombiner control system modification development. This item remains open awaiting completion of these assessments.

4.2.2 Other Surveillance Activities

During a review of the fire protection program, the inspector identified weaknesses in NYPA's performance and review of related surveillance tests. These weaknesses are discussed in section 8.1.1.

5.0 SECURITY (71707, 92700)

5.1 <u>Routine Security Reviews</u>

The inspectors observed routine site and vital area access controls and alarm response. NYPA was effectively implementing its security plan for the activities observed.

5.2 <u>Unauthorized Entry (LER 90-S01)</u>

This event was reviewed in inspection 90-17 prior to issuance of the licensee event report (LER). The event involved a contractor watchperson without site access piggybacking into the protected area with a contractor watchperson who had site access. The unbadged watchperson was instructed by a NYPA engineer to leave the protected area and the engineer kept the watchperson in sight until he did so. The unauthorized entry lasted about two minutes. NYPA did a



thorough investigation of this event and reported it in LER 90-S01. NYPA revoked protected area access and terminated employment for the two watchpersons directly involved and for two other contractor watchpersons who witnessed the event but took no action. All contractor watchpersons were reinstructed on their responsibilities and duties regarding access to the protected area. NYPA's security program has been changed to ensure that contractor watchpersons are badged for access to the protected area prior to being assigned security duties. Also, a NYPA security guard will be stationed with contractor watchpersons. The inspector discussed this event with the region-based security inspector. The inspectors consider NYPA's corrective actions in response to this event to be adequate.

6.0 EMERGENCY PREPAREDNESS (71707)

6.1 Notification of Unusual Event

As described in section 2.2, NYPA declared an unusual event on May 14 due to a potentially contaminated injured individual being transported offsite to a local hospital. NYPA acted appropriately in assuming potential contamination, even though a thorough frisk at the hospital found the individual not to be contaminated. NYPA made the proper notifications for this event in accordance with the emergency plan.

6.2 Post Accident Sampling System Drill

The annual post-accident sampling system (PASS) drill required by NUREG-0654 was conducted by NYPA on May 7, 1991. The principal objective of the drill was NYPA's demonstration of their ability to obtain and analyze a simulated post-accident in-plant liquid sample within all required guidelines. The exercise was conducted utilizing portions of surveillance procedure 3PT-A18a (Rev 2), "Post-Accident Reactor Coolant Sample System Operability Test."

The resident inspector observed the drill and attended the post-drill critique. All objectives of the drill were successfully achieved. Additionally, the post-drill critique and the analysis of licensee observers' findings and recommendations were considered thorough and effective. The Radiological and Environmental Services (RES) department staff displayed expertise in their performance of the procedure and their coordination between the health physics and chemistry staffs throughout the exercise.

7.0 ENGINEERING AND TECHNICAL SUPPORT (71707, 71715, 92702)

7.1 Plant Trip Resulting from Electrical Fault on 345KV System (LER 91-04)

The inspector reviewed LER 91-04 which described the direct electrical trip on March 20, 1991 due to a faulted potential transformer in the Buchanan substation. The trip was previously discussed in NRC Inspection Report 50-286/91-08. The inspector considered NYPA's submittal adequate. This issue is closed.

7.2 (Update) Unresolved Item (91-01-01) Visible and Audible Alarm Indications for Core Exit Temperature and Reactor Water Level for Mid-Loop Operation

The inspector observed the performance of ENG-390E (Rev 0), Mid-Loop Trouble Alarm Functional. This alarm provides audible and visual alarm indications for low RCS level via a signal from the ultrasonic level measuring system (ULMS) and high temperature signals from two independently-powered core exit thermocouples. The test was successful and alarms considered operable.

The second, independent RCS level indication system, ULMS, was scheduled to be acceptance tested during this period of mid-loop operation. The plant must be in the mid-loop condition so that required cross-checking versus the independent water level indication system can be performed. However, during the final stages of the ULMS calibration, functional check, and verification (ENG-390C/D), the ULMS developed sporadic level indications. The ULMS utilizes an ultrasonic transducer mounted at the bottom of the hot leg pipe to transmit ultrasonic pulses and receive the echoes reflected from the water surface. The output is a continuous analog signal proportional to water level in the pipe. Investigation by NYPA technicians revealed either a problem with the ULMS transducer and circuitry or the location of the transducer 'flat spot.' The transducer signal was weaker than anticipated. NYPA electrical engineering has theorized that a small defect may exist on the inner wall of RCS piping directly above the ULMS transducer. To correct this situation, the flat spot will be relocated or an alternate ULMS transducer will be purchased. NYPA intends to undertake these corrective actions during an upcoming outage period of suitable length to accomplish these activities.

The inspector observed the ULMS calibration procedure and the drain down of the RCS into the reduced inventory condition. No other abnormalities were noted. The electrical engineering supervisor informed the NRC inspector that an update on the generic letter 88-17 enhancements and ULMS status would be transmitted to NRC in the near future.

7.3 Problems Identified During Generic Letter 89-10 Review (LER 91-06)

This voluntary submittal described NYPA's response to generic letter (GL) 89-10 and the impact of that review on eleven safety-related valves. Plant engineers determined that these eleven valves did not meet the design basis criteria for misposition events as established in GL 89-10. Problems identified included inadequate spring packs, gear ratios, torque settings, and motors. The original selection of gear ratios, motors, and spring packs was accomplished under the engineering practice and motor-operated valve (MOV) technology available at the time of initial plant design. All eleven valves met the acceptance criteria established in the FSAR and technical specifications of the plant.

NYPA upgraded the values to satisfy the GL 89-10 requirements and satisfactorily retested the values in November 1990. The inspector considered NYPA's corrective actions to be adequate and their LER submittal well documented.

8.0 SAFETY ASSESSMENT AND QUALITY VERIFICATION (71707, 40500)

8.1 <u>Fire Protection and Prevention Activities</u>

During panel walkdowns, in March 1991, the inspector noted the Appendix "R" diesel generator fire alarm illuminated in the control room. Upon questioning the operators and the fire and safety supervisor, the inspector learned that the fire detection and suppression system for the Appendix "R" diesel generator had been inoperable for over nineteen months, since August 8, 1989. Shortly after, while conducting an inspection of the Appendix "R" diesel generator, the inspector discovered all five emergency lighting units inoperable in the trailer with a deficiency tag hung from each unit. Prior to these inspections, the inspector had recently received a copy of SOR 91-3-19 by the fire and safety supervisor requesting an assessment of unresolved fire protection issues (some as old as eighteen months) which, in his view, may have required higher prioritization or some compensatory measures. Due to these findings, the inspector commenced a review of the site fire protection equipment and activities. This review began during inspection 91-8 and continued into this inspection period. The inspector examined related surveillance tests, work packages, fire protection equipment, the fire protection program, emergency lighting and the IP3 Appendix "R" requirements.

8.1.1 Fire Equipment Surveillance Tests

The inspector reviewed several surveillance tests in order to verify NYPA's satisfactory performance and review of the test results. Documents which were examined are listed below:

PT-M37A	Fire Protection System - Fire Pump House (COL-FP-1)
PT-M37C	Fire Protection System - General (COL-FP-3)
PT-A15	Fire Protection System Valve Cycling
PT-A16	Hydrostatic Test of the Exterior Fire Hoses
PT-A17	Fire Fighting Foam Concentrate Test (FP-17)
PT-A22	Admin. Bldg. Smoke and Heat Detectors Functional
PT-M26	Smoke and Heat Detectors Functional (TH, CP, FPH)
PT-M26	Portable Fire Extinguisher Check (FP-14A)
PT-M26B	Remote Fire Extinguishers (FP-14)
PT-M37B	Fire Protection System - Ring Header (COL-FP-2)
PT-M42	Fire Pumps Functional
PT-M66	Appendix R Diesel Battery Inspection
PT-M71	Fire Pump Diesel Battery Inspection
PT-Q15	Penetration Fire Battery Inspection
PT-Q37	Emergency Lighting System Test
PT-Q65	Appendix R Diesel Generator Functional
PT-R48	High Pressure Fire Protection System Valve Cycling
PT-R82	CO2 System Functional

PT-R84 Fire Pumps Functional

PT-R95	Electrical Tunnel Fire Damper Functional
PT-R98B	Appendix R Diesel Generator Halon Functional
PT-SA13	Fire Protection Smoke Detectors (Accessible)
PT-SA18	Fire Hydrant Inspection
PT-R99	Appendix R Diesel Generator Functional
PT-R100	Appendix R Fire Barrier Inspection
PT-R102	Fire Barrier Radiant Energy Shield Inspection
PT-R103	Appendix R Diesel Generator Battery Load Test

As a result of this review, the inspector identified the following discrepancies:

- 1. The Appendix R Diesel Generator Halon Functional Test, PT-R98B had not been performed since August 8, 1989. This finding is discussed in further detail in section 8.1.3.
- The inspector noted that on surveillance test 3PT-R100, Appendix R Fire Barrier 2. Penetration Seal Inspection, ETN4-74A-CC, penetration number 285 (drawing 9321-M-40953) which was inspected on December 5, 1990 was not accepted by the NYPA The performance test had been reviewed and fully accepted by plant inspector. supervision on December 13, 1990 without comment or corrective action on the penetration. The inspector discussed the finding with the performance and reliability supervisor. Upon review of the surveillance document three days later, the inspector noted that the penetration had now been accepted and documented by means of striking out the circled "no" and circling "yes" on the applicable line item. The inspector discussed the issue with the responsible NYPA penetration inspector. The NYPA inspector informed the NRC inspector that both he and a test engineer had just verified the penetration properly sealed. The engineer had answered the specific questions regarding the seal which had originally caused the inspector to indicate the penetration Both individuals emphasized that the seal had, in fact, been as not acceptable. satisfactory all along.

The NRC inspector discussed the above with the performance and reliability supervisor. The inspector considered NYPA's test performance and review inadequate in this instance due to its acceptance of the surveillance without properly addressing the deficiency noted for the penetration in question.

3. During the review of procedure PT-M37B, the inspector noted that step 1.7, FP-113, Hydrant 310 isolation was skipped in the performance of the Fire Protection System Ring Header (COL-FP-2) conducted on February 16, 1991. The missing item was not identified in the review by NYPA supervision. The inspector presented the finding to the Performance and Reliability Supervisor. The valve was verified open and annotated on the surveillance the next day.

- 4. During the review of procedure PT-Q65, Appendix R Diesel Generator Functional Test, performed on January 9, 1991, the equipment calibration dates were not indicated for three verifying components as required per step 3.2. No calibration sheet was attached. After presenting the finding to the performance and reliability supervisor, the calibration dates were properly annotated on the surveillance.
- 5. During the review of procedure PT-R84, Fire Pump Functional Test, conducted on November 21, 1989, the inspector noted that the site electric fire pump failed the overall acceptance criteria due to its inability to achieve 150% flow (3750 gpm at a system head of 149 psi), as required in step 3.5.15.1 and in the overall acceptance criteria. When examining MWR 19825, written to investigate and repair the condition, the inspector noted that the fire pump once again failed the subsequent retest due to high vibrations at 100% flow. The fire pump was declared inoperable and MWR 20992 was written in order to repair the pump. During the review of retest 20992, the inspector noted the following discrepancies:
 - 1. The retest did not require the performance of step 3.5.15.1, 150% flow, even though that condition was the original reason for the failure of procedure PT-R84 on November 21, 1989.
 - 2. The pump was fully accepted with respect to the overall acceptance criteria by NYPA even though the fire pump was never proven capable of developing 150% flow as required by overall acceptance criteria step 6.1.3.
 - 3. Although retest 20992 required the performance of section 3.5, steps 3.5.1 through 3.5.14, and steps 3.5.16 through 3.5.19, the technicians did not perform step 3.5.16 through step 3.5.18.

The inspector discussed his findings with the performance and reliability supervisor and the applicable performance engineer. NYPA initially stated that the 150% flow test was only required by the plant's insurer and not an operability concern. NYPA was unable to completely address the inspector's concerns prior to the end of the period, however, the responsible engineer stated that the pump had never been able to achieve 150% flow and that this requirement would be addressed in a July 1991 meeting with the insurer. The NRC inspector verified that the plant Technical Specifications only require the fire pump to develop a flow of 2350 gpm at a system head of 250 feet. However, the inspector expressed his concern regarding the weaknesses identified in the overall management of the pump retest, acceptance and review. The overall acceptance criteria clearly required 150% flow as well as the surveillance procedure step 3.5.15.1. Since the pump had never achieved this value, the inspector questioned how the pump performance was accepted. NYPA was unable to provide further details to the inspector prior to the end of the inspection period. This is an unresolved item (91-09-02) pending NYPA's resolution of the fire pump acceptance criteria and retest.

8.1.2 <u>Emergency Lighting Units</u>

After discovering all of the emergency lighting units inoperable in the Appendix R diesel generator trailer, the inspector reviewed NYPA's history of performance in procedure PT-Q37, IP3 Emergency Lighting System Test. Additionally, the inspector reviewed NYPA's current status of corrective action for unresolved item 90-06-01, dated one year earlier, which identified NYPA's lack of review of previously identified inoperable emergency lighting units and an evaluation of the impact of the units on Appendix R requirements. The inspector also compared the April 2, 1991 3PT-Q-37 test data with his own inspection results. Upon completion of his review, the NRC inspector presented to NYPA management the following findings:

- 1. As of April 2, 1991, 29 emergency lighting units failed procedure PT-Q37 and were in need of maintenance, of which 13 were required by Appendix R according to the surveillance. This number did not include the five inoperable Appendix R diesel generator trailer lighting units which were missing from the surveillance test.
- 2. Of the 13 Appendix R required units previously mentioned, six were repetitive findings from previous surveillances. Of the 29 total units requiring maintenance, 17 were repetitive findings from the previous surveillances.
- 3. The surveillance procedure for Appendix R emergency lighting did not include the units within the Appendix R diesel generator trailer or the service water pump intake structure.
- 4. Although NYPA had taken some action in order to ensure increased reliability of the units through the ongoing development of a preventive maintenance program for the emergency lighting units, no action had been taken on the evaluation of inoperable emergency lighting units or their impact on the Appendix R requirements to date as related to unresolved item 90-06-01.
- 5. NYPA had failed to take action on a 1988 fire protection Technical Specification audit FPA-88-R06 (Now QA REC 482). This finding described NYPA's failure to identify the safety area and aiming requirements for emergency lighting in surveillance procedure 3PT-Q37.

Upon receipt of these findings, NYPA investigated the issue and developed a corrective action plan which resulted in the following:

- 1. NYPA revised surveillance procedure 3PT-Q37 to include guidelines for an engineering evaluation of emergency lighting failures in order to determine the impact that the failure has on Appendix R requirements. Consideration would be given to access and egress requirements, the total number of lighting units in the area, and if the affected fire zones have sufficient emergency lighting with the inoperable lighting unit(s). This evaluation will be performed by the technical services department.
- 2. The responsible engineer performed a plant walkdown of the currently deficient emergency lighting units and completed an engineering evaluation to determine which units were critical for Appendix R safe shutdown activities. This inspection resulted in five lighting units requiring immediate repair in order to meet Appendix R (section III.J) requirements.

Lighting Unit No.	Location
EB-30 EB-58 EB-1 EB-1 EB-7	Charging Pump Cell Component Cooling Water Auxiliary Boiler Feed Pumps Control Panel - Appendix R Diesel Generator Fan Room

All of these lights were needed to support safe shutdown activities during an Appendix R postulated fire. Repairs were promptly completed on these units.

- 3. The revised surveillance procedure 3PT-Q37 required the issuance of a priority 2A work request and the lighting unit repair or replacement within seven calendar days for those units deemed necessary for safe shutdown functions as determined by an engineering evaluation.
- 4. NYPA's corrective action plan included a commitment to ensure that all emergency lighting units which are not considered critical for safe shutdown, but are associated with Appendix R, be repaired in a timely manner.
- 5. NYPA stated that they will perform an additional plant walkdown of all emergency lighting in order to determine the effect on safe shutdown activities. These findings would then be highlighted in a revision to procedure 3PT-Q37, eliminating the need for a separate engineering evaluation and walkdown each time procedure 3PT-Q37 is performed.

The inspector discussed the issues and corrective action plan with the operations superintendent, technical services superintendent, and responsible engineer. The inspector considered NYPA's corrective actions untimely, although ultimately effective in addressing the issues. The inspector voiced his concern with NYPA's lack of attention to unresolved item 286/90-06-01, dated April 11, 1990, as well as to FPA-88-R06 identified in 1988. Upon review of the revised surveillance procedure, 3PT-Q37, the inspector noted that the service water pump intake structure lighting units were still omitted. The responsible engineer informed the inspector that corrective action was already underway to again revise the procedure to include those components.

The inspector considered NYPA's action effective in closing unresolved item 286/90-06-01, but evaluated its responsiveness to the issue, which was determined to impact safe shutdown activities during an Appendix R postulated fire, as slow. The inspector identified inoperable emergency lights which were required by Appendix R, Section III.J. Although NYPA's corrective actions to address the inspector's concerns, which were raised within this reporting period, were considered prompt and effective, NYPA's lack of attention to the previous NRC and QA findings displayed inadequate corrective action. This is one example of inadequate corrective action described in section 8.1.7.

8.1.3 <u>Appendix R Diesel Generator Fire Detection and Suppression System Inoperable for 20</u> <u>Months</u>

During a routine walkdown of the control room, the inspector noted the Appendix R diesel generator (DG) fire alarm illuminated. Upon questioning the operators and fire and safety supervisor, the inspector learned that both the fire detection and suppression system for the Appendix R DG had been inoperable for an extensive period of time. Although this system is not an Appendix R requirement for Indian Point 3, the inspector reviewed the issue to determine the reason for the extended period of inoperability.

On August 8, 1989, NYPA performance technicians performed the Appendix R DG Halon Functional Test, 3PT-R98B, for the first time. This surveillance was developed as a result of an American Nuclear Insurer (ANI) recommendation to test the fire detection and suppression system inside the Appendix R diesel enclosure. The technicians discovered that the heat detectors being utilized in the Appendix R DG enclosure were non-resetting detectors which required disposal upon completion of the testing. Thus, the test itself deemed the fire detection/suppression system inoperable until detector replacement. NYPA issued work request No. 11232 for the replacement of the detectors following the surveillance and the request was entered into the site's work control system. In early 1990, however, technical services was asked to look into the replacement of the single failure detectors with those capable of resetting. (The fire detectors which are in service in the rest of the plant are the resetting type.) Design equivalent modification (DEM) 90-03-120, was developed and issued in order to replace the single-failure detectors. The existing Appendix R DG fire suppression/detection system, however, remained inoperable throughout this period.

The new detectors were ordered through the DEM and received on site. The maintenance was conducted through MWR 24230. Upon initiation of the work, NYPA discovered that the new detectors could not be mounted on the old detector bases. New bases were then ordered but were not received until early 1991. After the new bases and detectors were installed, I&C technicians discovered a ground within the system during initial alarm panel testing. Discussions with the alarm panel manufacturer disclosed the need for component replacement within the alarm panel in order to make the panel compatible with the newly installed detectors and bases. Upon receipt of these components, NYPA discovered that they were incorrect and returned them to the vendor for replacement. The correct parts were received by NYPA and installed during the week of March 25, 1991 under work request I-27282. NYPA revised the surveillance test to reflect the installation of the new detectors and other system changes. The system passed the new test's operability criteria on March 28, 1991. The overall acceptance criteria was not met due to the failure of the east smoke detector for which a replacement was ordered.

The inspector reviewed the associated modification and work packages and discussed the issue with the operations general manager, fire and safety supervisor and all pertinent NYPA personnel. The inspector examined the retest and discussed the data with the associated I&C supervisor. Additionally, the inspector observed ongoing modifications and maintenance by NYPA technicians on the system.

The inspector found the fire and safety supervisor well aware of this issue. The supervisor considered this equipment essential and had voiced his concerns through SOR 91-3-19 which is discussed in detail in section 8.1.5. Although NYPA's intent was clearly to increase the reliability of the system through this modification, the inspector considered NYPA's overall management of the modification and the system's operability deficient.

Although certain delays encountered during the modification process were unavoidable, the inspector considered the twenty-month delay excessive and regarded the inoperability of the system throughout the design modification and procurement process inappropriate. Additionally, the inspector considered the modification preparation inadequate, in this instance, due to the unexpected delays which were the result of component incompatibility.

8.1.4 Safe Shutdown Emergency Locker

The inspector conducted an audit of the Appendix R Safe Shutdown Emergency Locker utilizing the checklist provided in Operational Directive, OD-3. All required equipment and current procedures were available. The inspector reviewed the prior monthly audits which had been conducted by the operations department. No discrepancies were noted in this review.

8.1.5 Fire Protection Work Requests

In accordance with site administrative procedures, the fire and safety supervisor maintains a status on all fire protection (FP) work requests and prepares a monthly report for plant management. Due to his overall concern with certain FP deficiencies, (for example: the Appendix R DG halon system) he submitted SOR 91-3-19 on February 6, 1991 requesting an assessment of the outstanding FP issues with respect to various required guidelines. It was his belief that certain inoperable systems required higher prioritization or compensatory measures to assure compliance with the requirements.

NYPA's OERG conducted an investigation and followup report on this issue. The followup report provided the following information.

- 1. SOR 91-3-19 described concerns regarding a list of 90 open FP work requests (59 I&C and 31 maintenance) which were dated from May 26, 1988 to February 7, 1991. NYPA's subsequent review by the OERG of the work history file over the same period displayed 597 FP work requests completed in that time frame (307 I&C and 290 maintenance).
- 2. Of the 59 outstanding I&C work requests, 11 of them were written within 2 days of SOR 91-3-19. Another 15 were written during the previous month. Thirteen were greater than one year old and of these, several awaited resolution of a request for engineering services (RES) or receipt of parts.
- 3. Of the 31 outstanding maintenance work requests, 10 were greater than one year old.
- 4. OERG discussions with the maintenance and I&C supervisors indicated that a high priority was given to all FP work requests. The maintenance department assigned a priority 3 (on a scale of 1-10) to all FP related work requests even when assigned a lower priority in the plant work control system.

The OERG investigator concluded that FP work requests receive priority attention. NYPA's investigation did not support the fire and safety supervisor's concern regarding work prioritization.

The NRC inspector discussed the OERG report with the OERG supervisor and then with the fire and safety supervisor. The inspector discussed the outstanding FP work requests with the fire and safety supervisor. The fire and safety supervisor highlighted certain issues, but considered the overall FP equipment status satisfactory. The Appendix R DG halon system was one of his most significant concerns. The NRC inspector considered NYPA's followup report incomplete in that it did not address all of the issues presented in SOR 91-3-19. Although the prioritization of work requests was thoroughly discussed, NYPA's overall evaluation of the impact of the 90 outstanding items on regulatory requirements and the compensatory measures which would be necessary were neglected. The inspector considered this further review essential to resolve the fire and safety supervisor's concerns outlined in SOR 91-3-19, especially in light of the previously existing weaknesses in the Appendix R emergency lighting identified by the inspector. When questioned by the inspector, NYPA management was unable to declare that no other regulatory issues were existent within the ninety open items. The inspector considered the lack of this type of review a significant weakness. If a review of this nature had been conducted on the Appendix R emergency lighting, the impact of the regulatory requirements on these issues would have been better understood and the appropriate corrective actions taken prior to NRC review. The inspector addressed these concerns with the OERG supervisor and general managers of operations and maintenance.

A review of NYPA's assessment of thirteen fire protection work requests selected by the NRC inspector was performed by OERG. This self-assessment evaluated NYPA's ability to properly address associated regulatory requirements and necessary compensatory measures on fire protection issues. OERG concluded that fire equipment deficiencies are appropriately assessed by the site work control system for significance and regulatory effect. Those deficiencies of regulatory significance are assigned an appropriate priority. Although some items have been previously overlooked (for example, emergency lighting), they are few in number. The OERG report concluded that the Indian Point Unit 3 fire protection design and surveillance programs are adequate to assure the plant meets its fire protection regulatory commitments. Additionally, the report describes the positive steps currently being taken by NYPA to further enhance the fire protection program; including (1) the development of the Fire Protection Reference Manual (FPRM), published in May 1991, which improved the engineering basis for the site fire protection system, and (2) the addition of three fire protection engineers to the corporate engineering staff to provide technical assistance.

The NRC inspector reviewed the OERG report and discussed its contents with the author. Additionally, the inspector attended the presentation of this evaluation to PORC. The inspector considered the assessment thorough and complete.

Although the OERG review did not result in the discovery of additional deficiencies, the inspector considered the fire and safety supervisor's actions commendable in ensuring plant management's attention focused on significant fire protection related issues.

8.1.6 **QA Standard Audit Report No. 90-42, IP3 Fire Protection Program**

The inspector reviewed NYPA's QA audit 90-42 on the IP3 fire protection program conducted by NYPA fire protection engineers in December 1990 and January 1991 and issued on April 1, 1991. The inspector identified concerns within the report which demonstrated a lack of corrective action on previous audit findings and recommendations (two dated in 1986, two dated in 1987, three dated in 1988, and four dated in 1989). More significantly, deficiency IP3-FPA-89-F03, identified in 1989, described NYPA's lack of proper review, corrective action, and root cause analysis on the findings of the previous annual audits. Although improvements were described regarding the methods used to track the deficiencies, this item was considered open and required NYPA's future evaluation of the time allocated for resolving the concerns.

Upon disclosing the issue to NYPA management, the inspector commenced a thorough review of the audit findings. The report was discussed with QA and licensing personnel. The lead QA engineer and licensing engineer informed the inspector of various weaknesses which had resulted in the previous lack of effective corrective action. These self-identified weaknesses included: the lack of formalized tracking of the open items, the disagreement between corporate and site viewpoints on the findings, and the lack of a clearly documented design basis for fire protection. Effective corrective action was conducted, through the utilization of a fire protection consultant, on finding IP-3-FPA-89-F04 which addressed concerns regarding technical specification surveillance requirements, during the reporting period. This finding, however, was one of ten other issues which were part of the previous audits, some potentially safety significant and existent since 1986.

NYPA also informed the inspector of their intention to address these other outstanding deficiencies through the utilization of similar consultants. Additionally, the technical services manager notified the inspector that actions were underway to hire an on-site fire protection engineer.

The inspector considered NYPA's previous lack of effective action on the older findings another example of inadequate corrective action as described in section 8.1.7.

8.1.7 Fire Protection Conclusions

The inspector identified specific weaknesses in the review of surveillances and conduct of retests. The inspector considered the twenty-month delay in modification of the Appendix R DG fire suppression and detection system to be excessive. Additionally, the inspector concluded that NYPA displayed inadequate or ineffective corrective action in the following instances:

- 1. NYPA failed to take corrective action on the emergency lighting issues addressed in NRC unresolved item 90-06-01 or QA REC 482. This emergency lighting was required by Appendix R. (Refer to section 8.1.2.)
- 2. NYPA did not undertake effective corrective action to resolve fire protection QA audit findings dated several years earlier. This lack of corrective action was noted in another finding during a 1989 audit. (Refer to section 8.1.6.)

These examples of inadequate corrective action in the fire protection area are a violation of 10 CFR 50, Appendix B. (91-09-03)

The inspector considered NYPA's failure to undertake timely corrective action on these issues indicative of a weakness in their ability to properly prioritize issues, assess them for safety significance and regulatory requirements and undertake appropriate compensatory measures. The lack of an engineering focal point or reference addressing this topic contributed to this weakness. The inspector noted recent corrective action in this area and will evaluate its effectiveness in a future inspection.

8.2 Safety Assessment and Self-Assessment Activities

Plant operating review committee (PORC) members are kept well informed on plant issues and status during the plant morning meeting and through routine interactions. The inspector attended three of the weekly PORC meetings. The topics included procedure revisions, temporary procedure changes, significant occurrence report (SOR) review, licensing items and classifications. Procedure revisions and temporary procedure changes are presented by the responsible PORC member. Another PORC member does an independent review. Typically these items generate little discussion. Of the meetings attended, all items were approved except for one temporary procedure reviews to be adequate. The PORC uses the operational experience review group (OERG) as an independent subcommittee to follow up SORs. All SOR followup reports presented to PORC were thorough and comprehensive and contained good recommendations. Licensing topics including a technical specification amendment, an NRC information notice and inspection reports received an appropriate amount of discussion. The inspector concluded that the PORC was performing adequate reviews and meeting their technical specification requirements.

The inspector attended an offsite safety review committee (SRC) meeting. The agenda included the previous meeting minutes, proposed technical specification changes, nuclear safety evaluations, plant events, reportable events, PORC minutes, the audit program and audit reports. Several nuclear safety evaluations received extensive discussion. All items received an appropriate amount of discussion and review of pertinent safety issues. The inspector verified that the technical specification requirements for the SRC were being met. On April 29, 1991, NYPA gave a presentation to NRC on their self-assessment activities. Based on this presentation it is apparent that NYPA is active in performing self-assessments in all functional areas. Much of this self-assessment is performance based. This presentation was very useful as an introduction to NYPA's self-assessment program.

9.0 MANAGEMENT MEETINGS

At periodic intervals during the course of the inspection, meetings were held with senior facility management to discuss the inspection scope and findings. The issues in this inspection were discussed with site management throughout this inspection and an exit meeting was held on June 21, 1991, to discuss the findings and conclusions of this report period. During the discussion, the licensee did not identify any 10 CFR 2.790 material. The inspector also attended the following management meetings conducted by region-based inspectors:

<u>Dates</u>	<u>Subject</u>	Report	Inspector
4/19	Electrical Distribution System Functional Inspection	50-286/91-80	A. Della Greca
5/10	Inservice Inspection	50-286/91-11	R. McBrearty
5/17	Engineering	50-286/91-12	L. Prividy
5/23	Radiological Controls	50/286/91-13	S. Sherbini
5/23	Security	50-286/91-10	T. Dexter