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Licensee: New York Power Authority

Facility: Indian Point 3 Nuclear Power Plant

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Buchanan, New York 10511

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EXECUTIVE SUMMARY

Indian Point 3 Nuclear Power Plant
NRC Inspection Report No. 50-286/97-09

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covered a six-week period of resident and headquarters inspections.

Operations

The licensee conservatively interpreted technical specifications to support the repair of a boric acid system valve leak. However, the monitoring and housekeeping controls of the valve leakage were weak, resulting in large amounts of boric acid deposits on the weld channel containment penetration pressurization system. (Section O1.2)

General plant housekeeping was good for the areas of the main steam, auxiliary feedwater and station batteries. The licensee appropriately identified various equipment deficiencies within their problem identification process. (Section O2.1)

Maintenance

The licensee's planning and implementing an emergent work package to replace a rapidly degrading leaking valve bonnet was good. Good coordination enabled the licensee to complete the job in two hours and precluded a technical specification plant shutdown. (Section M1.2)

The licensee appropriately implemented station procedures regarding the maintenance rule for the instrument air and chemical and volume control systems. The systems safety functions were appropriately classified, the maintenance preventable functional failures have been accounted for where applicable and the changing of the 10 CFR 50.65 system characterization criteria, a (1) or a (2), has been conservatively implemented. The maintenance rule disposition of the recent valve failures in the chemical and volume control system is an inspector follow item (IFI 97009-01). (Section M1.3)

The licensee's response to an inoperable service water pump, which contained a plastic bottle in the suction casing, was weak. The licensee missed opportunities to reevaluate the appropriateness of foreign material controls in the service water bay area and the effectiveness of the camera inspections of the service water bay that were performed at the end of the refueling outage. (Section M2.1)

Executive Summary (cont'd)

The licensee's response to a failed diaphragm valve in October 1996, when it was identified that many diaphragm valves had been in service since original plant construction without preventive maintenance, was weak. Although the licensee initiated a plan to incorporate these diaphragm valves into the preventive maintenance program, the valves which had a high potential to impact the plant or whose function was not periodically verified through surveillance testing or operation, were not evaluated and prioritized for work. As a result, the licensee missed opportunities to performed maintenance during the recently completed refueling outage 9. (Section M2.2)

Engineering

The engineering which supported the heater drain pump suction strainer modification was weak in that it inappropriately characterized the debris in the system and provided procurement specifications for a strainer mesh size that was too small for the intended application. The system engineers monitoring of the differential pressure across the strainers throughout the post modification test was good and enabled the licensee to proactively remove the strainers prior to fully clogging the heater drain pump suction path. (Section E1.1)

The quality of the nuclear safety evaluation (NSE) which supported the alteration of the control room ventilation was weak in that it relied on an engineering judgment that did not have a sound technical basis. Additionally, the plant operation review committee (PORC) review of the NSE was weak in that it did not effectively challenge the technical aspects of the nuclear safety evaluation. (Section E1.2)

The nuclear safety evaluation to support the repair of a containment isolation valve by using an equivalent valve was adequate and supported the maintenance activity in a timely manner. However, the nuclear safety evaluation was weak in that it did address possible plant conditions which may affect the validity of a previously performed test that was relied upon to demonstrate valve leak tightness. (Section E1.3)

The modification package and implementation for the emergency diesel fans were weak. The lateness in modification development and the large amount of modification work performed during the recent refueling outage contributed to these weaknesses. However, the self assessment efforts, which were performed in recognition of the lateness in modification development, and the quality review of this modification were good and identified several inconsistent and cumbersome. The licensee had taken appropriate interim actions to address these weaknesses and was overhauling the modification process. However, completion of these efforts and implementation of the new process must be timely to support the modifications planned for refueling outage 10. The implementation of the portion of the modification with the plant at power was good. However, a deficiency was identified regarding the temporary modification that was in effect for the 314 and 315 fans. A temporary modification change notice was not initiated. This is considered an unresolved item (URI 97009-02). (Section E3.1)

Executive Summary (cont'd)

Plant Support

The "off year" emergency preparedness exercise was well controlled and provided the licensee with an opportunity to identify areas for improvement in the emergency planning process. Overall, command and control and technical assessments were good; however, two instances of poor communications were noted. (Section P1)

The licensee appropriately implemented the security plan. The identification of a potential security vulnerability, which was not addressed by the security plan, was excellent. This potential vulnerability was appropriately addressed, including planned revisions to the security plan. (Section S1)

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ATTACHMENT

- Attachment A - Partial List of Persons Contacted
- Inspection Procedures Used
- Items Open, Closed, and Discussed
- List of Acronyms Used

Report Details

Summary of Plant Status

At the beginning of this inspection period, the plant was operating at 74% power. Full power was achieved on September 27. On October 15, the licensee reduced power to 40% to repair leaks on the main feed pump casing drain lines and address high differential pressures on the heater drain pump strainers. On October 19, the licensee returned the plant to full power, where it remained through the end of the inspection period.

I. OPERATIONS

O1 Conduct of Operations

O1.1 General Comments (71707)

During this inspection period, the inspectors conducted operational activities including power ascension and reduction, removal of equipment from service, and entry and exit from technical specification action statements. The licensee conducted the above activities in a satisfactory manner and without incident.

O1.2 Boric Acid System Valve Failure

a. Inspection Scope (71707, 93702)

On October 21, 1997, the licensee identified external leakage from valve CH-267B, 32 boric acid transfer pump (BATP) filter bypass stop. The inspector reviewed the licensee's action in response to this deficiency.

b. Observation and Findings

On October 21, 1997, at about 3:00 p.m., a nuclear plant operator identified a small leak originating from valve CH-267B. Initially, the leak was estimated to be about 1/4 gallon per minute (gpm) and believed to originate from the weep hole of the valve bonnet. This valve is a Grinnell diaphragm valve, which has a seat consisting of a rubber diaphragm. Normally, system fluid is not in contact with the bonnet; however, the leakage indicated that the diaphragm may have failed.

On the morning of October 22, the leakage from the valve had increased to about 4 gpm. Although the work package had already been developed for the repair, the licensee deferred the valve repair until the 32 emergency diesel generator, which was out of service for preventive maintenance, could be returned to service. However, the inspector noted that the monitoring and housekeeping controls of the leakage were weak. The leakage had dripped on components of the weld channel and containment penetration pressurization system (WCCPPS), and deposited large amounts of boric acid. Although adequate WCCPPS pressure was maintained throughout this event, personnel inadvertently bumped the 32 BATP local/remote switch and inadvertently repositioned the switch during cleanup of the boric acid from the WCCPPS. Also, the acid crystallization of borated water that was diverted to the floor drains clogged the primary auxiliary building drains.

The licensee conservatively interpreted technical specifications to support the repair of valve CH-267B. The boric acid system had to be isolated to perform the repair. Although technical specifications allowed the entire boric acid storage system to be inoperable for 48 hours, the technical specifications did not allow both boric acid pumps to become inoperable. This was not consistent since the boric acid pumps could not perform their function if the boric acid storage system was inoperable and no borate water was available to the pumps. Nevertheless, the licensee conservatively entered a shutdown action statement to place the plant in hot shutdown within seven hours. At the time of the event, the licensee was in the process of changing the technical specifications, but had not yet submitted the change request to the NRC.

c. Conclusions

The licensee conservatively interpreted technical specifications to support the repair of a boric acid system valve leak. However, the monitoring and housekeeping controls of the valve leakage were weak, resulting in large amounts of boric acid deposits on the weld channel containment penetration pressurization system.

O2 Operational Status of Facilities and Equipment

O2.1 System Walkdowns and Final Safety Analysis Report Reviews

a. Inspection Scope (71707)

The inspector performed walkdowns of the station batteries and portions of the main steam and auxiliary feedwater systems. Additionally, the inspector verified the system configuration was consistent with the description in the final safety analysis report (FSAR).

b. Observations and Findings

General plant housekeeping for the areas walked down was in accordance with plant policy. Areas were clean and well lit. The inspection of the batteries indicated no signs of leakage and electrolyte levels were within the normal range. The room temperatures were normal, indicating no apparent problems with area ventilation.

The steam generator atmospheric relief valves and associated instrument air lines were visually inspected with no adverse conditions noted. The main steam safety relief valves and main steam isolation valves had no adverse conditions observed.

The inspector identified no unknown equipment deficiencies and noted that a problem identification description (PID) existed for a small steam leak from a steam isolation valve in the auxiliary boiler feed pump (ABFP) room. No discrepancies between the FSAR and the current system configuration were identified.

c. Conclusions

General plant housekeeping was good for the areas of the main steam, auxiliary feedwater and station batteries. The licensee appropriately identified various equipment deficiencies within their problem identification process.

08 Miscellaneous Operations Issues (92700, 92901)

- 08.1 (Closed) Violation 50-286/95013-01: failure to promptly identify and correct a degraded containment isolation valve. On August 25, 1995, the licensee identified that a containment isolation valve, NNE-AOV-863, failed a routine surveillance test. This failure resulted in the initiation of a technical specification required reactor shutdown. However, nine days earlier on August 16, the licensee's staff observed that the valve was not stroking smoothly, but did not consider the potential problem of closure time on operability. The failure to recognize this adverse condition to quality and take prompt corrective actions was a violation.

The licensee responded to the violation by letter dated November 11, 1997. The licensee determined that the cause was the failure of operators to recognize that the degraded condition of the valve affected its operability. Contributing causes were weaknesses in the work control process regarding operability determination for problem identifications, inadequate communications and a lack of questioning attitude. Corrective actions taken to preclude recurrence included: (1) revising procedure OPS-SD-01, "Work Control Process," to require an operability determination by a senior licensed operator for each problem identification; (2) revising procedure AP-8, "Deviation Event Reporting and Operability Determination Manual," to also reflect this requirement; and, (3) reinforcing management expectations for a questioning attitude on operability. The inspector verified the completion of the above actions through the review of documentation. Revision 5 of procedure OPS-SD-01 and revision 34 of procedure AP-8 included the requirement mentioned above. Action commitment tracking system (ACTS) item 14219 documented the re-enforcement of management expectations by the operations manager. This item is closed.

- 08.2 (Closed) Violation 50-286/95015-01: failure to adhere to procedures resulted in the over pressurization of a containment airlock door seal, inadvertent discharge of reactor coolant system water from a vent port, and the incorrect positioning of nitrogen bottle isolation valves. The failure to adhere to procedures was a violation. The licensee responded to the violation by letter dated December 29, 1995. The causes for these events included inadequate work planning, inadequate written communications, informal communications, improper documentation and ineffective communications. Corrective actions taken included training for pertinent personnel, and revising applicable administrative, operating and surveillance procedures. The inspector considered the licensee's corrective actions to this violation (coupled with the corrective actions discussed in section 08.4 that also addressed procedural

adherence issues) to be reasonable. The inspector also verified the completion of corrective actions documented in the licensee's response through a sampling review of procedures and action commitment tracking system documents. This violation is closed.

- 08.3 (Closed) Violation 50-286/95017-01: failure to take effective corrective actions for procedure quality issues. One of the corrective actions in response to the July 1995 operation of the reactor coolant system at reduced pressure was to review the procedure changes to ensure that for the past two years the appropriate 10 CFR 50.59 review was performed. This corrective action was inadequate because it failed to identify that a temporary procedure change to the procedure SOP-RHR-1, "Residual Heat Removal System," had not been evaluated as required by 10 CFR 50.59. This inadequate temporary procedure change contributed to the undetected release of about 1300 gallons of component cooling system water into the containment building. This event was cited as a violation.

The licensee responded to this violation by letter dated March 22, 1996. The licensee concluded that the failure to identify the inadequate temporary procedure change was due to personnel error. The lead reviewer erred in determining the scope of review for procedure changes and did not review active temporary procedure changes as part of the effort. The licensee's corrective actions included re-reviewing the procedure change database to identify any similar oversights, revising the safety screening process to review all procedure revisions and temporary procedure changes except for minor editorial changes, strengthening the qualified safety review selection process, reviewing temporary procedure changes that were in effect for the adequacy of the safety reviews and revising procedure SOP-RHR-1. The inspector considered the licensee's response to the violation reasonable, and verified the completion of corrective actions documented in the licensee's response through a sampling review of procedures and action commitment tracking system documents. This violation is closed.

- 08.4 (Closed) Violations 50-286/96002-01 and 96003-01: several examples in which activities affecting quality were not accomplished in accordance with procedures. The examples identified by violation 96002-01 included missed hourly log reading as required by a temporary operating procedure, inadequate distribution of temporary procedure changes, inadequate implementation of equipment lay up, inappropriate hanging of non-deficiency tags in the control room, failure to complete cold weather preparations, failure to complete operations department periodic task directive, and failure to routinely tour certain plant areas as required by operations procedures. The examples identified by 96003-01 included failure to take all procedural actions in response to drifting rod position indications, failure to ensure condenser vacuum was established prior to steam system warmup and walkdowns, failure to take timely actions in response to a control rod position greater than 12 steps from the group demand position and failure to close a valve after filling the 34 safety injection accumulator.

The licensee responded to the violations by letters dated May 9, 1996, and June 21, 1996. The licensee determined that these examples collectively

highlighted continued weaknesses in management oversight and involvement, weaknesses in the individual performance of operators, staff and managers, and weaknesses in both procedure and process quality. Previous corrective actions to improve procedure adherence and operator performance were enhanced by management and organizational changes, and plans to increase the number of senior licensed individuals. Specific corrective actions involved counseling personnel, revising the temporary procedure change distribution process, improving equipment lay up practices, revising the work control process concerning posting deficiencies in the control room, incorporating surveillances in the operations department self-assessment program to assure compliance with administrative requirements, enhancing the cold weather procedure, revising the operations department periodic task program to increase formality and clarify responsibility and accountability, and revising the procedure for operator rounds. The inspector considered the licensee's response to the violations reasonable, and verified the completion of corrective actions documented in the licensee's response through a sampling review of procedures and action commitment tracking system documents. This verification included the revisions to the cold weather, equipment lay up and operations department periodic task procedures. These items are closed.

- 08.5 (Closed) Violation 50-286/96002-02: corrective actions did not effectively resolve the continuing problems with the administration and control of operator overtime. As documented in NRC inspection report 50-286/96002, the inspectors identified instances where operators exceeded the overtime limits of technical specifications without prior approval. The licensee responded to the violation by letter dated May 9, 1996. The licensee took actions to clarify the overtime procedure, to provide a means for recording shift turnover time and to heighten the awareness of site personnel of the overtime limits and of individual accountability for adhering to overtime limits. This violation is closed.
- 08.6 (Closed) Violations 50-286/96007-01 and 96008-01: two examples of protective tagging procedure requirements being violated. In the first example, a bleed valve that was controlled by a protective tagging order was improperly operated. In the second example, the steam trap on the steam supply line to the auxiliary feed pump turbine was tagged without adequately evaluating the impact on the operability of the auxiliary feed pump. The licensee responded to these violations by letters dated September 16, 1996, and November 14, 1996. The licensee determined that the cause of the first example was a weak protective tagging process, which allowed more than one component to be controlled by one tag. Also, there was a lack of clear written direction with regard to management expectations of what plant equipment may be operated by maintenance personnel during maintenance activities. The cause of the second example was the failure of the control room supervisor to adequately assess operability, to use the appropriate mechanisms to control the effect of the tagout on pump operability, and to effectively communicate the status and required actions to the relieving shift. Corrective actions taken included training and counseling of pertinent personnel, issuing of a shift order clarifying management expectations, revising administrative procedures to prohibit the control of more than one component with one tag, and strengthening the operational impact review process. The inspector considered the licensee's

response to the violations reasonable, and verified the completion of corrective actions documented in the licensee's response through a sampling review of procedures and action commitment tracking system documents. This included the revision of administrative procedure AP-21, "Conduct of Operations," to clarify which and when personnel can operate equipment, and action tracking system documents that indicated the completion of pertinent training. These violations are closed.

II. MAINTENANCE

M1 Conduct of Maintenance

M1.1 General Comments (62707)

The inspectors observed all or portions of the following work activities:

- WR 97-05304-00, High Differential Pressure on 31 Heater Drain Pump Strainer
- WR 95-04424-14, Diesel Generator Building Exhaust Fan 319
- WR 97-07129-00, Boric Acid Transfer Pump Replacement
- WR 95-02076-00, Replace Sample Isolation Valve for Boric Acid Batch Tank
- WR 93-04728-04, Replace Charging Pump Relief Valve CH-237
- WR 96-07533-00, Replace Charging Pump Seals
- WR 97-05556-00, Replace Boric Acid System Valve Bonnet CH-267B

The inspectors observed that the work performed under the above work requests (WR) was conducted satisfactorily and in accordance with applicable maintenance and administrative procedures. The inspector also reviewed significant equipment failures that occurred to determine whether the equipment was within the scope of the maintenance rule, whether the licensee's corrective actions were appropriate, and whether the licensee was appropriately monitoring equipment performance.

M1.2 Boric Acid Transfer System Valve Replacement

a. Inspection Scope (62707)

The inspector observed the planning and implementation of the bonnet replacement for the boric acid transfer system filter bypass stop valve, CH-267B.

b. Observations and Findings

The inspector observed the pre-job walkdown performed by the maintenance mechanics. Thorough planning and good communications between the mechanics was observed. The job site had the appropriate plant support personnel covering the work, and contingency plans were in place if the scope of the work package needed to be expanded. The protective tagout for the job provided an adequate measure of safety for those performing the work and the system was drained in a controlled manner through the defective valve. When the new bonnet had been

installed, there was a discrepancy between the valve procedure stem travel distance and the actual value determined by the mechanics. The maintenance personnel sought the appropriate guidance in resolving this issue, verified the in-situ distance and initiated a deficiency event report to disposition the difference between the as left value and the value stated in the procedure. Lastly, since this system requires maintaining a specific temperature to preclude boric acid buildup in the system piping, the licensee implemented good planning by having the appropriate personnel prepared to install temporary insulation as soon as the work was completed. Also, the maintenance and operations personnel worked together efficiently to complete the work in two hours precluding a technical specification plant shutdown. Overall, the planning and implementation of the work process was performed well.

Conclusions

The licensee's planning and implementing an emergent work package to replace a rapidly degrading leaking valve bonnet was good. Good coordination enabled the licensee to complete the job in two hours and precluded a technical specification plant shutdown.

M1.3 Maintenance Rule Implementation (IFI 97009-01)

a. Inspection Scope (62707)

The inspector reviewed the implementation of 10 CFR 50.65, "Maintenance Rule," for the instrument air and chemical and volume control systems.

b. Observations and Findings

The instrument air (IA) system was scoped into the maintenance rule because it is used to mitigate the consequences of an accident, used in the emergency operating procedures and could potentially cause a reactor scram. The instrument air system has been a 10 CFR 50.65 a(1) since November 1, 1996 due to excessive unavailability of the IA compressors. Discussions with the system engineer revealed the primary cause of the unavailability is the age of the compressors. Currently, attempts are being made to characterize the stations usage of instrument air at full capacity in order to make recommendations to replace the compressors.

The chemical and volume control system (CVCS) has been rated a 10 CFR 50.65 maintenance rule category a(2) system since July 3, 1997. The inspector reviewed documents related to changing the systems status from a(1) to a(2) and determined that the licensee was appropriately implementing station procedures, which provide the criteria for changing the maintenance rule monitoring status of a system. The inspector noted, however, that two CVCS valve failures had occurred during this inspection period that had not yet been evaluated as functional failures or maintenance preventable functional failures. The CH-267B valve diaphragm failure was discussed above, and the more recent CH-FCV-110A failure in which the valve failed to stroke fully open due to boric acid build up on the plug. The determination

of maintenance preventable functional failure (MPFF) or functional failure (FF) status of the CH-267B and CH-FCV-110A valves will be left as an inspector follow item (IFI 97009-01).

c. Conclusions

The licensee appropriately implemented station procedures regarding the maintenance rule for the instrument air and chemical and volume control systems. The systems safety functions were appropriately classified, the maintenance preventable functional failures have been accounted for where applicable and the changing of the 10 CFR 50.65 system characterization criteria, a (1) or a (2), has been conservatively implemented. The maintenance rule disposition of the recent valve failures in the chemical and volume control system is an inspector follow item (IFI 97009-01).

M1.4 Surveillance General Comments (61726)

The inspectors observed all or portions of the following surveillances:

- 3PT-M16, Safety Injection Pumps Functional Test
- 3PT-Q91A, 31 Safety Injection-Component Cooling Water Pump Functional Test
- 3PT-M17, Containment Spray Pump Functional Test
- 3PT-Q38B, 32 Boric Acid Transfer Pump Functional Test
- 3PT-R32C, Control Room Filtration System Functional Test
- 3PT-M18A, Residual Heat Removal Pump Functional Test
- 3PT-M19, Auxiliary Component Cooling Pump Functional Test

The licensee conducted the above surveillances appropriately and in accordance with procedural and administrative requirements. As applicable, good coordination and communication with the control room were observed during performance of the surveillance. Procedures supported the timely completion of the surveillance.

M2 Maintenance and Materiel Condition of Facilities and Equipment

M2.1 Service Water Pump Failure

a. Inspection Scope (62707)

The inspectors reviewed the licensee's resolution of a plastic bottle found in the suction casing of the 35 service water pump.

b. Observations and Findings

On September 17, during the performance of surveillance procedure 3PT-Q92E, "35 Service Water Pump Operational Test," 35 service water pump (SWP) failed to develop adequate differential pressure and was declared inoperable. The licensee initiated deviation event report (DER) 97-2314 to document this failure. During the removal of the pump on September 23, the licensee identified that a plastic bottle

was lodged in the suction casing of the pump. The plastic bottle was flattened to about 80 square inches. The licensee initiated DER 97-2364 to document this deficiency.

The inspector reviewed the licensee's resolution of the DERs. The licensee closed DER 97-2314 on October 11. Although DER 97-2314 indicated that the likely cause of the failure was a plastic bottle lodged in the suction casing, the DER only indicated that a video camera inspection of the service water bays was conducted in refueling outage 9, and that an extensive foreign material exclusion (FME) improvement action plan was in place. However, the inspector noted that the adequacy of the video camera inspection was not reviewed, and no specific corrective actions were identified to prevent recurrence of the inappropriate entry of the bottle into the service water bay. Regarding the second DER initiated, the licensee classified DER 97-2364 as a level "D" DER. A level "D" DER requires no review or corrective actions, and is used for trending purposes only.

The licensee was not able to determine the origin of the bottle, but believed that it was possible that the bottle had passed through the traveling water screens. The inspector reviewed the inservice test data of the 35 service water pump with the licensee's inservice test program engineer. The data indicated that there was a potential for the plastic bottle to have been in the service water bay prior to the outage. This was based on the erratic trend in differential pressure exhibited by the pump during past surveillance tests. However, the equipment failure evaluation of the pump had not yet been completed.

The inspector considered the licensee's response weak, because the licensee did not consider or take actions specific to this event to strengthen the controls of foreign material entry into the service water bay. The licensee missed opportunities to reevaluate the appropriateness of the foreign material exclusion controls near the service water bay and the effectiveness of camera inspections performed at the end of the outage.

c. Conclusions

The licensee's response to an inoperable service water pump, which contained a plastic bottle in the suction casing, was weak. The licensee missed opportunities to reevaluate the appropriateness of foreign material controls in the service water bay area and the effectiveness of the camera inspections of the service water bay that were performed at the end of the refueling outage.

M2.2 Diaphragm Valve Action Plan

a. Inspection Scope (62707)

During a walkdown of the containment spray system, the inspector noted that the system piping configuration was not conducive to testing or maintaining the manual isolation valve from the spray additive tank. The inspector reviewed the surveillance and maintenance program for this isolation valve.

b. Observations and Findings

Valve SI-1841 is a manual, normally-opened, Grinnell diaphragm valve, which is located at the outlet of the spray additive tank. The sodium hydroxide solution that passes through this valve supplies both trains of the containment spray system. The inspector discussed the testing and maintenance of this valve with the maintenance and system engineers. Based on these discussions, there were no periodic tests to verify adequate flow through the valve. Also, the valve had been installed since original plant construction and no preventive maintenance had been performed.

The maintenance engineer indicated that a plan was being implemented to incorporate Grinnell diaphragm valves into the preventive maintenance program. This plan was initiated in response to the failure of valve CH-378, primary water inlet isolation to the chemical and volume control system (CVCS) batch tank, in October 1996. The failure of valve CH-378 resulted in a number of licensee concerns regarding the preventive maintenance and extent-of-condition of other diaphragm valves. One specific concern was the vendor recommended replacement frequency of five to six years. The licensee decided to perform preventive maintenance on the valves during refueling outages 10 and 11 on a staggered basis rather than in the recently completed refueling outage. This decision was based on the low failure rate of the valves experienced at Indian Point 3.

At the time of the inspector's review, the maintenance engineer had reviewed and incorporated, as appropriate, the valves in the CVCS and the waste disposal systems into the preventive maintenance program. The containment spray system valves were reviewed and incorporated, as appropriate, into the preventive maintenance program before the end of this inspection period. However, many of the valves required the plant to be in a shutdown condition to perform physical work. At the end of this inspection period, the licensee verified no leakage past the bonnet weep hole of valve SI-1841 to assure that the diaphragm was intact.

The inspector considered the licensee response to the failure of CH-378 and the identification that these diaphragm valves were omitted from the preventive maintenance program was weak. The licensee did not prioritize those valves which can significantly impact the plant or whose function was not periodically verified through surveillance testing or operation. As a result, the licensee missed opportunities to address these concerns during refueling outage 9. The containment spray additive tank isolation valve, which affects both trains of containment spray and is not tested periodically, was not scheduled for maintenance during the recently completed refueling outage 9. Also, subsequent to the inspector's identification of the valve SI-1841 concern, valve CH-267B, boric acid filter bypass stop valve, failed and required the plant to enter a shutdown action statement to perform repairs.

c. Conclusions

The licensee's response to a failed diaphragm valve in October 1996, when it was identified that many diaphragm valves had been in service since original plant construction without preventive maintenance, was weak. Although the licensee initiated a plan to incorporate these diaphragm valves into the preventive maintenance program, the valves which had a high potential to impact the plant or whose function was not periodically verified through surveillance testing or operation, were not evaluated and prioritized for work. As a result, the licensee missed opportunities to performed maintenance during the recently completed refueling outage 9.

M8 Miscellaneous Maintenance Issues (92902, 92700)

- M8.1** (Closed) Violation 50-286/96001-01: failure to construct two scaffolds located in safety-related areas with a minimum one-inch clearance or with approval from design engineering as required by construction procedures. The licensee responded to this violation by letter dated May 3, 1996. The causes for these events included a lack of attention by the scaffolding supervisors, poor communications between scaffolding supervisors during shift turnover, the weak work practice of estimating rather than measuring the dimensions of the scaffolding, and weak communications between the workers and supervisors. The corrective actions taken included re-inspection of the two scaffolds, reviewed of all existing scaffolds, discussions with construction services and maintenance department personnel, and incorporation of lessons learned in an applicable maintenance lesson plan. The licensee also increased scaffold inspections for an interim period until the scaffolding procedure was revised to incorporate lessons learned. The inspector considered the licensee's response to the violation reasonable, and verified the completion of corrective actions documented in the licensee's response through a sampling review of procedures and action commitment tracking system documents. The scaffolding procedure was revised on June 14, 1996. This violation is closed.
- M8.2** (Closed) Unresolved Item 50-286/97001-03: this item was left open to review the appropriateness of the licensee's conclusion that the maintenance rule risk significance of the control room ventilation system was low. The inspector, in consultation with regional and headquarter personnel, reviewed the licensee's determination and concluded that the determination was appropriate. The licensee's expert panel had determined that the system was not a significant contributor to shutdown risk for the key functions of decay/containment heat removal, inventory control, electrical power distribution, reactivity control and containment integrity. This item is closed.
- M8.3** (Closed) Licensee Event Report 50-286/97025-00: automatic reactor trip due to a high resistance contact on a reactor protection relay while testing an analog channel. This event occurred on September 15, 1997, and was reviewed in detail

in NRC inspection 50-286/97007. No new information was provided in the licensee event report that affects the conclusions drawn during the inspection. This item is closed.

III. ENGINEERING

E1 Conduct of Engineering

E1.1 Heater Drain Pump Suction Strainer

a. Inspection Scope (37551, 62707, 71707)

The inspector reviewed the engineering modification package for the heater drain pump suction strainers. Additionally, the inspector reviewed the nuclear safety evaluation (NSE) which supported the installation and removal of the strainers.

b. Observations and Findings

Originally, the heater drain pump strainers were installed at the suction to the heater drain pumps to remove any construction materials present in the facility piping upon initial start up. These strainers were intended to be removed after the plant had operated for a cycle, however; the original start up strainers for the heater drain pumps remained in the plant until 1993. The new suction strainers were installed as permanent strainers to protect the pumps from foreign material and debris left in the system after the maintenance performed during the refueling outage. During the post modification test of the strainers the system engineer noted unexpected excessive pressure drops across the strainer baskets. On October 15, 1997, after three weeks of operation, the suction strainers were removed from service to preclude a failure of the heater drain pumps due to sustained large differential pressures at their suction points. The strainers were originally described as "temporary" in the final safety analysis report (FSAR) and their removal was expected therefore no unreviewed safety question was caused by the removal of the strainers.

Examination of the strainers after removal revealed that the baskets had almost become fully clogged just three weeks into plant operation. Further investigation revealed that the strainer mesh size was too small for the intended application. Discussions with design engineering revealed that the mesh size was chosen to preclude known type of failure mechanisms like "Black Beauty," a sand blasting residue that has been known to clog secondary systems. However, the characterization of the "normal" debris in the system was weak and apparently did not correlate with the mesh size of the strainers.

c. Conclusions

The engineering which supported the heater drain pump suction strainer modification was weak in that it inappropriately characterized the debris in the

system and provided procurement specifications for a strainer mesh size that was too small for the intended application. The system engineers monitoring of the differential pressure across the strainers throughout the post modification test was good and enabled the licensee to proactively remove the strainers prior to fully clogging the heater drain pump suction path.

E1.2 Control Room Ventilation

a. Inspection Scope (37551)

The inspectors reviewed the nuclear safety evaluation (NSE) which evaluated the repositioning of the control room air-conditioning exhaust damper.

b. Observations and Findings

The tripping of the central control room air-conditioning (CCRAC) compressors caused the facility to enter a technical specification limiting conditions for operation (LCO) on several occasions because the control room ventilation boundary is opened to the atmosphere each time the compressors are reset. The apparent cause of the compressor trips is that the air flow distribution in the control room is not uniform. Consequently, the thermometer input to the air-conditioning compressors does not accurately represent the temperature of the air that actually flows back to the air-conditioning system. To solve the flow distribution problem the engineering organization proposed closing the damper in one of the central control room (CCR) exhaust registers in order to obtain an air flow with a temperature that more closely matched that of the sensing thermometer. The nuclear safety evaluation (NSE) was qualitative in nature and did not provide a sufficient technical basis on which system performance assumptions could be made. Previous test data based on a different system configuration was used to bound the problem but again, the technical correlation did not provide an adequate technical basis from which an engineering judgment could be made. In particular, the inspector believed that the increased pressure drop across the portion of the system upstream of the charcoal filters would have a severe effect on the amount of outside air flowing through the filters. Current dose calculations are based on 400 cfm of outside air, however; the most recent test data showed the system was balanced such that the outside air flow was between 250 cfm and 400 cfm, leaving little margin for additional flow resistance upstream of the filters. The "engineering judgement" used as a basis for this NSE did not appropriately support the alteration of the system configuration which was confirmed when the performance test revealed outside air flow to be three times greater than the 400 cfm limit. The licensee restored the damper to the original position and retested the system to assure system operability. No attempts to revisit this course of action have been taken since the failure of the performance test.

The inspector attended the plant operation review committee (PORC) meeting charged with approving this NSE. The PORC review of this NSE did not thoroughly challenge the engineer to provide sound technical practices to support the

engineering judgement. The PORC relied on the follow-up performance test to verify the impact the new ventilation configuration would have on the system.

c. Conclusion

The quality of the nuclear safety evaluation (NSE) which supported the alteration of the control room ventilation was weak in that it relied on an engineering judgment that did not have a sound technical basis. Additionally, the plant operation review committee (PORC) review of the NSE was weak in that it did not effectively challenge the technical aspects of the nuclear safety evaluation.

E1.3 Containment Isolation Valve Evaluation

a. Inspection Scope (37551)

The inspector reviewed the nuclear safety evaluation NSE 95-3-264, which was developed to support corrective maintenance of containment isolation valve NNE-AOV-863, the nitrogen supply isolation valve.

b. Observations and Findings

On September 11, valve NNE-AOV-863 did not stroke properly and was declared inoperable. To repair the valve, the licensee relied on the use of a manual downstream valve (NNE-1609) as an equivalent isolation valve to maintain containment integrity. Nuclear safety evaluation (NSE) 95-3-264 provided the basis for using this valve as an equivalent isolation valve.

The inspector reviewed the NSE and concluded that it was adequate to support the repair of NNE-AOV-863, while maintaining containment integrity. However, the inspector noted that the leak tightness of valve NNE-1609 relied upon a previously performed local leak rate test on the containment isolation valves NNE-AOV-863 and NNE-1610. Since the test used valve NNE-1609 as a pressure boundary, the NSE concluded that it demonstrated the leak tightness of the valve. But since the test was not written specifically to verify leakage past valve NNE-1609, the test did not assure that the downstream piping of valve NNE-1609 was depressurized. The inspector considered the NSE to be weak in that it did not address potential plant conditions on the validity of the test to demonstrate valve NNE-1609 leak tightness. The inspector, however, verified through the review of operator logs that the piping downstream of valve NNE-1609 was depressurized at the time of the test.

c. Conclusions

The nuclear safety evaluation to support the repair of a containment isolation valve by using an equivalent valve was adequate and supported the maintenance activity in a timely manner. However, the nuclear safety evaluation was weak in that it did not address possible plant conditions which may affect the validity of a previously performed test that was relied upon demonstrate valve leak tightness.

E3 Engineering Procedures and Documentation

E3.1 Emergency Diesel Room Ventilation Modification (URI 97009-02)

a. Inspection Scope (37551, 62707)

The inspectors reviewed minor modification MMP 95-3-187, "Emergency Diesel Generator Motor/ Starter/Feeder Changes." The modification involved the realignment of building exhaust fan power supplies and the replacement of the 7.5 horsepower fan motors with 10 horsepower motors. As of the end of the inspection period, the fan motor power supplies had been rearranged, but the upgrade of the fan motors had not yet commenced.

b. Observation and Findings

The inspector identified several weaknesses in the modification package and its implementation, but subsequently noted that these weaknesses were already identified by the licensee. These weaknesses included incomplete modification package documentation, unclear documentation of specific testing and acceptance criteria in the modification package, the lack of field walkdown documentation, improper sequence of design verification approvals, and inconsistencies between modification procedures and the current engineering organization.

The inspector considered the lateness in developing this modification and the large amount of other modification work planned and performed during refueling outage 9 contributed to the quality issues associated with this modification. This resulted in less than thorough reviews and field walkdowns. The portion of the modification performed during the refueling outage required 59 engineering change notices. Also, the modification procedures were cumbersome and inconsistent, and created challenges for the engineering staff.

Overall, the self assessment efforts and the quality review of this modification were good and identified numerous quality issues. Prior to the start of the refueling outage, the licensee recognized the impact of "late" modifications and the large amount of modification work. The self assessments were performed, in part, to address these issues. Also, the licensee recognized that the modification process was cumbersome and required overhaul. The licensee was developing a new modification process, which mirrors current industry standards. This effort was currently scheduled for completion by April 1998. The licensee had in place interim measures to improve modification quality including development of a modification quality review process and the use of modification teams. Although these initiatives were good, the inspector noted the need to have an improved modification process in place in a timely manner to support the development of modifications for the next refueling outage.

During the review of this modification, the inspector identified some deficiencies which were not previously identified by the licensee. These deficiencies are described below.

- In January 1997, the licensee implemented a temporary modification for the 314 and 315 diesel building exhaust fans such that the fans are powered from 31 emergency diesel generator. During the implementation of the permanent modification, the licensee realigned the power supply of the 314 fan on October 16, however the temporary modification was not revised to reflect the change. The licensee intended to remove the temporary modification after the completion of the modification to the 315 fan, however the work on the 315 fan was not performed until November 4. Administrative procedure AP-13, "Temporary Modifications," stated that if amendment to, or partial restorations of, the temporary modification is required, then a temporary modification change notice shall be developed and tracked via a work request. The inspector noted that a temporary modification change notice was not generated. However, this issue is left unresolved pending the NRC's review of the temporary modification process and determination of the significance of the lack of a temporary modification change notice. **(Unresolved Item 97009-02)**
- Procedure MCM-11, "Preparation, Review, and Approval of Modification Test Requirements," indicated that the testing outlined in attachment 4.2 of the procedure shall be considered. Attachment 4.2 lists the use of thermography for modifications involving switchgear. However, the inspector noted that the modification package did not require the use of thermography or have a documented basis for not requiring thermography. The inspector considered this to be an example of the unclear documentation of the specific testing and acceptance criteria in the modification package, which was a finding by the licensee during self assessments.
- The inspector noted an inconsistency in a systems operating procedure. Procedure SOP-EL-5B, "Motor Control Center (MCC) and Load Center Operation," had a note which indicated that various MCCs have yellow labels for quick identification. MCCs 36D and 36E, which was installed by the modification, were identified by the procedure to have yellow labels, however, the labels in the field were white.

Despite weaknesses in the modification package and process, the inspector considered the implementation of the portion of the modification with the plant at power was good. Work packages were well developed and included appropriate testing of the activities. The operability of the emergency diesel generators were maintained to support technical specification requirements and unavailability was minimized by coordinating activities during preventive maintenance activities. Although a minor procedure discrepancy was identified, the overall procedural control during the numerous phases of the modification implementation was excellent. Procedure changes were well coordinated after each fan of MCC was modified. Communication of the changes to the operations staff was good.

c. Conclusions

The modification package and implementation for the emergency diesel fans were weak. The lateness in modification development and the large amount of modification work performed during the recent refueling outage contributed to these weaknesses. However, the self assessment efforts, which were performed in recognition of the lateness in modification development, and the quality review of this modification were good and identified several quality issues. The modification procedures and processes were inconsistent and cumbersome. The licensee had taken appropriate interim actions to address these weaknesses and was overhauling the modification process. However, completion of these efforts and implementation of the new process must be timely to support the modifications planned for refueling outage 10.

The implementation of the portion of the modification with the plant at power was good. However, a deficiency was identified regarding the temporary modification that was in effect for the 314 and 315 fans. A temporary modification change notice was not initiated. This is considered an unresolved item.

E8 Miscellaneous Engineering Issues (92700,92903)

- E8.1 (Closed) Unresolved Item 50-286/96001-03: discrepancies with the final safety analysis report (FSAR) were indicative that plant procedures may not have been consistently been evaluated against the FSAR. These examples, which were identified by the licensee, included the procedures for terminating sodium hydroxide addition, cross-connecting 480 volt buses, and controlling the positions of two waste gas system valves. The item was reviewed in NRC inspection 50-286/96003, but was left open pending further review of the licensee's corrective actions.

On October 9, 1996, the NRC sent the licensee a letter requesting information pursuant to 10 CFR 50.54(f) regarding the adequacy and availability of design basis information. The licensee responded by letters dated February 7, 1997, and March 10, 1997, which detailed the licensee's commitments regarding the adequacy and availability of design basis information. The licensee committed to completing a verification program of the final safety analysis report. In addition, the licensee committed to performing period vertical-slice assessments at Indian Point 3. Based on the commitments made by the licensee in response to the NRC's 10 CFR 50.54(f) letter, this item is closed.

- E8.2 (Withdrawn) Licensee Event Reports 50-286/96010-00: the nitrogen supply to zone 3 of the weld channel containment penetration pressurization system (WCCPPS) became inoperable, while zone 2 was inoperable due to testing. The WCCPPS system consists of four zones that supply pressurized gas to various containment isolation components. Compressed air normally supplies the four zones, and nitrogen is used as a backup in the event that compressed air is not available. On June 15, 1996, the licensee declared the backup nitrogen supply to zone 3 inoperable. With zone 2 inoperable for testing, the licensee determined that

the plant was in a condition outside technical specifications. Subsequently, the licensee reassessed the technical specification requirement and determined that the failure of the nitrogen backup supply did not make zone 3 inoperable. On September 19, 1997, the licensee submitted a letter to the NRC withdrawing the licensee event report. The inspector reviewed the licensee's basis for determining that zone 3 was not inoperable and considered the basis to be reasonable,

IV. PLANT SUPPORT

P1 Conduct of Emergency Preparedness Activities

a. Inspection Scope (71750)

The inspectors observed the licensee's "off year," emergency preparedness exercise.

b. Observations and Findings

On October 29, 1997, the licensee conducted an emergency preparedness exercise. This was an "off year," exercise, so participation by representatives of the surrounding counties was limited. The inspectors attended the briefing for the exercise controllers and determined that licensee expectations of the controllers were clearly stated in the briefing and the controllers were well prepared for the exercise. While observing the exercise the inspector noted that the control room was quiet and allowed for clear communication immediately following the start of the exercise; however, once the control room staff was augmented the ambient noise level made communications more difficult. Two instances of poor communications were noted. Regarding the first instance, the licensee identified that the technical support center was not informed that a main steam safety valve was stuck open. Regarding the second instance, an error was made when the control room emergency director incorrectly released a radiological data sheet indicating a radioactive release to the atmosphere which exceeds technical specifications. Once the emergency operations facility had been staffed, the Emergency Director released a corrected form although the incorrect information had already been relayed to the joint news center. Overall, the inspectors considered that the exercise was well coordinated and provided the licensee with the opportunity to identify areas for improvement in the emergency preparedness plan.

c. Conclusions

The "off year" emergency preparedness exercise was well controlled and provided the licensee with the opportunity to identify areas for improvement in the emergency planning process. Overall, command and control and technical assessments were good; however, two instances of poor communications were noted.

S1 Conduct of Security and Safeguards Activitiesa. Inspection Scope (71750)

The inspectors reviewed the licensee's implementation of the security plan.

b. Observations and Findings

During this inspection, the inspectors conducted walkdowns of the protected area perimeter, observed security activities in the central and secondary alarm stations, and reviewed security activities associated with access control and compensatory actions. The inspector also walked down security barriers including accompaniments with security personnel on building rooftops to inspect security hatches. Overall, the licensee was appropriately implemented the security plan.

The inspector noted that the licensee identified a potential vulnerability associated with an area containing a safety-related structure. Although the security plan did not address this particular area, the licensee concluded that the security for the area should be enhanced based on its safety significance. As an immediate action, a security guard was posted in the area. The licensee enhanced the security protection for the area and indicated that the security plan would be revised to reflect the plant upgrade. The inspector considered the licensee's identification and response to this potential security vulnerability to be excellent.

c. Conclusions

The licensee appropriately implemented the security plan. The identification of a potential security vulnerability, which was not addressed by the security plan, was excellent. This potential vulnerability was appropriately addressed, including planned revisions to the security plan.

V. MANAGEMENT MEETINGS**X1 Exit Meeting Summary**

The inspectors presented the inspection results to members of the licensee management at the conclusion of the inspection on November 6, 1997. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT A

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Barrett, Site Executive Officer
 J. Comiotes, General Manager, Operations
 J. Russell, General Manager, Maintenance
 D. Quinn, General Manager, Plant Support
 J. DeRoy, Director, IP3 Engineering

NRC

G. Wunder, Project Manager
 D. Dempsey, Reactor Engineer

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
 IP 61726: Surveillance Observations
 IP 62707: Maintenance Observation
 IP 71707: Plant Operations
 IP 71750: Plant Support Activities
 IP 92700: Onsite Followup of Written Reports of Nonroutine Events
 IP 92901: Followup - Plant Operations
 IP 92902: Followup - Maintenance
 IP 92903: Followup - Engineering
 IP 93702: Prompt Response to Events at Operating Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

IFI 97009-01: Chemical and volume control system valve failures, maintenance rule screening
 URI 97009-02: Temporary modification was not revised to reflect configuration change while implementing a permanent modification

Closed

VIO 95013-01 Failure to promptly identify and correct a degraded containment isolation valve
 VIO 95015-01 Failure to adhere to procedures resulted in the over pressurization of a containment air lock, inadvertent discharge of reactor coolant system water and incorrect positioning of a valve
 VIO 95017-01 Failure to take effective corrective actions for procedure quality issues
 VIO 96002-01 Failure to follow procedures including missed hourly readings, inadequate equipment layup, failure to complete cold weather preparations, failure to complete operations periodic tasks and failure

to routinely tour certain areas

VIO 96003-01 Failure to follow procedures including failure to take all actions in response to control rod drift, failure to ensure condense vacuum prior to steam system warmup and failure to close a valve.

VIO 96002-02 Corrective actions not effective to resolve administration and control of operator overtime

VIO 96007-01 A bleed valve controlled by a tagging order was improperly operated

VIO 96008-01 A steam trap was tagged out without adequately evaluating the impact on the operability of an auxiliary feed pump

VIO 96001-01 Failure to construct two scaffolds within required construction procedures

URI 97001-03 Review of maintenance rule risk significance of control room vent system

LER 97025-00 Automatic reactor trip due to high resistance contact on a reactor protection relay

URI 96001-03 Review of corrective actions regarding FSAR discrepancies

Withdrawn

LER 96010-00 Nitrogen supply to zone 3 of WCCPPS became inoperable

LIST OF ACRONYMS USED

ABFP	Auxiliary boiler feed pump
ACTS	Action Commitment Tracking System
BATP	Boric acid transfer pump
CCR	Central Control Room
CCRAC	Central Control Room Air Conditioning
CFM	Cubic feet per minute
CVCS	Chemical and volume control system
DER	Deviation Event Report
FF	Functional Failure
FME	Foreign material exclusion
FSAR	Final safety analysis report
gpm	gallons per minute
IA	Instrument Air
IFI	Inspector Follow Item
LCO	Limiting conditions for operation
LER	Licensee Event Report
MCC	Motor control center
MPFF	Maintenance Preventable Functional Failure
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
NSE	Nuclear safety evaluation
PID	Problem identification description
PORC	Plant operating review committee
SWP	Service water pump
URI	Unresolved item
VIO	Violation
WCCPPS	Weld channel and containment penetration pressurization system
WR	Work request