January 19, 2000

EA 99-328

Mr. John H. Mueller
Chief Nuclear Officer
Niagara Mohawk Power Corporation
Nine Mile Point Nuclear Station
Operations Building, 2nd Floor
P.O. Box 63
Lycoming, NY 13093

SUBJECT: **NRC INTEGRATED INSPECTION REPORT NOS. 05000220/1999010 AND 05000410/1999010**

Dear Mr. Mueller:

This report transmits the findings of safety inspections conducted by NRC inspectors at the Nine Mile Point Nuclear Station, Units 1 and 2, from October 31 through December 18, 1999. At the conclusion of the inspection, the findings were discussed with members of your staff.

Overall, the conduct of operations at the Nine Mile Point Nuclear Station reflected an acceptable safety focus. We observed several improvements in the approach to and conduct of operations. For example, the November 13, Unit 1 startup was well performed and the review of Unit 1 containment integrity issues was thorough. In contrast, some configuration control errors have continued to impact station performance. These issues included misalignment of Unit 2 nitrogen system valves and improper configuration control of Unit 1 liquid poison system tank volume instrumentation during testing.

Based on the results of this inspection, the NRC has determined that three Severity Level IV violations of NRC requirements occurred. These violations are being treated as Non-Cited Violations (NCVs), consistent with Section VII.B.1.a of the Enforcement Policy. The NCVs are described in the subject inspection report and involved the failure to implement appropriate corrective actions for solenoid-operated-valve aging concerns, the failure to perform quarterly relay testing per Technical Specifications, and the failure to perform a safety evaluation when changing test requirements for fire detection equipment and barriers at Unit 1. If you contest these violations or their severity level, you should provide a response within 30 days of the date of this inspection report, with basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region I, the Director, Office of Enforcement, and the NRC Resident Inspector at the Nine Mile Point facility.

In accordance with 10CFR2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Sincerely,

/RA/

Michele G. Evans, Chief
Projects Branch 1
Division of Reactor Projects

EA 99-328
Docket Nos. 05000220, 05000410
License Nos. DPR-63, NPF-69

Enclosure: NRC Inspection Report Nos. 05000220/1999010 and 05000410/1999010

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REGION I

Docket/Report Nos.:	05000220/1999010 05000410/1999010
License Nos.:	DPR-63 NPF-69
Licensee:	Niagara Mohawk Power Corporation P. O. Box 63 Lycoming, NY 13093
Facility:	Nine Mile Point, Units 1 and 2
Location:	Scriba, New York
Dates:	October 31, 1999 - December 18, 1999
Inspectors:	G. Hunegs, Senior Resident Inspector R. Fernandes, Resident Inspector B. Fuller, Resident Inspector K. Kolaczyk, Operations Engineer L. Scholl, Senior Reactor Engineer
Approved by:	Michele G. Evans, Chief Projects Branch 1 Division of Reactor Projects

EXECUTIVE SUMMARY

Nine Mile Point Units 1 and 2
05000220/1999010 & 05000410/1999010
October 31, 1999 - December 18, 1999

This inspection report included aspects of licensee operations, engineering, maintenance, and plant support. The report covered a seven-week period of resident inspection. The results of a fire protection program inspection from December 6 - 10 and an engineering inspection from December 13 - 17 were also included in this inspection report.

Operations

On November 9, 1999, while commencing a reactor plant start-up at Unit 1 from a planned maintenance outage, the plant staff identified that primary containment integrity had not been properly established, in that, the shutdown cooling system isolation valves were not closed and the associated breakers racked out in order to maintain a water seal. An NMPC investigation team thoroughly reviewed the event and determined that operator knowledge of primary containment integrity requirements was lacking and operating procedures did not provide sufficient guidance related to establishing primary containment integrity. In addition, the team identified two previous instances where primary containment integrity Technical Specifications were not satisfied and appropriately reported these events. (O1.2)

The November 13, 1999, Unit 1 reactor startup was conducted in a conservative, well controlled manner. Effective supervision and oversight were provided by senior management. This was a notable improvement when compared with the startup that was conducted on October 16, 1999. (O1.3)

On November 18, 1999, the Unit 2 control room staff received an instrument nitrogen low pressure alarm and determined that it was the result of several nitrogen system valves being out of their correct position. The control room operators responded appropriately to the alarm and their immediate actions were good. The loss of configuration control was due to operator inattention to detail. (O1.4)

Unit 1 operators appropriately identified leakage from the No. 14 reactor recirculation pump seal. The pump's mechanical seal had been replaced during an outage in October 1999. The recirculation loop was promptly isolated and the reactor returned to full power. The shift crew conducted an excellent brief for the loop isolation evolution and identified the need for changes to the operating procedures used to maneuver the plant through an area of pressure and power oscillations. (O2.1)

On November 30, 1999, operations and maintenance personnel did not properly control the Unit 1 liquid poison system tank volume instrumentation. Prompt compensatory actions taken by the operations crew prevented a violation of Technical Specifications. Poor communications and coordination between the responsible maintenance and operations department personnel contributed to this failure to properly maintain equipment configuration control. (O2.2)

Engineering

The failure to implement appropriate corrective actions at Unit 2 to prevent the installation of main steam isolation valve (MSIV) solenoid-operated-valves (SOVs) with ethylene propylene diene monomer (EPDM) seals was a non-cited violation of the corrective action requirements of 10 CFR 50 Appendix B. The inspectors also identified weakness in the calculations performed by NMPC to determine the qualified life of the MSIV SOVs. (E8.5)

The failure to include all required relays in quarterly functional tests was a non-cited violation of Technical Specification surveillance requirements. Corrective actions were appropriate and additional, more broad-based corrective actions were being implemented as a result of previous licensee findings in the surveillance testing area. (E8.6)

Plant Support

On November 11, 1999, during routine maintenance at Unit 1, technicians found a pen cap lodged in the internals of a turbine building seal water pressure switch. The pen cap was positioned to prevent the alarm function from working. The security department was not initially made aware of the potential tampering issue and, as such did not become involved with the investigation until November 15. NMPC determined that the cause was most likely due to improper maintenance conducted in the past. The inspector concluded that the licensee's investigation was thorough. However, the security department was slow to investigate a potential tampering issue. (S1.1)

With some exceptions, NMPC was implementing an adequate Fire Protection Program. Fire detection and suppression systems located in safety-related areas were tested in accordance with requirements, fire brigade personnel were adequately trained, and fire barriers were maintained and inspected. Appropriate administrative requirements were in place to control the position of valves and components in the fire main system. (F2)

The identified exceptions were associated with surveillance testing of the fire pumps and fire detection systems, the timeliness of resolution of problems with fire protection panels at Unit 2, and questions regarding the qualifications of training personnel. With one exception, these items were self-identified during annual performance audits. NMPC's failure to perform a safety evaluation and change the Unit 1 FSAR, when revising test requirements for fire detection systems and barriers, was inspector identified. A non-cited violation was issued to document this failure to perform the requisite safety evaluation and FSAR change. (F2)

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Summary of Plant Status

Nine Mile Point Unit 1 (Unit 1) began this inspection report period in cold shutdown to perform repairs to the No. 11 recirculation pump mechanical seal. After seal replacement, on November 13, Unit 1 was restarted and proceeded to full power. On November 17, the licensee identified that the No. 14 recirculation pump seal was exhibiting signs of failure, so reactor power was lowered to approximately 80 percent and the recirculation loop was isolated. Reactor power was held at approximately 80 percent until operating procedures were revised to incorporate techniques for raising power through the region of pressure and power oscillations caused by turbine control valve characteristics. Reactor power was then raised to 100 percent on November 29. Unit 1 ended the report period at full power in four loop operation.

Nine Mile Point Unit 2 (Unit 2) remained at 100 percent power throughout the inspection period.

I. Operations

O1 Conduct of Operations [1]

O1.1 General Comments (71707)

Using NRC Inspection Procedure 71707, the resident inspectors conducted frequent reviews of ongoing plant operations. The reviews included tours of accessible areas of both units, verification of engineered safeguards features (ESF) system operability, verification of adequate control room and shift staffing, verification that the units were operated in conformance with Technical Specifications (TSs), and verification that logs and records accurately identified equipment status or deficiencies. In general, the conduct of operations was professional and safety-conscious.

O1.2 Inadequate Reactor Start-up Procedure and (Closed) Licensee Event Report (LER) 05000220/1999006, Shutdown Cooling Water Seal Not Established as Required by Technical Specification 3.3.0. (Unit 1)

a. Inspection Scope (71707)

On November 8, 1999, while commencing a reactor plant start-up from a planned maintenance outage, the adequacy of the start-up procedure was questioned by NMPC operators and management with regards to securing the shutdown cooling system and establishing primary containment integrity. The inspectors reviewed the LER, applicable procedures and NMPC's corrective actions. Additionally, the inspectors discussed the issue with NMPC personnel and observed the station operations review committee meeting presentation.

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[1] Topical headings such as O1, M8, etc., are used in accordance with the NRC standardized reactor inspection report outline. Individual reports are not expected to address all outline topics. The NRC inspection manual procedure or temporary instruction that was used as inspection guidance is listed for each applicable report section.

b. Observations and Findings

During preparations for the Unit 1 startup on November 8, 1999, the operating crew declared primary and secondary containment in effect. In actuality, primary containment integrity requirements were not met as the specific steps necessary to address the shutdown cooling system requirements had not been completed. The reactor mode switch was placed in STARTUP and control rod withdrawal was commenced. At the time the mode switch was taken to STARTUP, the shutdown cooling (SDC) system was in operation maintaining reactor coolant temperature in the range of 150 to 180 degrees Fahrenheit. Control room crew and management discussions were held concerning the appropriate time to secure the SDC system and a decision was made to suspend the startup pending additional review. After further discussion, it was determined that the procedure was not clear on the proper sequencing and securing of the SDC system. The two control rods that had been withdrawn were inserted and the mode switch was returned to REFUEL.

NMPC formed a multi-discipline team to investigate the event. The cause was determined to be inadequate operator training and improper implementation of the water seal modification performed in 1995, in that, operating procedures were not appropriately revised to address primary containment integrity considerations.

The shutdown cooling isolation valves were not originally designed to meet 10 CFR 50, Appendix J leakage requirements. In a letter dated August 27, 1984, NMPC requested exemption from 10 CFR 50, Appendix J, Type C leakage test. By letter dated May 6, 1988, the NRC denied the exemption request. NMPC decided to utilize a water seal in lieu of replacing the valves. In a letter dated June 30, 1994, NMPC proposed, in part, a water seal modification to meet the requirements of Section III.C.3(a)(b) of Appendix J. The safety evaluation associated with Technical Specification Amendment Number 154, dated March 20, 1995, states, in part, that during plant operation the shutdown cooling system isolation valves are normally closed and the breakers racked out to prevent a spurious valve opening from defeating the water seal. Based, in part, on this information, the NRC found the proposed water seal acceptable.

In 1995, Modification 88-153, which included Technical Specification Amendment Number 154, was implemented to ensure a water seal was established and maintained. Procedure revisions were made and operators were trained as part of operations acceptance of this modification. However, the specific requirements to maintain the shutdown cooling isolation valves closed and breakers racked out, whenever primary containment integrity is required, did not get adequately incorporated into the applicable procedures. In addition, during the investigation into these events, NMPC identified a number of issues concerning the plant modification control process. These issues were still being evaluated by NMPC at the conclusion of the inspection.

During the licensee's investigation, the root cause team identified two reportable conditions. On April 3, 1995, for approximately eight days, and on June 6, 1999, during a reactor vessel leakage test, the requirements to establish primary containment integrity were not met. Specifically, in the first case, the breakers associated with the shutdown cooling system isolation valves were not open and racked out. However, the shutdown cooling system valves were shut. In the second case, the inboard isolation

valves were open and the breakers were not racked out. However, the outboard isolation valves were shut. These two events were contrary to Technical Specification 3.3.0. NMPC reported these events in LER 050000220/1999006, Shutdown Cooling Water Seal Not Established as Required by Technical Specification 3.3.0. The inspectors verified that the LER was completed in accordance with the requirements of 10 CFR 50.73. Specifically, the description and analysis of the event, as contained in the LER, were consistent with the inspectors' understanding of the event. The root cause and corrective and preventive actions described in the LER were reasonable and appropriate. This licensee identified and corrected violation was of minor significance and not subject to formal enforcement action. This LER is closed.

The licensee revised procedures to provide additional control and guidance on when the shutdown cooling system water seal is required to be established. Operators were also re-trained on the primary containment integrity and the shutdown cooling system water seal requirements.

c. Conclusions

On November 9, 1999, while commencing a reactor plant start-up at Unit 1 from a planned maintenance outage, the plant staff identified that primary containment integrity had not been properly established, in that, the shutdown cooling system isolation valves were not closed and the associated breakers racked out in order to maintain a water seal. An NMPC investigation team thoroughly reviewed the event and determined that operator knowledge of primary containment integrity requirements was lacking and operating procedures did not provide sufficient guidance related to establishing primary containment integrity. In addition, the team identified two previous instances where primary containment integrity Technical Specifications were not satisfied and appropriately reported these events.

O1.3 Reactor Startup Observations (Unit 1)

a. Inspection Scope (71707)

The inspectors observed reactor startup activities conducted on November 13, 1999. The review included the conduct of operations, resolution of plant problems, and management oversight.

b. Observations and Findings

The reactor startup was conducted in a conservative, well controlled manner. Pre-evolution briefs were thorough and a safety focus was emphasized. Operators were aware of the status of equipment and rigorous in challenging equipment abnormalities. For example, operators identified issues concerning source range neutron monitor indications and a transformer oil level alarm. These issues were thoroughly investigated and resolved. Throughout the reactor restart evolution, senior NMPC managers provided oversight of activities. The startup was controlled in an improved manner when compared with the October 16, 1999 reactor startup. (See NRC Inspection Report 1999009)

c. Conclusions

The November 13, 1999, Unit 1 reactor startup was conducted in a conservative, well controlled manner. Effective supervision and oversight were provided by senior management. This was a notable improvement when compared with the startup that was conducted on October 16, 1999.

O1.4 Nitrogen Addition Configuration Control Error (Unit 2)

a. Inspection Scope (71707)

On November 18, 1999, during normal plant operations, the control room received a low instrument nitrogen pressure alarm and determined that it was the result of several valves being out of their correct position. The inspector reviewed the control room staff's immediate actions and NMPC's investigation of the event to evaluate the long term corrective actions.

b. Observations and Findings

The low pressure (LP) nitrogen supply tank is located in the reactor building and is supplied from two storage tanks outside the power block. The operators were aware of a recent delivery of nitrogen and, after taking the immediate actions of the alarm response procedure, completed a walk down and valve line-up on the nitrogen storage system. They determined that four valves which were normally open, were closed. The valves out of position prevented the outside storage tanks from maintaining a constant nitrogen supply to the LP nitrogen supply tank. The LP nitrogen supply provides operating force for the inboard main steam isolation valves (MSIVs) and the relief mode of the safety relief valves (SRVs). The alarm response procedure directs the operators to shut down the reactor should the pressure drop to 74 psig. In this instance, the nitrogen system leakage was slow and the alarm came in at 96 psig. The operators repositioned the valves and verified that the remaining valves in the system were in the correct position.

The inspector confirmed, through independent review and interviews with operators, the licensee's determination that this configuration control error was the result of inattention to detail by the operators. The failure to follow the nitrogen fill procedure when restoring the system is a violation of minor significance and not subject to formal enforcement action. This issue is in the NMPC corrective action program as DER 2-1999-3888. Corrective actions included valve line-up and procedure changes and remediation of the operators involved.

c. Conclusions

On November 18, 1999, the Unit 2 control room staff received an instrument nitrogen low pressure alarm and determined that it was the result of several nitrogen system valves being out of their correct position. The control room operators responded appropriately to the alarm and their immediate actions were good. The loss of configuration control was due to operator inattention to detail.

02 Operational Status of Facilities and Equipment

O2.1 Reactor Recirculation Pump Seal Failure (Unit 1)

a. Inspection Scope (71707)

Unit 1 replaced the No. 11 and No. 14 reactor recirculation pump (RRP) mechanical seals during a planned maintenance outage in early October 1999. The No. 11 RRP seal failed during startup from that outage, requiring a subsequent outage to rework that seal. After startup from that forced outage, on November 17, 1999, the No. 14 RRP mechanical seal exhibited signs of failure. The inspectors observed the evolution brief and the operators maneuvering of the plant to reduce power and isolate the affected loop. The licensee had not repaired the No. 14 RRP seal as of the end of this inspection period.

b. Observations and Findings

The No. 14 reactor recirculation pump (RRP) seal degraded quickly after replacement in late October 1999. Shift operators noted pressure fluctuations during control room panel walkdowns on the morning of November 17, 1999. With the plant at normal operating pressure and at full power, NMPC management determined that it was necessary to isolate the pump to prevent catastrophic failure of the seal.

The shift crew performed a detailed brief prior to the downpower to less than 80 percent power to isolate the loop. Power maneuvers in Unit 1 require close coordination due to pressure and power oscillations caused by the turbine control system characteristics. Excellent crew questioning during the brief resulted in many contingency actions being discussed and optimum equipment lineups determined.

The downpower maneuver was performed with no complications and very little observed power oscillation. The crew isolated the recirculation loop and secured the RRP. The unit operated in four loop recirculation from November 17th until the end of the inspection period.

The reactor was not immediately restored to full power. The plant manager directed that procedural modifications be made to incorporate the contingency actions and equipment lineups that were identified in the evolution brief prior to restoring the reactor to full power. The procedures were changed and reactor power was raised to 100 percent on November 29, 1999.

c. Conclusions

Unit 1 operators appropriately identified leakage from the No. 14 reactor recirculation pump seal. The pump's mechanical seal had been replaced during an outage in October 1999. The recirculation loop was promptly isolated and the reactor returned to full power. The shift crew conducted an excellent brief for the loop isolation evolution and identified the need for changes to the operating procedures used to maneuver the plant through an area of pressure and power oscillations.

O2.2 Inadequate Configuration Control Leads to "Near Miss" (Unit 1)

a. Inspection Scope (71707)

On December 1, 1999, the licensee identified that the status of the liquid poison system tank volume instrument was not properly controlled during testing which resulted in a "near miss" of a Technical Specification surveillance requirement to ensure adequate tank volume. The inspectors reviewed the associated deficiency report, interviewed operations and maintenance personnel, and discussed corrective actions with NMPC management.

b. Observations and Findings

On day shift, November 30, 1999, the liquid poison system tank volume instrument was rendered inoperable when technicians started calibration procedure N1-IPM-041-001. The tank volume function was one of multiple inputs to a liquid poison system common alarm in the control room. The calibration of the tank volume instrument resulted in a locked-in alarm annunciator.

The inspectors determined that the responsible technicians did not complete the calibration procedure by the end of the day shift and planned to complete it the following day. Prior to the end of shift, the control room operators requested that the common alarm be cleared so that other alarm inputs would not be masked by the locked-in tank volume alarm. The technicians adjusted the tank level probe on the work bench to insert a dummy signal to the tank volume instrument which cleared the common alarm. However, the probe was not inserted back into the tank. The control room operators observed the annunciator clear and incorrectly assumed that the calibration of the tank volume instrument was completed. There was no face-to-face communications between the technicians and the control room staff concerning the status of the tank volume instrument. This configuration control problem was compounded when the status of the tank volume instrument and associated calibration procedure was not reviewed during control room staff shift turnover at midnight.

On December 1, 1999, at 3:20 a.m., the control room staff used the tank volume instrument to record the volume in the liquid poison tank, as the operators were not aware that the instrument had a dummy volume signal inserted. The dummy signal resulted in the indicated volume reading approximately 50 gallons lower than the previously recorded volume. This discrepancy was appropriately noted and the resulting investigation revealed the inoperable status of the tank volume instrument. The Station Shift Supervisor promptly directed that the liquid poison tank be sounded to determine

volume. No violation of the Technical Specification surveillance periodicity occurred, as the previous valid tank volume reading and the manually sounded tank volume were within the required daily interval.

Operations and maintenance department personnel did not maintain proper configuration control during the calibration of the tank volume instrument. No entry concerning the status of the volume instrument was made in either the Station Shift Supervisor (SSS) log or the Equipment Status Log (ESL). The work was authorized by the outside (control room) SSS and was presented to the chief shift operator (CSO), bypassing the Assistant SSS. Accordingly, the Assistant SSS did not have adequate knowledge of the scope of the calibration and thus, the status of the liquid poison system maintenance which was scheduled to span three days. The portion of work pertaining to the tank volume instrument was not well communicated to the operations staff, who did not make an ESL entry because they understood the work to be completed within a single shift (no ESL entry allowed by procedure). The inspector notes that ESL entries provide tracking information to subsequent shift crews concerning the operability of equipment.

Deviation/Event Report (DER) 1-1999-3993 was initiated to place this "near miss" of a Technical Specification surveillance requirement into the corrective action program. The inspectors determined that the operations manager conducted training with each of the senior licensed operators on the shift crews on the importance of maintaining an awareness of the status of plant equipment. Case studies were presented to the operators and detailed discussions of the impact of not maintaining configuration control were included in the training sessions. Use of an Equipment Status Sheet was implemented to track short-term (less than one shift) inoperability of plant equipment.

c. Conclusions

On November 30, 1999, operations and maintenance personnel did not properly control the Unit 1 liquid poison system tank volume instrumentation. Prompt compensatory actions taken by the operations crew prevented a violation of Technical Specifications. Poor communications and coordination between the responsible maintenance and operations department personnel contributed to this failure to properly maintain equipment configuration control.

O8 Miscellaneous Operations Issues (92700)

O8.1 (Closed) LER 050000220/1998014: Control Room Staffing in Violation of Technical Specification due to an Unqualified Senior Reactor Operator (SRO) Assuming SRO Shift Duties. NMPC reported the noncompliance with Technical Specifications for control room staffing due to an unqualified SRO assuming shift duties. The reason for the violation, as documented in the LER, was NMPC's failure to emphasize to operators the importance and expectation to maintain and verify personal qualification status. In a letter dated April 13, 1999, the NRC issued a Notice of Violation (NOV) concerning the improper shift staffing and by letter dated May 10, 1999, NMPC responded to the NOV. In a letter dated June 29, 1999, the NRC concluded that the information regarding the

reason for the violation, and the corrective actions taken and planned to correct the violation and prevent recurrence was adequately addressed in LER 98-14 and the May 10, 1999, letter. The inspectors completed an on-site review of the LER and verified that it was completed in accordance with the requirements of 10 CFR 50.73. Specifically, the description and analysis of the event, as contained in the LER, were consistent with the inspectors' understanding of the event. The root cause and corrective and preventive actions, as described in the LER, were reasonable. This LER is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments (61726, 62707)

Using NRC Inspection Procedures 61726 and 62707, the resident inspectors periodically observed various maintenance and surveillance activities. As part of the observations, the inspectors evaluated the activities with respect to the requirements of the Maintenance Rule, as detailed in 10 CFR 50.65. In general, maintenance and surveillance testing activities were conducted professionally, with the work orders (WOs) and necessary procedures in use at the work site, and with the appropriate focus on safety. Specific activities and noteworthy observations are detailed in the inspection report in sections O2.1, O2.2, S1.1, and F2.

M8 Miscellaneous Maintenance Issues (92700)

M8.1 (Closed) LER 05000410/1999015: Inadvertent Start of Division l Diesel Generator Due to Personnel Error. The personnel performance issues associated with this LER were discussed in NRC Inspection Report 1999007. The inspector completed an on-site review of the LER and verified that corrective actions were completed and equipment issues that were identified were adequately addressed. The description and analysis of the event, as contained in the LER, were consistent with the inspectors' understanding of the event. The root cause and corrective and preventive actions, as described in the LER, were reasonable. This LER is closed.

III. Engineering

E8 Miscellaneous Engineering Issues (92903)

E8.1 (Closed) LER 05000410/1999007: Violation of Technical Specifications Regarding American Society of Mechanical Engineers (ASME) Code Section XI Class 2 Weld Inspection Requirements Due to Improper Use of a Code Exemption

a. Inspection Scope (37551, 92700)

On May 25, 1999, NMPC determined that sections of piping and piping supports in the high pressure core spray (HPCS) system, from the condensate storage tank to the HPCS pump, were improperly exempted from the first and second ten-year interval Inservice Inspection (ISI) Program plans. The inspectors reviewed the technical issues associated with this LER and conducted an on-site follow-up of the LER. The review included verification of completed short-term corrective actions and the determination of the status of long-term corrective actions.

b. Observations, Findings, and Conclusions

As a result of improperly applying exemptions, NMPC did not comply with Technical Specification Surveillance Requirement 4.0.5.a during the first ten-year interval. NMPC identified this discrepancy while performing corrective actions for LER 05000410/1998021 (see NRC Inspection Report 1998014). Corrective actions had included: performance of the required examinations; completion of a detailed, independent, second ten-year interval ISI Program review; ISI Program procedure changes; and fully staffing the ASME Code, Section XI programs with qualified individuals.

The inspectors verified that the LER was completed in accordance with the requirements of 10 CFR 50.73. Specifically, the description and analysis of the event, as contained in the LER, were consistent with the inspectors' understanding of the event. The root cause and corrective and preventive actions described in the LER were reasonable and appropriate. This licensee identified and corrected violation of Technical Specification surveillance requirements was of minor significance and not subject to formal enforcement action. This LER is closed.

E8.2 (Closed) VIO 05000220/1998002-08: Failure to test the functionality of the control room emergency ventilation system (CREVS) pressure switch DPIS-210-12. The pressure switch provides an alarm in the control room upon a lowering control room to turbine building differential pressure and had not been entered into the routine calibration program. NMPC initiated DER 1-1998-0169 to enter the deficiency into the corrective action system. The inspectors confirmed the completion of the corrective actions associated with this violation, as described in NMPC's June 26, 1998, response to the NOV. This violation is closed.

E8.3 (Closed) VIO 05000220/1998002-09: Failure to properly maintain and test the CREVS. Specifically, the licensee: (1) failed to ensure that the inlet damper was set at 100%

open during normal system operation and surveillance testing; (2) did not understand the significance of the damper adjustment during and subsequent to conducting the surveillance test; and, (3) failed to periodically verify total system flowrate and recirculation flowrate, as stated in the Final Safety Analysis Report (FSAR). NMPC initiated DER 1-1998-0335 to enter the deficiency into the corrective action system. The inspectors confirmed the completion of the corrective actions associated with this violation, as described in NMPC's June 26, 1998, response to the NOV. This violation is closed.

E8.4 (Closed) VIO 05000220/1998002-10: Failure to adequately maintain CREVS design. Specifically, the CREVS charcoal filter housing 575-watt heaters were not energized. NMPC initiated DER 1-1998-0508 to enter the deficiency into the corrective action system. The inspectors confirmed the completion of the corrective actions associated with this violation, as described in NMPC's June 26, 1998, response to the NOV. This violation is closed.

E8.5 (Closed) LER 05000410/1998018: Failure of Main Steam Isolation Valve to Close Due to Faulty Solenoid Valve

a. Inspection Scope (92903)

The inspectors reviewed the NMPC evaluation of the failure of a Unit 2 solenoid valve associated with the operation of a main steam isolation valve. The failure was identified on June 8, 1998 and was reported in LER 05000410/1998018.

b. Observations and Findings

On June 8, 1998, NMPC informed the NRC that one of the Unit 2 inboard main steam isolation valves (MSIVs) had failed to close during testing. The licensee determined that the fast close solenoid-operated-valve (SOV) had failed to change position due to age-related degradation of the seal material inside the SOV.

The inspectors reviewed applicable documents, including the design change package, and determined that NMPC engineering had conducted a thorough investigation of the MSIV failure. NMPC has also replaced the failed SOV with an equivalent SOV that used viton seals rather than the ethylene propylene diene monomer (EPDM) seals used in the failed SOV.

As stated in DER 2-1998-1088, several industry experience reports documented, as early as 1987, aging concerns with EPDM-type SOVs and improved reliability with viton-type SOVs. In the past, NMPC had taken several actions to address the various industry reports including replacement of the EPDM-type with viton-type SOVs. However, as addressed in the LER, NMPC concluded that the corrective actions were inadequate in the following areas:

1. Controls were not previously put in place to monitor the temperature in the local area of the SOVs to validate the assumptions of the qualification calculations.

2. Actions to purge SOVs with EPDM seals from the stock were not effective. As a result, the last EPDM-type SOV available from the warehouse was inadvertently installed in 1996 and failed in 1998.

3. Engineering controls were not established to prevent the installation of a valve with EPDM seals in the plant.

The failure to implement these actions to promptly correct a condition adverse to quality is a violation of 10 CFR 50 Appendix B, Criteria XVI. This severity level IV violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. **(NCV-05000410/1999010-01)** This violation is in the licensee's corrective program as DER 2-1998-1088.

To assess the environmental qualification of the SOVs, the inspectors reviewed the qualification package and, in particular, the calculations performed by the licensee to establish the qualified life of the SOVs installed in Unit 2. The inspectors determined that, in accordance with industry practices, NMPC had used the Arrhenius time-temperature regression analysis. Based on the Arrhenius theory, aging of a nonmetallic material is directly proportional to the temperature to which the material is exposed. Also, the material aging curve follows an exponential equation that includes the activation energy for a specific property of that material. For the same temperature, large activation energy values yield slower aging curves and, hence, longer qualified lives. When critical components with different activation energies are exposed to different temperatures, Arrhenius equation calculations should be performed for each component to ensure that the equipment qualified life is properly characterized.

In reviewing NMPC's Calculation No. EQ2AGEPCMSS01, "Asco Solenoid Aging (Qualified Life)," Revision 0 and subsequent revisions, the inspectors determined that the proper methodology had been used. However, the inspectors also identified the following weaknesses in the calculation:

1. In the August 1998, version of the calculation, Disposition B to Revision 1, the licensee based the qualified life of the SOV assembly on that of the coil material (silicone varnish). The calculation did not include an evaluation of the expected qualified life of the seal material and thus did not provide a bases for concluding that the varnish was the limiting component. This issue was documented in DER 2-1999-1196 and the results of a subsequent calculation performed by the licensee supported the original conclusion that the varnish was the limiting component.

2. The operating temperature of the silicone varnish was based on an incorrect SOV style. The drawing used by the licensee, FV-228-068, pertains to a single-solenoid SOV, whereas the SOVs used on the Unit 2 MSIVs are dual-solenoid type which operate at a higher temperature. Again, the calculation did not provide sufficient information to provide a bases for using the data for a single-solenoid SOV when determining the qualified life. Subsequent SOV temperature measurements obtained during plant operations showed that the temperatures assumed in the calculation were bounded by actual operating conditions.

c. Conclusion

The failure to implement appropriate corrective actions at Unit 2 to prevent the installation of main steam isolation valve (MSIV) solenoid-operated-valves (SOVs) with ethylene propylene diene monomer (EPDM) seals was a non-cited violation of the corrective action requirements of 10 CFR 50 Appendix B. The inspectors also identified weakness in the calculations performed by NMPC to determine the qualified life of the MSIV SOVs.

E8.6 (Closed) LER 05000410/1999013: Relays in Multiple Systems Were Not Correctly Tested as Required by Technical Specifications.

a. Inspection Scope (92903)

On July 29, 1999, NMPC identified that four relays were not being tested during the quarterly functional tests required by Technical Specifications (TS). The inspectors reviewed the technical issues associated with this LER and conducted an on-site follow-up of the LER. The review included assessment of the adequacy of immediate and long-term corrective actions.

b. Observations and Findings

During Improved Technical Specification procedure reviews, the licensee identified four relays that were not being tested during the quarterly functional tests required by TS. Additional reviews of similar circuits identified eight additional relays which were not being properly tested. Although the twelve relays were not being tested during the quarterly tests, they were tested during circuit logic tests that were performed each refueling. The failure to perform the quarterly functional tests is a violation of TS surveillance test requirements. This severity level IV violation is being treated as a Non-Cited Violation in accordance with Section VII.B.1.a of the NRC Enforcement Policy, **(NCV 05000410/1999010-02)**. This issue was in the corrective action program as LER 05000410/1999013.

The relays were subsequently tested and all operated properly. The surveillance procedures have been modified to ensure proper testing in the future and the procedure writers guide has been revised to clarify the definition of a channel functional test. All remaining channel functional tests will be reviewed to verify proper testing by March 31, 2000. Additional corrective actions will be implemented, if necessary, based on the results of this review.

Due to other previously identified surveillance test procedure problems, additional long term corrective actions were specified in LER 05000410/1999006. These actions include items such as development of a training and qualification program for procedure writers. Once personnel have been trained and qualified, an additional sample of all types of surveillance procedures will be reviewed to determine the extent of condition.

c. Conclusions

The failure to include all required relays in quarterly functional tests was a non-cited violation of Technical Specification surveillance requirements. Corrective actions were appropriate and additional, more broad-based corrective actions were being implemented as a result of previous licensee findings in the surveillance testing area.

IV. Plant Support

S1 Conduct of Security and Safeguards Activities

S1.1 Obstruction Found in Pressure Switch (Unit 1)

a. Inspection Scope (71750, 62707)

On November 11, 1999, while investigating the failure of a control room alarm associated with turbine building seal water (a non-safety related system) pressure, technicians found a plastic pen cap inside the associated pressure switch. The pen cap was lodged in the switch mechanism and prevented it from operating. The inspector reviewed the DER and discussed corrective actions with maintenance and security personnel.

b. Observations and Findings

During the performance of turbine building seal water pressure alarm testing, the low pressure alarm did not function. Technicians investigated and found a plastic pen cap inside the pressure switch housing which obstructed the alarm mechanism. After removing the obstruction, the switch was calibrated and tested satisfactorily. NMPC wrote DER 1-1999-3808 to investigate this event. Initially, the licensee investigation efforts were focused on prior maintenance practices. The security department was not informed of the potential for instrumentation tampering until November 15. After conducting interviews and records searches, the security department determined that there was no clear evidence of tampering. However, information gathered by the security department indicated that the most likely introduction of the pen cap was approximately 10 years earlier, when a pen (and cap) was purposely inserted into the switch mechanism to block the switch during planned maintenance.

c. Conclusions

On November 11, 1999, during routine maintenance at Unit 1, technicians found a pen cap lodged in the internals of a turbine building seal water pressure switch. The pen cap prevented actuation of the pressure switch alarm function. The security department was not promptly made aware of the potential for tampering and did not initiate an investigation until November 15. NMPC determined that the cause was most likely due to improper past maintenance practices. The inspector concluded that the licensee's investigation was thorough. However, the security department was slow to investigate this potential tampering issue.

F2 Status of Fire Protection Facilities and Equipment

a. Inspection Scope (64704)

The inspectors reviewed several aspects of the fire protection program. Areas reviewed included the testing and inspection program for fire detection and suppression equipment, fire brigade training and effectiveness, and the adequacy of administrative controls used to support maintenance on components in the fire main system. To conduct this review, the inspectors reviewed portions of the Unit 1 and 2 Final Safety Analysis Report (FSAR), plant drawings and procedures, and self-assessment reports. Additionally, the inspectors interviewed personnel who were involved in the fire protection program, walked down several plant areas, and reviewed training records.

b. Observations and Findings

Background

Responsibilities for the NMPC fire protection program were shared between the engineering and operations departments. Engineering department personnel were responsible for reviewing changes to the fire protection program and developing guidance to meet NRC fire protection requirements. The engineering department also analyzed how proposed breaches through fire barriers and seals may affect Appendix R equipment and the plant safe shutdown analysis.

The operations department was responsible for implementing the requirements mandated by the fire protection program. These requirements include testing and inspecting fire detection and suppression equipment, staffing the onsite fire brigade and inspecting fire barriers and seals.

Virtually all of the fire protection tests and inspections conducted within the protected area were performed by a twelve-person site fire department that was staffed on a 24-hour basis. Systems located in buildings outside of the protected area were typically inspected by contractor personnel. In addition to performing tests and inspections, the fire department supplied two personnel to the five-person site fire brigade. The remaining three brigade positions were filled by personnel from other departments.

Tests and Inspections

Surveillance and test requirements for fire protection systems, barriers, and seals, were outlined in Chapters 10A and 9A of the Unit 1 and Unit 2 FSAR, respectively. The FSAR test requirements were implemented by NMPC surveillance procedures, including N1-FST-FPP-C001 and N2-FSP-FPP-R01, “Fire Penetration Inspections” which provided guidance for the inspection of fire barriers and seals.

The inspector reviewed several completed Unit 1 surveillance procedures, and verified NMPC tested fire protection equipment and barriers that protected safety-related or equipment that was credited in the safe shutdown analysis, in accordance with the test requirements contained in the plant FSAR. During the 1990's, NMPC reduced and in some instances stopped testing/inspecting fire protection barriers, detection, and suppression systems that protect Balance-of-Plant (BOP) equipment, (i.e., equipment

that was not safety-related or not credited in the plant safe shutdown analysis). Fire protection equipment that protects safety-related equipment was not affected by this change. However, the Unit 1 FSAR was not updated to reflect the revised testing schedule and the appropriate safety analysis had not been performed.

Specifically, Appendix 10 A of the Unit 1 FSAR states, in part, that all fire detection equipment and barriers located in plant areas should be periodically tested and inspected. However, NMPC did not revise the Unit 1 FSAR, as required by 10 CFR 50.71(e), or prepare the requisite 50.59 safety evaluations when changing the test/inspection schedule for the BOP fire protection equipment and barriers.

NMPC was in the process of re-evaluating the efficacy of their earlier decision to stop testing equipment in BOP areas, and had re-instituted some limited testing and inspection. When tested, the equipment has operated properly. However, NMPC did not plan to resume testing all of the systems/barriers that were previously tested, until the recommendations from a study, scheduled to be completed in May 2000, were completed. The study was intended to review the current maintenance and testing schedule and regulatory requirements for detectors and barriers at Units 1 and 2, and based upon that review, develop a revised maintenance/testing plan.

10 CFR 50.59 (b)(1) requires, in part, records for changes to the facility, as described in the safety analysis report, must include a written safety evaluation which provides the basis for the determination that the change to the facility does not involve an unreviewed safety question. Contrary to the above, NMPC changed the facility, as described in paragraph 2.4.1.10 and 2.5.1.1 of the Unit 1 FSAR, concerning the test/surveillance requirements for fire detectors and barriers in areas where BOP equipment was located, and did not have a written safety evaluation to determine if this change involved an unreviewed safety question. Further, the FSAR was not updated to reflect the revised testing schedule contrary to 10 CFR 50.71(e). This Severity Level IV Violation is being treated as a Non-Cited Violation consistent with Section VII.B.1.a of the NRC Enforcement Policy **(NCV 05000220/1999010-03)**. This violation was included in the licensee's corrective action program as DER 1-99-4132.

Fire Brigade

Procedure NTP-TQS-402, Nuclear Fire Protection/Appendix R Fire Brigade Training Programs, described the training program for the Nuclear Fire Protection Department and the Appendix R fire brigade personnel. Training for the fire brigade met the requirements of 10 CFR 50.48, "Fire Protection" and consisted of a combination of "hands on" and classroom instruction. Attendance at training was monitored by the training department, and fire brigade personnel were encouraged to provide comments/suggestions regarding the adequacy of their training. As required by Appendix R, quarterly fire drills were conducted to test the performance of the fire brigade.

During the inspection, the inspector observed the fire brigade respond twice. The first event involved a spill of a hazardous material (approximately one liter of power steering pump fluid from a delivery truck spilled in the protected area). The second event was a

fire drill which involved a simulated fire in the HPCS pump room at Unit 2. Fire brigade performance during both events was excellent. The brigade arrived promptly, with the appropriate equipment, and took appropriate action to contain and remove the spill for the first event, and extinguish the simulated fire in the HPCS room.

According to NMPC, the site fire department has worked the most overtime this year on site, with some personnel having worked almost 300 hours. The increased overtime could be attributed, in part, to downsizing the department (undergone over the last several years) from approximately 50 people to the present day twelve person force. The inspector noted that the increased overtime did not appear to affect the performance of the department, since the department's performance during the hazardous material spill event and fire drill was excellent.

Fire Protection System Alignment Controls

GAP-OPS-02, "Control of Hazardous Energy and Configuration Tagging," was the procedure that described the administrative controls for equipment Lockout/Tagout, Control Tagging, Markups and Holdouts. As such, the procedure was used to control the manipulation of valves and breakers in the fire main system for Units 1 and 2.

With one exception, GAP-OPS-02 provided appropriate guidance regarding the tagging/lockout of valves and breakers in the fire main system. The exception concerned the control of markups for valves in the Unit 2 fire main system. Specifically, step 4.3 of GAP-OPS-02 indicated all valve markups for the Unit 2 fire main system should be under the control of the Chief Shift Operator (CSO) or the designee. However, step 3.23 of GAP-OPS-02 contradicted step 4.3, in that, step 3.23 indicated the CSO does not have to control valve markups for valves that were outside of the powerblock. Because the Unit 2 fire main system contained valves both inside and outside of the powerblock, it was unclear who should issue and control markups for valves in the Unit 2 fire main system that were located outside of the powerblock. A January 23, 1998, internal memorandum clarified some of the ambiguity by indicating a non-controller-based lockout/tagout was acceptable for Unit 2 valves outside of the powerblock. However, GAP-OPS-02 was never changed to reflect the memo guidance. NMPC indicated they would revise GAP-OPS-02 to resolve the procedure ambiguity.

Oversight of Fire Protection Activities

As required by plant Technical Specifications, NMPC conducted periodic audits of the site Fire Protection Program. The last two audits conducted in October 1998 and 1999, respectively, have been critical of the overall performance of the Fire Protection Program, with each report highlighting several areas for improvement. For example, the reports highlighted a number of deficient conditions associated with the Unit 2 fire protection panels, fire main system pump performance testing, and training department instructor qualifications.

Because of the thoroughness of the internal NMPC review, the inspector did not re-examine those areas covered by the audits. Instead, the inspector verified NMPC had placed the issues identified by the audits into the corrective action program and had initiated corrective actions to address the items.

To date, most of the issues identified in the 1998 audit had been adequately resolved. For items that had not been adequately resolved, Deficiency Event Reports (DER)s were re-issued. Because the 1999 audit was recently issued, NMPC fire protection personnel had not yet formulated corrective action plans to address the issues. However, adequate corrective action plans were in place to address the repeat issues, such as concerns regarding the qualifications of fire training instructors, which had not been addressed from the 1998 audit.

c. Conclusions

With some exceptions, NMPC was implementing an adequate Fire Protection Program. Fire detection and suppression systems located in safety-related areas were tested in accordance with requirements, fire brigade personnel were adequately trained, and fire barriers were maintained and inspected. Appropriate administrative requirements were in place to control the position of valves and components in the fire main system.

The identified exceptions were associated with surveillance testing of the fire pumps and fire detection systems, the timeliness of resolution of problems with fire protection panels at Unit 2, and questions regarding the qualifications of training personnel. With one exception, these items were self-identified during annual performance audits. NMPC's failure to perform a safety evaluation and change the Unit 1 FSAR, when revising test requirements for fire detection systems and barriers, was inspector identified. A non-cited violation was issued to document this failure to perform the requisite safety evaluation and FSAR change.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of the licensee management on January 7, 2000. The licensee acknowledged the findings presented.

ATTACHMENT 1

PARTIAL LIST OF PERSONS CONTACTED

Niagara Mohawk Power Corporation

R. Abbott,	VP Nuclear Engineering
J. Conway	VP Nuclear Generation
L. Hopkins	Unit 1 Plant Manager
J. Mueller	Senior VP and Chief Nuclear Officer
M. Peckham	Unit 2 Plant Manager
C. Terry	VP Quality Assurance, Nuclear

INSPECTION PROCEDURES USED

IP 37550	Engineering
IP 37551	On-Site Engineering
IP 61726	Surveillance Observations
IP 62707	Maintenance Observations
IP 64704	Fire Protection Program
IP 71707	Plant Operations
IP 71750	Plant Support
IP 92700	Onsite Follow-up of Written Reports of Non-Routine Events at Power Reactor Facilities
IP 92903	Followup - Engineering

ITEMS OPENED, CLOSED, AND UPDATED

OPENED AND CLOSED

05000410/1999010-01	NCV	Failure to implement actions to promptly address a condition adverse to safety (MSIV solenoid valve).
05000410/1999010-02	NCV	Failure to test relays per TSs.
05000220/1999010-03	NCV	Failure to Perform a Safety Evaluation When Changing Test Requirements for Fire Detection Equipment and Barriers.

CLOSED

05000220/1998002-08	VIO	Failure to Test the Functionality of the Control Room Emergency Ventilation System (CREVS) Pressure Switch DPIS-210-12.
05000220/1998002-09	VIO	Failure to Properly Maintain and Test the CREVS.
05000220/1998002-10	VIO	Failure to Adequately Maintain CREVS Design.

05000220/1998014	LER	Control Room Staffing in Violation of Technical Specification Due to an Unqualified Senior Reactor Operator (SRO) Assuming SRO Shift Duties.
05000220/1999006	LER	Shutdown Cooling Water Seal Not Established as Required by Technical Specification 3.3.0.
05000410/1998018	LER	Failure of MSIV to close due to Faulty solenoid valve.
05000410/1999007	LER	Violation of Technical Specifications Regarding American Society of Mechanical Engineers (ASME) Code Section XI Class 2 Weld Inspection Requirements Due to Improper Use of a Code Exemption.
05000410/1999013	LER	Relays in multiple systems were not correctly tested, as required by TSs.
05000410/1999015	LER	Inadvertent Start of Division I Diesel Generator Due to Personnel Error.

LIST OF ACRONYMS USED

ASCO	Automatic Switch Company
ASME	American Society of Mechanical Engineers
ASSS	Assistant Station Shift Supervisor
BOP	Balance-of-Plant
CSO	Chief Shift Operator
CREVS	Control Room Emergency Ventilation System
DCP	Design Change Package
DER	Deviation/Event Report
EPDM	Ethylene Propylene Diene Monomer
ESF	Engineered Safeguards Feature
ESL	Equipment Status Log
FSAR	Final Safety Analysis Report
GE	General Electric
HPCS	High Pressure Core Spray
IR	Inspection Report
ISI	Inservice Inspection
LER	Licensee Event Report
LP	Low Pressure
MSIV	Main Steam Isolation Valve
NCV	Non Cited Violation
NMPC	Niagara Mohawk Power Corporation
NOV	Notice of Violation
RRP	Reactor Recirculation Pump
SDC	Shutdown Cooling
SOV	Solenoid Operated Valve
SRO	Senior Reactor Operator
SRV	Safety Relief Valves
SSS	Station Shift Supervisor
TS	Technical Specification
Unit 1	Nine Mile Point Unit 1
Unit 2	Nine Mile Point Unit 2
VIO	Violation