U.S. NUCLEAR REGULATORY COMMISSION

REGION I

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Licensee:	Niagara Mohawk Power Corporation 301 Plainfield Road Syracuse, New York 13212
Facility:	Nine Mile Point, Units 1 and 2
Location:	Scriba, New York
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7-24-92
Date

<u>Inspection Summary</u>: This inspection report documents routine and reactive inspections of plant operations, radiological controls, maintenance, surveillance, emergency planning, security, and safety assessment/quality verification activities.

<u>Results</u>: See Executive Summary.

EXECUTIVE SUMMARY

Nine Mile Point Units 1 and 2
NRC Region I Combined Inspection Report Nos. 50-220/92-15 & 50-410/92-17
May 24, 1992 - July 4, 1992

Plant Operations

NMPC conducted outage activities at Unit 1 safely over the period. This included the off-loading and re-loading of the reactor fuel in support of the emergency cooling system work. At Unit 2, operators conducted several plant start-ups and shutdowns very well, in support of turbine vibration testing, following completion of the second refueling outage.

Radiological Controls

Radiological controls and postings were good.

Maintenance and Surveillance

Maintenance and surveillance activities were conducted properly at both units. At Unit 2, the inadvertent depressurization of the reactor vessel during the reactor vessel leakage test was caused by personnel error and an unclear work procedure.

Engineering and Technical Support

NMPC performed well during the replacement and repair work related to the valve body cracking in the emergency cooling system. This included the determination to off-load the core and install plugs in the recirculation loop suction nozzles to reduce the risk from an unisolable leak during the repairs. The circumstances surrounding the inadvertent isolation of the Division III EDG at Unit 2 during the March 23, 1992 loss of off-site power were reviewed. The EDG service water control circuits had not been properly designed to ensure that the EDG could perform its design function if a loss of off-site power occurred during a surveillance test operability run. This was considered a violation, however, the significance of the violation was low. An unresolved item was identified, dealing with the design assumptions for the low cooling water pressure isolations on the Division I and II EDGs.

Safety Assessment/Quality Verification

Temporary instruction 2515/113 was completed and NMPC actions to maintain decay heat removal capabilities were found acceptable.

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*The NRC inspection manual procedure or temporary instruction that was used as inspection guidance is listed for each applicable report section.

DETAILS

1.0 SUMMARY OF FACILITY ACTIVITIES

1.1 Niagara Mohawk Power Corporation Activities

The Niagara Mohawk Power Corporation (NMPC) safely conducted outage activities at Nine Mile Point Unit 1 (Unit 1) over the period. These activities included disassembly of the reactor vessel and off-loading and reloading of the reactor fuel in support of work on the sections of the emergency cooling system (EC) that were unisolable from the reactor vessel.

NMPC conducted refueling outage activities at Nine Mile Point Unit 2 (Unit 2) safely over the period. Major refueling outage work included the reactor pressure vessel leakage test, Division I emergency diesel generator (EDG) corrective maintenance, and turbine reassembly. The second refueling outage was completed on July 4 when the generator was synchronized to the grid.

1.2 NRC Activities

Resident inspectors conducted inspection activities during normal, backshift and weekend hours over this period. There were 24 hours of backshift (evening shift) and 17 hours of deep backshift (weekend, holiday, and midnight shift) inspection during this period.

2.0 PLANT OPERATIONS (71707,93702)

2.1 Plant Operations Review - Unit 1

2.1.1 Refueling Activities

The inspector observed portions of fuel transfer from the control room and the refueling bridge and verified: plant conditions, fuel handling and accountability, core reactivity monitoring, refueling equipment operability, housekeeping and loose object control, communication practices, and radiological controls. The inspector assessed that qualified and knowledgeable individuals conducted the refueling activities well, as required by the technical specifications and the approved procedure.

2.1.2 Radwaste Operator Inattention to Detail

During a routine operation from the radwaste control room an operator mispositioned a valve that caused the overflow of the clarifier tank. The clarifier tank in the radwaste system functions to allow impurities in the radwaste to settle out. When starting up the system the operator opened the flush water supply valve, inadvertently allowing clean water from the condensate transfer system to flow into and overflow the clarifier tank. Approximately 3,500 gallons of water overflowed from the tank onto the 236 foot and 248 foot elevations through the radwaste building drain system. Radwaste operators detected this condition from the radwaste control room and secured the clarifier operation.

No equipment damage, personnel injury, or spread of contamination resulted from the spill. The water was pumped to a holding tank and the area cleaned up. The radwaste supervisor initiated a deviation/event report (DER) and conducted an accountability meeting to determine the possible causes. The radwaste supervisor found that the root cause was failure to self-check and verify system configuration when starting up the clarifier system. The evolution was considered skills of the trade and the operating procedure was not used.

The inspector interviewed the radwaste operators involved and performed a walkdown of the clarifier system operation that was in progress when the spill occurred. The inspector agreed with the NMPC assessment that this event resulted from operator inattention-to-detail. The inspector also assessed that this event had no safety consequence. The corrective actions taken in response to this event were prompt and thorough.

2.1.3 (Closed) Unresolved Item 220/90-26-01: Drywell Temperature Indication

NMPC's planned modification to upgrade the drywell temperature monitoring instrumentation to meet Regulatory Guide 1.97 requirements will also address an issue on the method of calculating average drywell temperature. An average drywell temperature of 150°F is an entry condition to the emergency operating procedure for primary containment control. There are three drywell temperature instruments in the control room. No average temperature reading is available, requiring the operators to estimate an average of the three readings. The three instruments do not meet the requirements of Regulatory Guide 1.97 for channel redundancy and separation or environmental qualification of emergency operating procedure key parameters. The safety parameter display system (SPDS) provides an average reading for drywell temperature that is consistently higher than the bulk average temperature since the instruments are located high in the drywell.

Modification W1-90-012, Independent Drywell Ambient Temperature, will upgrade the existing drywell temperature indications to a redundant, safety-related, electrically isolated, physically separated, and environmentally and seismically qualified design. The change will provide operators with reliable, redundant indication of weighted average drywell ambient temperature on the control panels. This modification is scheduled for implementation during the 1993 refueling outage. The inspector assessed that this modification will provide suitable average drywell temperature indication on the control room panels. This item is closed.

2.2 Plant Operations Review - Unit 2

The operations department performed very well during refueling outage, plant startup, and shutdown activities. Operators conducted control room activities well, including panel manipulations and operator response to alarms. Operators properly entered the emergency operating procedures on the loss of a radiological effluent monitor following the inadvertent trip of the cooling tower blowdown sample pump. The operators properly conducted the reactor pressure vessel leakage test, including response to and assessment of the cause for an inadvertent depressurization (see section 5.2 below).

2.2.1 Unit Startup Following the Second Refueling Outage

During plant startup, the control room operator shift turnovers and shift crew briefings were observed to be properly conducted in a professional atmosphere. It was positively noted that plant modifications and the procedures affected by the modifications were reviewed with the oncoming shift to increase crew awareness of these changes. In addition, a reactor analyst briefed the shift on the reactivity characteristics of the new core in comparison to the old core.

During startup activities the inspector verified the operability of the following safety-related systems through control room panel walkdowns; high pressure core spray, standby liquid control, low pressure coolant injection, reactor core isolation cooling, low pressure core spray, service water, containment isolation, neutron monitoring, emergency on-site and off-site power supplies, reactor protection, and the normal reactor building ventilation and standby gas treatment. During these walkdowns operators were aware of lit annunciators and system configurations.

The operations department performed five reactor startups, four reactor shutdowns, and numerous rolls of the turbine generator to allow balancing because of high vibrations. The operating crews conducted these evolutions very well. The crews responded properly to challenging situations including the transition from the electro-hydraulic control system to the steam condensing mode of the residual heat removal system to control vessel pressure during a shutdown with low decay heat. One minor problem detracted from this otherwise very good performance. During a turbine generator startup a control switch for a lube oil pump was left misaligned causing a turbine trip. A turbine trip at this low power level was not significant, however, NMPC took appropriate actions to address the minor problem. Operations department management and supervision demonstrated a continued proactive safety perspective through excellent oversight, control, and support.

2.2.2 EDG Fuel Oil Receipts

The inspector identified a potential vulnerability for ensuring the quality of the fuel oil in the emergency diesel generator storage tanks. While the procedures for sampling the oil were in accordance with the technical specifications, they permitted new oil to be added to top-off a tank before the in-depth analysis of the new oil was completed. The procedures and technical specification allowed fuel oil to be added to storage tanks following a general on-site analysis of the fuel quality. Technical specifications also require that a more in-depth laboratory analysis be completed within 31 days after adding new fuel oil to the storage tanks. By topping-off all of the EDG fuel tanks from a single tanker, oil that might not meet the requirements of the full analysis could contaminate all storage tanks. This could lead to EDGs running on oil that did not meet the specification and could lead to a common mode failure of all EDG units.

NMPC agreed that this issue was a concern and prior to the conclusion of this inspection, confirmed through analysis that the fuel oil in each EDG storage tank met the required standards. Further, NMPC implemented temporary procedural changes to the diesel fuel transfer procedure, which included provisions for holding the fuel oil in the tanker until full analysis results were received. The inspector found this acceptable to address this concern.

3.0 RADIOLOGICAL AND CHEMISTRY CONTROLS (71707)

3.1 Routine Observations - Unit 1 and Unit 2

The inspector noted no adverse conditions during routine walkdowns of radiological conditions and postings throughout both plants.

4.0 MAINTENANCE (62703)

4.1 Observation of Maintenance Activities - Unit 1

4.1.1 Electrical Corrective Maintenance

The inspector observed that electricians used good skills of the trade while conducting routine corrective maintenance on an EC relay. As a result of high resistance readings detected during routine surveillance testing, electricians cleaned a set of contacts for relay 11K62 in the channel 11 EC initiation logic per work request 203296. The markup, work-in-progress sheet, and work plan were properly filled out. Three electrical technicians adequately performed the cleaning using a burnishing tool and an electrical solvent. Subsequently, the resistance across the contacts was measured and found acceptable. The inspector observed a very minor oversight by the electricians during verification of terminal board connection tightness, for which appropriate corrective actions were taken.

4.2 Observation of Maintenance Activities - Unit 2

4.2.1 Electrical Troubleshooting on Safety-Related Uninterruptible Power Supply

Electricians satisfactorily performed troubleshooting on the maintenance power supply for safety-related uninterruptible power supply (UPS) 2VBA*UPS-2B. A blown neutral fuse for the three silicon controlled rectifiers (SCRs) in the maintenance supply allowed an unregulated maintenance supply output to be compared to the normal UPS output. This caused intermittent loss of synchronization between the normal and maintenance AC output voltages. Under loss of synchronization conditions, the UPS could not automatically transfer to the maintenance power supply following failure of the normal supply inverter. The electricians found that two defective SCRs allowed excessive current to flow to the maintenance supply transformers resulting in the blown fuse. The inspector assessed that the observed portions of the troubleshooting was satisfactorily conducted. The work-in-progress sheet, troubleshooting procedure, lifted lead and jumper log, and blue markup were properly controlled.

5.0 SURVEILLANCE (61726, 61707)

5.1 Observation of Surveillance Activities

The inspector observed and reviewed portions of the following surveillance tests to assess performance in accordance with approved procedures and limiting conditions of operation, removal and restoration of equipment, and deficiency review and resolution.

Unit 1

-- Operators performed the core spray keep-fill surveillance test properly. This surveillance test proved operation of the core spray keep-fill system from the condensate system. The inspector observed the performance of the surveillance test and validated the methodology used met the requirements of Technical Specification Surveillance 4.1.4.g. The operators maintained strict control of valve position changes and used repeat-backs during oral communications. In summary, the surveillance test met the technical specification surveillance requirements and operators effectively conducted the test.

-- Operators conducted the emergency cooling system surveillance test properly. This surveillance performed an operability check of the makeup tank level control valves. The level control valve functioned properly and the results were properly documented and reviewed.

Unit 2

-- The inspector observed the excess flow check valve operability test on a shutdown range vessel level instrument line during the reactor vessel leakage test. The surveillance brief properly assessed plant conditions, plant impact, and alternative vessel level indications. The operations personnel demonstrated good communications, procedural adherence and control, system knowledge, and proper radiological controls to minimize the spread of contamination. The surveillance test was properly performed.

-- The inspector observed portions of the control rod drive scram insertion time testing and control rod coupling integrity verification surveillances, both in the control room and at the hydraulic control units. Operations personnel properly conducted the test and demonstrated good procedural adherence and system knowledge.

5.2 Inadvertent Automatic Depressurization System (ADS) Actuation

An error in the reinstallation of two automatic depressurization/safety relief (ADS/SRV) valves caused an inadvertent reactor coolant depressurization. This event occurred while performing a reactor coolant vessel leakage test in parallel with an ADS system logic functional test. The performance of these tests in parallel should have been acceptable since the ADS logic test required the depressurization of the pneumatic supplies to the ADS function, thus preventing valve operation in the ADS mode. However, when the ADS initiation conditions were simulated, using a test switch, the reactor coolant system depressurized. Operators secured the test and determined that a piping error on two of the ADS/SRV valves allowed the pneumatic pressure for the SRV function to actuate the ADS function. The piping error occurred during the recent refueling outage when ten SRVs were removed for testing and replacement.

No adverse safety consequences resulted from this event. This ADS surveillance would only be performed while shutdown. NMPC had a contractor perform an analysis on the structural integrity of the SRVs and associated piping since the valves passed water vice steam. The contractor determined that no SRV structural or internal damage affecting operability occurred. The inspector reviewed the analysis and determined that it appeared adequate.

NMPC submitted Licensee Event Report (LER) 92-13, dated June 26, 1992, to document this event. The inspector found that the LER was complete. The LER adequately addressed the effect on ADS system operability if this condition had not been identified. The root cause was personnel error with a contributing factor of inadequate procedural guidance for connection of the air supply lines. The initial corrective actions were to inspect the eighteen SRVs (including the seven ADS valves), no other deficiencies were identified. The maintenance supervisors were counseled by plant management on the need for workers to use increased attention-to-detail when conducting skills of the trade work. Two DERs were issued; one to ensure that the SRV piping connections will be adequately marked during disassembly in the future. The second DER was issued to address a negative trend in events caused by improper restoration of equipment to service. The inspector found these actions appropriate.

6.0 EMERGENCY COOLING SYSTEM REPAIRS - UNIT 1 (62703, 37700)

As discussed in the previous Combined Inspection Report 220/92-12 and 410/92-14, section 6.0, NMPC identified cracking in the EC condensate return line valves. During this period NMPC developed and implemented a plan to replace the manual blocking valves and to perform code repairs on the check valve body cracks. To reduce the consequences of and the potential for an unisolable leak during the work, NMPC decided to off-load the core, install the spent fuel pool gates, and to install plugs in the applicable reactor vessel recirculation suction nozzles. During this period, the inspector reviewed the management controls over the work, the conceptual engineering package and safety evaluation, and the travelers used to sequence and document the actual work and determined that NMPC conducted these activities well.

6.1 Management Control of the Repair/Replacement Program

NMPC management used good safety perspective during development of the plan for replacement and repair of these valves. A project manager provided overall coordination and support to the effort. NMPC controlled the project well through the "NMP1 1992 Emergency Condenser Outage - EC System Fix" chart that showed the chronological status of each program task. NMPC also performed well in overseeing the contractor performing this work.

6.2 Conceptual Engineering Package and Safety Evaluation Review

The inspector determined that the conceptual engineering package provided a comprehensive engineering-based approach to this repair and replacement modification. This package included a summary of the issues relating to the replacement and repair of the subject valves and the mechanical and structural design inputs. The package properly addressed the following; safety classification, code reconciliation, system and environmental conditions, design criteria for replacement components, modifications to replacement gate valves, repair of check valve 39-04, tests and inspections prior to installation, installation welding, tests and inspections following installation, and piping analysis of the modified EC system. The package provided the engineering guidelines by which the modification was to be implemented, describing the concise actions to be taken, and the basis on which these actions were necessary and permitted.

The inspector reviewed safety evaluation 92-036 and determined that it was comprehensive and consistent with 10 CFR 50.59 requirements. The evaluation adequately addressed the background and repair/replacement scope, tests and examinations, and analyses performed; with attachments addressing compliance to NRC standards and ALARA aspects of the work.

6.3 Procurement and Qualification of Gate Valves 39-01 and 30-02

NMPC, based on its engineering evaluation, chose to replace the cracked gate valves with new gate valves. The replacement valves were 10-inch, 1550 psig rated, forged high carbon steel (SA182F316) Westinghouse motor operated valves, with the motor operators replaced with manual operators. The original valves were a standard gate valve, rated at 900 psig, made of cast CF8m steel with a lower carbon content than SA182F316.

Prior to purchase, the gate valves were tested and inspected by Westinghouse following the ASME Code Section III, 1974 through 1975 Addenda. The inspector confirmed this by review of the material certifications in the Customer Data Package. The drain connections (which were the site of cracking) were not provided in the replacement valves. Since the valve body was of a forged stainless steel with high carbon content, it was susceptible to sensitization and intergranular stress corrosion cracking (IGSCC). One axial inch of 1/4 inch clad was provided to cover the heat affected zone and weld joint geometry to preclude sensitization and IGSCC. The inspector verified the acceptability of the visual, radiographic and dye penetrant inspections conducted on the valve end connections before and after deposition of the corrosion resistant clad. The valve body surfaces were "flapped" smooth to lower possibility of surface contamination according to ALARA philosophy.

6.4 Gate Valves 39-01 and 39-02 Removal and Replacement Travelers

The inspectors reviewed the travelers for removal and replacement of the valves and with those related to preparation of the buttered weld surfaces on the weld joint surface preparation in detail. The upstream and downstream ends of both valves were buttered because the valve body was composed of a higher carbon content than the attached piping. Buttering increases the weld quality by providing for protection against sensitization and intergranular stress corrosion cracking. The travelers reviewed include the following:

(a) CWA-12011-1 "Remove and Replace Valve 39-01, Install Bottom Drain Assemblies"

(b) CWA-12011-2 "Remove and Replace Valve 39-02, Install Bottom Drain Assemblies"

(c) CWA-12011-5 "Prep Valve 39-01" (buttering)

(d) CWA-12011-6 "Prep Valve 39-02" (buttering)

The inspectors noted that the travelers were complete and provided a detailed listing of the operation sequence of the project with appropriate signatures attesting to completion. The welding qualifications provided complete information to allow traceability of the essential weld variables.

Inspection of the weld material use reports and the automatic welding program data report showed traceability of the identity and qualification of the welder. The weld procedure specifications were found acceptable through the procedure qualification record (PQR). The inspector audited portions of the PQRs and found them to be acceptable. Travelers CWA-12011-2,5,6 were audited in detail, while traveler CWA-12011-1 was audited for completeness.

6.5 Conclusions

Overall, NMPC performed this task well. Management demonstrated good safety perspective and control of the project. The engineering approach and safety evaluations were comprehensive and well documented. The new gate valves were procured, qualified, and inspected consistent with the ASME Code and system design requirements. The inspector noted that the travelers were complete and provided a detailed listing of the operation sequence of the project, together with appropriate signatures attesting to completion. The welding qualifications were in order with complete information provided to allow traceability of the essential weld variables.

7.0 ENGINEERING AND TECHNICAL SUPPORT (92701)

7.1. (Closed) Unresolved Item 410/92-11-02: Division III Emergency Diesel Generator Cooling Water Design Deficiency - Unit 2

NMPC adequately corrected a design deficiency in the service water (SW) supply to the Division III emergency diesel generator. The Division III EDG does not have its own cooling water pumps, but instead relies on SW pumps powered from the other two EDGs. NMPC identified a design deficiency in the logic for the Division III EDG low SW pressure isolation during their review of the March 23, 1992, loss of off-site power (LOOP). The design caused the diesel cooling water flow to isolate if the diesel had been running for more than one minute before the low pressure condition occurred. This was significant since a low pressure condition would occur following a LOOP, before the other EDGs repowered the SW pumps. The isolation would cause the Division III EDG to trip on high temperature or be damaged due to high temperature depending on why the diesel was running.

The design change revised the way in which a loss of SW pressure, from either Division I or II, caused the isolation of its respective supply to the Division III EDG. The modification removed the previous time delay function, which had allowed the Division III EDG to start and operate for one minute before a low SW pressure would cause an isolation. A new time delay relay was installed in the control logic for each supply valve, such that once SW pressure was low, following a nominal 83-second time delay, the isolation would occur without consideration for the operation of the EDG. If the SW supply pressure recovered during the time delay period, the SW supply valve logic would reset and the valve would remain open. NMPC engineering developed the 83-second time delay vice the previous one minute time delay, based on more conservative assumptions, including assuming that the last of the three divisional service water pumps would start and re-pressurize the header, while the previous setting assumed that the first of the three SW pumps started.

During this review NMPC also identified a design weakness in the logic for the similar low pressure isolation for the Division I and II EDGs. This isolation was initially set to occur on a low pressure after one minute of EDG operation. If the low pressure had been caused by a rupture in the Division III piping and if the first SW pump did not start to restore pressure, the EDG cooling water supply valve could isolate. NMPC developed a change to the time delay closure of these valves to prevent isolation on low SW pressure following an EDG start for 160 seconds. This would allow the Division III EDG cooling to isolate first, allowing the pressure to recover if a break in the Division III piping caused the low pressure.

The inspector found modification package 92-006, which directed these changes, well developed, with completed portions properly documented. This modification was completed prior to the restart of the unit. The associated installation plans, the engineering design change, the generic installation and test procedures, and the work in process forms were all properly conducted. The inspector also found that mechanical and electrical engineering calculations properly determined the new setpoints. These calculations were based on a very conservative assumption that the SW pump, which started to provide cooling flow to the respective EDG and the Division III EDG, would be the last possible pump in the start sequence. The inspector verified that the control room drawings and the associated alarm response procedures were properly updated to reflect the new conditions.

The inspector found that the Division III EDG would not have functioned as designed during all potential scenarios. The updated safety analysis report (USAR) section 8.3, Standby Diesel Generator - Division III stated that testing does not impair the ability of starting the HPCS pump within the required time (i.e., the system should have been designed such that if the EDG was running for surveillance testing and the design basis event occurred it would supply the HPCS pump). The need for this function was derived from Regulatory Guide 1.108 paragraph c.1.b.(3), which was endorsed by NMPC in USAR Table 1.8-1.

The design deficiency, in place since initial construction, made the Division III EDG unable to perform its function of supplying power to the HPCS pump if a LOOP occurred alone or in conjunction with a design basis LOCA, while the EDG was running for operability testing. This was a violation since Technical Specification 3.8.1.b required the EDG to be operable in modes 1, 2 or 3 **(410/92-17-01)**. This violation was not significant because of the short duration and the method of testing. The technical specification required periodic operability test takes about two hours to complete. Further, to conduct the test off-site power was necessary to allow the EDG to be loaded. Thus, the LCO for an inoperable Division III EDG, which allowed HPCS to be considered operable for 72 hours as long as off-site power was operable, was not violated during surveillance testing. NMPC adequately discussed the design deficiency and the required changes to the plant in LER 92-06, supplement 01, dated June 15, 1992.

The inspector did note one issue during the review of this modification that needed to be addressed to determine its safety significance. The issue was that once a Division I or II EDG was running for longer than the 160 second time delay, it would immediately isolate on a low SW pressure. This could be a concern if a pipe break in the Division III cooling water system occurred causing the low pressure in the Division III and/or the Division I or II EDGs. In this case the Division III EDG cooling water would not isolate for 83 seconds while the Division I and II cooling water would isolate immediately. The Division III SW piping was seismic Category I and designated as safety-related. This issue was unresolved **(410/92-17-02)** pending review of the design basis assumptions for the low SW pressure isolation. This was necessary to determine if the Division III SW pipe break was a credible failure and if so, what the effect would be on the Division I and II EDGs.

8.0 SAFETY ASSESSMENT AND QUALITY VERIFICATION (71707, 92700)

8.1 Review of Licensee Special Reports - Unit 2

The inspector reviewed the following Special Reports and found them satisfactory:

-- Special Report, dated March 11, 1992. Division I residual heat removal system heat exchanger service water radiation monitor inoperable for greater than 72 hours to replace the sample lines with stainless steel piping.

-- Special Report, dated June 23, 1992. Reactor building ventilation gaseous effluent monitoring system inoperable for greater than 72 hours to correct a faulted process flow transmitter.

8.2 Temporary Instruction 2515/113 - Decay Heat Removal

This temporary instruction (TI) provided inspection guidance on ensuring the maintenance of adequate plant configurations to support removal of decay heat from the reactor. The inspector reviewed plant operating procedures, USARs, and interviewed various plant personnel. Except for the plant outage information, the information provided addresses both units.

Unit 1 remained shutdown with fuel off loaded to facilitate repairs to unisolable sections of EC system valves and piping. Mechanical plugs were installed in the applicable reactor recirculation suction nozzles to establish isolation. To mitigate the consequence of leakage past the plugs, the fuel pool gates were installed to ensure that the spent fuel pool could not inadvertently be drained. In this plant configuration, the only decay heat removal consideration was the spent fuel pool cooling system, which remained operable. This repair plan indicated that NMPC was sensitive to shutdown risk. A detailed safety evaluation determined the repair method met all code and regulatory requirements and did not constitute an unreviewed safety question.

Unit 2 finished the second refueling outage this assessment period. A review of the NMPC program to minimize shutdown risk during the outage was conducted and the results documented in IR 50-410/92-07. The outage schedule was found to be well prepared and sensitive to shutdown risk.

At both units NMPC implemented a checklist that verified the capability to remove reactor vessel and spent fuel pool decay heat during shutdown activities. This shutdown risk assessment provided a vehicle by which the operators could quantitatively and qualitatively assess the status of systems, both primary and support, needed to assure that the station would remain in a safe shutdown condition. The overall goal of the program was to maintain one system greater than technical specification requirements.

At both units NMPC relied on the divisional concept to ensure that electrical power (both AC and DC) to necessary systems was maintained. During divisional outages NMPC maintained the off-site power source, the EDG and the DC battery chargers, backed up by battery, operable to support the required shutdown loads. Battery load and service testing was performed every other refueling cycle, during a respective divisional outage. Non-standard electrical line-ups have been analyzed to ensure they can carry sufficient load, and can properly activate protective circuitry. NMPC analyzed the effects on the system of the use of backup power sources that included the EDGs and alternate off-site circuits. Approved procedures for using such line-ups were in place.

Operators were trained in the appropriate procedures to manually control electric power systems if needed when automatic control systems were disabled for maintenance. Typically, components were declared inoperable if the automatic control systems were unavailable. In such cases, the redundant system and power supplies would remain available. The periods of increased vulnerabilities did not coincide with the minimal availability of electric plant power sources. This was accomplished through effective outage scheduling. The EDGs were declared inoperable when its field flashing source was removed from service for maintenance or testing.

In summary, effective scheduling of outage work and use of shutdown risk assessment checklists ensured the availability of reliable decay heat removal. There was sufficient redundancy and diversity of decay heat removal systems and their power supplies to minimize shutdown risk. No concerns were identified by the inspector.

9.0 MANAGEMENT MEETINGS

At periodic intervals and at the conclusion of the inspection, meetings were held with senior station management to discuss the scope and findings of this inspection. Based on the NRC Region I review of this report and discussions held with Niagara Mohawk representatives, it was determined that this report does not contain safeguards or proprietary information.