

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Report Nos.: 93-11; 93-11  
Docket Nos.: 50-220; 50-410  
License Nos.: DPR-63; NPF-69  
Licensee: Niagara Mohawk Power Corporation  
301 Plattfield Road  
Syracuse, New York 13212  
Facility: Nine Mile Point, Units 1 and 2  
Location: Scriba, New York  
Dates: June 20 through August 7, 1993  
Inspectors: R. A. Plasse, Acting Senior Resident Inspector  
W. F. Mattingly, Resident Inspector  
W. L. Schmidt, Senior Resident Inspector  
Approved by: Walter L. Seese For 8/19/93  
Larry E. Nicholson, Chief Date  
Reactor Projects Section No. 1A  
Division of Reactor Projects

**Inspection Summary:** This inspection report documents routine and reactive inspections of plant operations, maintenance, engineering, and plant support activities.

**Results:** See Executive Summary.

## EXECUTIVE SUMMARY

### Nine Mile Point Units 1 and 2

NRC Region I Inspection Report Nos. 50-220/93-11 & 50-410/93-11

06/20/93 - 08/07/93

#### Plant Operations

Control room operators conducted routine activities well at both units. The prompt identification and response by the Unit 2 operations, maintenance, and engineering departments minimized the extent of charcoal bed combustion in the offgas system. However, the operating staff was challenged by this event because NMPC had not included vendor recommendations for preventing, detecting, and extinguishing such combustion in their operating procedures. The adequacy of previous efforts to prepare for this event were unresolved pending review of NMPC's root cause investigation.

#### Maintenance

Unit 1 maintenance personnel performed well during several activities, including a preplanned maintenance outage of the 102 emergency diesel generator (EDG).

#### Engineering

Unit 2 engineering provided well written temporary modifications and 10 CFR 50.59 safety evaluations to support the offgas combustion recovery efforts. Through a well prepared engineering study, NMPC was addressing a service water system concern to determine the most limiting accident scenario.

#### Plant Support

Periodic inspector observations of station workers and radiation protection personnel implementation of radiological controls and protection program requirements did not identify any deficiencies. Implementation of radiological controls appeared effective during periodic inspector observations of station personnel.

## TABLE OF CONTENTS

	<u>PAGE</u>
EXECUTIVE SUMMARY .....	ii
1.0 SUMMARY OF FACILITY ACTIVITIES .....	1
1.1 Niagara Mohawk Power Corporation Activities .....	1
1.2 NRC Activities .....	1
1.3 NMPC Reorganization .....	1
2.0 PLANT OPERATIONS (71707, 93702, 71710, 90712) .....	1
2.1 Operational Safety Verification .....	1
2.2 Offgas Charcoal Bed Overheating .....	2
2.3 Review of Licensee Event Reports and Special Reports .....	3
3.0 MAINTENANCE (62703, 61726, 90712) .....	3
3.1 Maintenance Observations – Units 1 and 2 .....	3
3.1.1 EDG 102 Maintenance .....	4
3.1.2 Emergency Diesel Generator (EDG) Modification Review	
3.1.3 (Closed) Unresolved Item (93-06-01): Inadequate EDG Isolation ..	4
3.1.4 (Closed) Unresolved Item (93-01-04): Control of Measuring and Test Equipment .....	5
3.2 Surveillance Observations – Units 1 and 2 .....	5
3.3 Review of Licensee Event Reports and Special Reports .....	5
4.0 ENGINEERING (71707, 37700, 40500, 90712) .....	6
4.1 Review of Licensee Event Reports and Special Reports .....	6
4.2 Site Operations Review Committee (SORC) Meetings .....	6
4.3 Temporary Modification Review .....	6
4.3.1 Temporary Bypass of the Offgas Charcoal Filters .....	6
4.3.2 Temporary Nitrogen Supply to Offgas Charcoal Filters .....	7
4.4 (Closed) Unresolved Item (50-410/93-01-02) and Service Water System Evaluation .....	7
5.0 PLANT SUPPORT (71707, 90712) .....	8
5.1 Radiological and Chemistry Controls .....	8
5.1.1 Fuel Leakage - Unit 1 .....	8
5.1.2 (Closed) Unresolved Item (92-29/34-01) .....	9
5.2 Security and Safeguards .....	9
6.0 MANAGEMENT MEETINGS .....	9

\* 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 operated Nine Mile Point Unit 1 (Unit 1) and Unit 2 (Unit 2) at essentially full power throughout the period.

#### 1.2 NRC Activities

Resident inspectors conducted inspection activities during normal, backshift and weekend hours over this period. There were 13 hours of backshift (evening shift) and 12 hours of deep backshift (weekend, holiday, and midnight shift) inspection during this period.

#### 1.3 NMPC Reorganization

As of August 1, NMPC made the following changes to their Nuclear organization. Mr. Jim Perry, the former VP - Quality Assurance, has left that position, to work with a nuclear industry group. The VP - QA position was incorporated into the General Manager of Safety Assessment, Licensing, and Training position, reporting to the Executive Vice President - Nuclear and responsible for Quality Assurance, licensing, and training. This position is being filled by Mr. Marty McCormick, the former Unit 2 Plant Manager. Mr. John Mueller, the former Unit 2 Operations Manager, has become the Unit 2 Plant Manager. Mr. John Conway, the former Technical Services Manager for Unit 2, has become the Unit 2 Operations Manager.

### 2.0 PLANT OPERATIONS (71707, 93702, 71710, 90712)

#### 2.1 Operational Safety Verification

The inspectors observed overall plant operation and verified that the licensee operated the plant safely and according to procedures and regulatory requirements. The inspectors conducted regular tours of the following plant areas:

- Control Room
- Reactor Building
- Control Building
- Turbine Building
- Switchgear Rooms
- Access Control Points
- Protected Area Perimeter
- Refuel Floor
- Service Water Bays
- Diesel Generator Rooms

The inspectors observed plant conditions through control room tours to verify proper alignment of engineered safety features; to verify that operator response to alarm conditions was in accordance with plant operating procedures; to verify compliance with Technical Specifications, including implementation of appropriate action statements for equipment out

of service; and to review logs and records to determine if entries were accurate and identify equipment status or deficiencies. These records included operating logs, turnover sheets, and system safety tags.

The inspector conducted detailed walkdowns of accessible areas to inspect major components and systems for leakage, proper alignment, proper lubrication, proper cooling water supply, and any general condition that might prevent fulfillment of their safety function. The inspector observed plant housekeeping controls including control and storage of flammable material and other potential safety hazards.

The inspector found that shift turnovers were comprehensive and accurate, and adequately reflected plant activities and status. Control room operators effectively monitored plant operating conditions and made necessary adjustments. Housekeeping was commensurate with ongoing work. The inspector concluded that NMPC conducted overall plant operations in a safe and conservative manner.

## 2.2 Offgas Charcoal Bed Overheating

On July 28 Unit 2 auxiliary operators noted elevated temperatures indicating possible charcoal combustion inside the offgas system filter beds. The Unit 2 system consists of two parallel trains, with four charcoal filter bed vessels installed in series, in each train. NMPC identified elevated temperatures in the first vessel in each train. Mid-point shell temperatures were 99°F and 115°F (normally 60°F to 70°F) and the top-of-the vessel shell metal temperatures were approximately 270°F (normally 60°F to 70°F).

NMPC took aggressive actions to limit the effects of the filter combustion. The off-normal procedure for fire in the offgas system, discussed in section H of N2-OP-42, required that operators commence an orderly reactor shutdown. Further, NMPC contacted the system vendor experts to determine appropriate action to extinguish the charcoal combustion. Operators secured the shutdown at 35% power following the processing of a procedure change. This procedure change allowed operation with the charcoal beds bypassed; while monitoring the bed temperatures and purging nitrogen through the beds to extinguish the fire and cool the charcoal. Carbon monoxide concentration at the outlet of the beds was sampled and bed temperatures taken to monitor the progress in extinguishing the combustion. NMPC restored reactor power to 100 percent with the offgas charcoal beds isolated and a nitrogen purge established. NMPC closely monitored offgas release rates and verified that plant stack releases were well within the allowable technical specifications limit (250 - 400 microcuries per second versus 350,000 microcuries per second allowable). The inspector independently verified that the stack release rates were within the TS limits.

returned it to service. At the conclusion of the inspection report period a nitrogen purge continued on the second train to further decrease the charcoal bed temperatures and reduce the likelihood of reignition when returned to service.

The inspector found that the offgas system operating procedure did not include recommendations for preventing, detecting, and extinguishing offgas fires from GE service information letters (GE SILS) 150. The inspectors reviewed the disposition to deviation/event report (DER) 2-92-Q-1235, dated March 30, 1992, issued based on GESIL 150. The DER resolution was weak in that the actions as stated were not completed. By not including the actions recommended by the SIL in the procedure, the operating staff was challenged by a potentially preventable event. This weakness did not have a significant impact in NMPC's ability to combat the combustion because the vendor expert was contacted immediately and his knowledge compensated for the procedure weakness. At the end of the inspection period NMPC continued to perform their root cause investigation of this event. The issues of the adequacy of the DER review and the operating procedure were unresolved (50-410/93-11-01) pending inspector review of NMPC's root cause investigation.

### 2.3 Review of Licensee Event Reports and Special Reports

The inspector reviewed the following licensee event reports (LERs) and special reports to verify that they conform to the requirements specified in 10 CFR 50.73 and the technical specifications. These requirements include a proper narrative description of the event, the cause of the event, an assessment of the safety consequences, and corrective actions.

LER 92-19, Reactor water cleanup (RWCU) system isolation on high pump room temperature due to an inadequate plant impact assessment for concurrent surveillance and flow measurement tests. See Inspection Report 92-29 for additional information.

## 3.0 MAINTENANCE (62703, 61726, 90712)

### 3.1 Maintenance Observations – Units 1 and 2

Maintenance activities were observed during this inspection period to ascertain that safety related activities were being conducted according to approved procedures, technical specifications, and appropriate industrial codes and standards. Observation of activities and review of records verified that: required administrative authorizations and tag outs were obtained, procedures were adequate, certified parts and materials were used, test equipment was calibrated, radiological requirements were implemented, system prints and wire removal

documentation were used, and quality control hold points were established. Maintenance activities observed included:

N2-IMP-EQM-005T, Division I ATWS level transmitter replacement  
N2-EPM-GEN-V520, Clean, inspect, and lubricate H<sub>2</sub> recombiner inlet isolation valve  
WO 93-00647, PM EDG 102 neutral breaker  
WO 93-02052, Replace air start solenoid SOV 96-86 on EDG 102  
WO 93-03145, Replace turbo lube oil pump on EDG 102  
WO 93-03683, Turbo lube oil pump brush inspection  
WO 93-02520, Clean/Inspect EDG 102 air intake filter  
WO 93-3083, PM on EDG 12 cooling water heat exchanger  
WO 93-03484, Main steam line high radiation monitor calibration

The above activities were effective with respect to meeting the safety objectives.

### 3.1.1 EDG 102 Maintenance

The EDGs are placed in a seven-day limiting condition of operation (LCO) on a quarterly basis to inspect for zebra mussels in the raw water heat exchanger. Maintenance personnel performed well during performance of this activity on EDG 102. The licensee used this opportunity to perform several other work tasks which included various preventive maintenance (neutral breakers, air intake filters), corrective maintenance (repair air box handhole cover leak, replace turbo lube oil pump), modification (lubrication sample valve) and resolution of a 10 CFR Part 21 issue with the air start solenoid valve. The inspector reviewed the system isolation as well as various portions of the maintenance and documentation and concluded that the maintenance and subsequent retest were successfully completed. The EDG zebra mussel inspection was an excellent example of a preplanned maintenance outage during plant operation.

### 3.1.2 Emergency Diesel Generator (EDG) Modification Review

NMPC properly installed a modification to the lube oil sample valves to the pre-lubrication piping of the EDG. This modification allowed a more representative sampling of EDG crank case oil for analysis of engine wear and performance and was properly installed and tested.

### 3.1.3 (Closed) Unresolved Item (93-06-01): Inadequate EDG Isolation

The inspector reviewed NMPC's root cause evaluation which concluded that the cause of the event was poor work practices of the personnel required to develop the heat exchanger isolation. NMPC took appropriate corrective action to prevent recurrence. Independent review of the isolation established to support the 102 EDG raw water heat exchanger, discussed above, found that the isolation was proper. This item is closed.



### 3.1.4 (Closed) Unresolved Item (93-01-04): Control of Measuring and Test Equipment

The inspector identified several examples of improper control of measuring and test equipment (M&TE) in both units where M&TE was not in use, not correctly secured, and not controlled by an individual. The concern was that improperly controlled M&TE could be damaged without the end user's knowledge and could potentially lead to an operability issue. NMPC completed a revision to the administrative procedure controlling M&TE (GAP-MTE-01) which specifically requires M&TE to be returned to the issue point after use and job completion, and personnel using M&TE in the field that is unattended or not connected in a test mode shall protect, secure, or barricade the equipment to prevent damage or unauthorized use. The inspectors have also completed several plant tours and have not identified any examples of improperly controlled M&TE. This item is closed.

### 3.2 Surveillance Observations – Units 1 and 2

Through observation of safety-related surveillance activities, interviews, and review of records, the inspectors verified: use of proper administrative approval, personnel adherence to procedure precautions and limitations, accurate and timely review of test data, conformance of surveillances to technical specifications, including required frequencies, and use of good radiological controls. Surveillance activities observed included those listed and discussed below:

N2-OSP-HCS-SA001, Hydrogen recombiner functional and electrical continuity test  
N2-OSP-SLS-Q001, Standby liquid control (SLC) pump, check valve, and relief valve test  
N2-OSP-SLS-Q002, SLC system motor operated valve operability test  
N2-IST-VIB-@001, SLC pump B vibration measurements  
N2-ISP-NMS-Q167, APRM channel F calibration  
N2-ISP-RMC-Q100, Rod block monitor channel A calibration  
N2-CSP-OFG-S330, Offgas shiftly surveillance  
N2-OSP-RMC-W@001, Rod exercising  
N2-OSP-RPS-W002, Manual scram channel functional test  
N1-ISP-001-007, Main steam line high radiation monitor instrument calibration

The above activities were effective with respect to meeting the safety objectives.

### 3.3 Review of Licensee Event Reports and Special Reports

The inspector reviewed the following licensee event reports (LERs) and special reports to verify that they conform to the requirements specified in 10 CFR 50.73 and the technical specifications. These requirements include a proper narrative description of the event, the cause of the event, an assessment of the safety consequences, and corrective actions.



LER 92-21, Reactor core isolation cooling (RCIC) system isolation resulting from a false high reactor building general area temperature signal. Poor wire installation and worker practices contributed to the inadvertent isolation.

LER 92-23, Multiple engineered safety features (ESF) actuations resulting from a partial loss of off-site power due to a breaker component failure. See Inspection Reports 92-29 and 93-15 for further details.

LER 92-24, RCIC and shutdown cooling isolations after a failed temperature switch caused a false high reactor building general area temperature signal. The high pressure core spray (HPCS) system was inoperable for planned maintenance at the time of the RCIC isolation, therefore, the operators entered TS action statement 3.0.3. Since the HPCS maintenance had not yet started, the operators immediately returned the HPCS pump to standby, declared the HPCS system operable, and exited TS action statement 3.0.3. The inspector had no additional questions on this LER.

#### 4.0 ENGINEERING (71707, 37700, 40500, 90712)

##### 4.1 Review of Licensee Event Reports and Special Reports

The inspector reviewed the following licensee event reports (LERs) and special reports to verify that they conform to the requirements specified in 10 CFR 50.73 and the technical specifications. These requirements include a proper narrative description of the event, the cause of the event, an assessment of the safety consequences, and corrective actions.

LER 93-04, Type B local leak rate surveillance test not performed on the metal expansion bellows for the traversing incore probe drywell penetration. See Inspection Report 96-06 for further details. The inspector had no further questions on this LER.

##### 4.2 Site Operations Review Committee (SORC) Meetings

The inspectors attended a Unit 1 SORC meeting on June 29, 1993, to discuss improvements to the control of the measuring and test equipment (M&TE) programs. The inspectors found the SORC meeting to be well controlled, comprehensive, and focused on safety. The inspector also verified that committee member composition and quorum requirements as specified in the technical specifications were satisfied.

##### 4.3 Temporary Modification Review

###### 4.3.1 Temporary Bypass of the Offgas Charcoal Filters

Due to the high temperature conditions in the offgas system charcoal beds, NMPC installed a temporary one inch bypass line around the charcoal beds. The temporary bypass line was designed to eliminate the high temperature conditions without offgas radiological stack

release exceeding technical specification limits. The offgas flow bypasses the charcoal beds and flow continues through the high efficiency particulate air (HEPA) filter providing a filtered release pathway. The inspector reviewed temporary modification package 93-046 and the 10 CFR 50.59 safety evaluation and concluded NMPC addressed all appropriate safety concerns.

#### 4.3.2 Temporary Nitrogen Supply to Offgas Charcoal Filters

NMPC installed a temporary nitrogen supply to the offgas charcoal filters to mitigate the high temperature conditions. The inspector reviewed temporary modification 93-047 and the 10 CFR 50.59 safety evaluation and concluded NMPC addressed all appropriate safety concerns including radiological consequences and control room habitability.

#### 4.4 (Closed) Unresolved Item (50-410/93-01-02) and Service Water System Evaluation

This item dealt with the safety significance of the installation and use of a smaller than designed diameter impeller in the A service water (SW) pump. The inspector reviewed NMPC data, which indicated that the pump would have been degraded by approximately 16 psig or 37 feet of head below the design level. The inspector was concerned that this lowered head would have the affect of reducing the available flow from this pump, in a single SW pump alignment, following a design basis accident (DBA) loss of coolant accident (LOCA), to the point that components could not be cooled.

NMPC evaluated the system flow requirements and the SW pump capacities for normal and accident conditions using a series of computer generated system resistance curves for different system configurations and plotted pump curves for different pump combinations. Based on a review of these curves, the inspector noted that the flow from the A SW pump in its degraded condition would have been above that required following the DBA LOCA. This item was closed.

The inspector found that NMPC engineering continued to address an issues where the SW system pump performance limit specified in TS was not conservative with respect to system design. TS 4.7.1.1.1.d requires that each SW pump develop a discharge pressure of 80 psig at 6500 gpm. A discharge pressure of 80 psig actually represent a developed head of less than 80 psid, after subtracting the suction pressure. The pump design value was a developed head of 80 psid at 10,000 gpm. This would mean that each SW pump could be degraded to less than its design value if the TS criteria was followed. Review of the design pump curves shows that the pumps should be developing approximately 97 psid or 223 feet of head, at 6500 gpm. If SW pumps were allowed to degrade to this value they may not be able to perform their intended safety function.

The engineering study indicated that the most limiting condition for the operation of SW was not the DBA LOCA, but a LOCA not concurrent with a loss of off-site power. This would leave four SW pumps running in parallel. Based on the system resistance curve for this type

of accident and the combined pump curve for four pump parallel operation, engineering determined that a degradation of 17 feet of head below the designed pump curve would be the maximum acceptable. This means that all four pumps could be degraded to 17 feet below the individual pump curves and if operated in parallel would provide the required flow.

Review of current system data indicates that the pumps were operating above the 17 feet degraded pump curves. The engineering study was well prepared, but was not finalized at the end of the inspection. Further, NMPC engineering and licensing were reviewing the study to determine if changes to the TS SW pump operability testing conditions and the inservice testing program were needed.

## 5.0 PLANT SUPPORT (71707, 90712)

### 5.1 Radiological and Chemistry Controls

During routine tours of the accessible areas at both units, the inspectors observed the implementation of selected portions of NMPC's radiological controls program to ensure: the utilization and compliance with radiological work permits (RWPs); detailed descriptions of radiological conditions; and personnel adherence to RWP requirements. The inspectors observed adequate controls of access to various radiologically controlled areas and use of personnel monitors and frisking methods upon exit from these areas. Posting and control of radiation areas, contaminated areas and hot spots, and labelling and control of containers holding radioactive materials were verified to be in accordance with NMPC procedures. Radiation protection technician control and monitoring of these activities was satisfactory. Overall, the inspector observed an acceptable level of performance and implementation of the radiological controls program.

#### 5.1.1 Fuel Leakage - Unit 1

During routine daily gross noble gas offgas system sampling on June 10, Chemistry personnel identified an increased release rate downstream of the hydrogen recombiner, but before the offgas system holdup volumes. Offgas system release rates increased to a maximum of about 1591  $\mu\text{C}/\text{sec}$ . Steady state release rates prior to this had been less than 307  $\mu\text{C}/\text{sec}$ . The increase in the release rate required NMPC to enter their failed fuel action plan.

Isotopic analysis of offgas samples indicated a release of gases generated in the reactor's fuel. NMPC determined the data to be similar to a previous fuel failure identified on September 28, 1992, in that the largest increase was in the release of Xe-133. NMPC determined, using core flux tilting, that the fuel pin leak was in the vicinity of control rod 26-43. Operators subsequently fully inserted rod 26-43 to prevent/slow down further fuel pin degradation. Plotting of the sample data showed that the release rate peaked at

approximately 1591  $\mu\text{c}/\text{sec}$ . Subsequent to control rod 26-43 insertion on July 4, the release rate decreased to a steady state level of 915  $\mu\text{c}/\text{sec}$ . NMPC tracked the release rates well. The inspectors independently verified the release rate through instrument observations and verified that they were always well within the Unit 1 TS limit 500,000  $\mu\text{c}/\text{sec}$  from noble gasses.

NMPC continued to monitor the offgas activity daily over the period. Aggressive offgas sampling and isotopic analysis during the flux tilt evolution appeared to be successful in determining the general location of the fuel leak. The Chemistry department performed well in identification and location of the fuel leak.

#### 5.1.2 (Closed) Unresolved Item (92-29/34-01)

This item dealt with the misinstallation of an airborne radioactive material sampling system on the Unit 2 instrument air system. Because of poor procedure controls over the installation, the rig was allowed to sample off of the nitrogen system rather than the instrument air system without operator knowledge. Initial corrective actions for this occurrence were adequate. Further, NMPC changed their procedure for temporary modification to specify that procedures which install temporary equipment have the proper controls in place to ensure that temporary equipment does not impact plant operations. This item was closed.

#### 5.2 Security and Safeguards

Implementation of the physical security plan was observed in various plant areas with regard to the following: protected area and vital area barriers were well maintained and not compromised; isolation zones were clear; personnel and vehicles entering and packages being delivered to the protected area were properly searched and access control was in accordance with approved licensee procedures; persons granted access to the site were badged to indicate whether they have unescorted access or escort authorization; security access controls to vital areas were maintained and persons in vital areas were authorized; security posts were adequately staffed and equipped, security personnel were alert and knowledgeable regarding position requirements, and written procedures were available; and adequate illumination was maintained. Licensee personnel were observed to be properly implementing and following the physical security plan.

### 6.0 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. NMPC did not object to any of the findings or observations presented at the exit meeting.