

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Report Nos.: 90-10  
90-10

Docket Nos.: 50-220  
50-410

License Nos.: DPR-63  
NPF-69

Licensee: Niagara Mohawk Power Corporation  
301 Plainfield Road  
Syracuse, New York 13212

Facility: Nine Mile Point, Units 1 and 2

Location: Scriba, New York

Dates: November 15, 1990 through January 3, 1991

Inspectors: W. A. Cook, Senior Resident Inspector  
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Approved by: Glenn W. Meyer 1-30-91  
Glenn W. Meyer, Chief Date  
Reactor Projects Section No. 1B

**Inspection Summary:** This inspection report documents routine and reactive inspections during day and backshift hours of activities including: plant operations; radiological protection; surveillance and maintenance; and safety assessment/quality verification.

**Results:** No violations and no unresolved items were identified. An Executive Summary follows:



## EXECUTIVE SUMMARY

### **Nine Mile Point Units 1 and 2 Combined Inspection Report Nos. 50-220/90-10 and 50-410/90-10 November 15, 1990 - January 3, 1991**

#### Plant Operations

Unit 1 - In general, performance by the operations staff was satisfactory during this inspection period. The November 17, 1990 reactor scram was attributed to personnel error due to inattention to detail. Operator actions in response to the November 17, 1990 scram and the December 29, 1990 forced shutdown were satisfactory.

Unit 2 - Operations staff support of outage activities was observed to be generally satisfactory. Operator error due to inattention to detail resulted in an inadvertant ESF actuation on December 7, 1990.

#### Surveillance and Maintenance

Surveillance and maintenance activities were well planned and executed. The forced shutdown of Unit 1 on December 29, 1990, was another example of negative effects resulting from poor maintenance practices performed during the previous SALP period. Since restart of Unit 1 in July 1990, three forced outages were attributed to past poor maintenance practices.

#### Radiation Protection and Chemistry

Unit 1 Radwaste Building 225 foot elevation cleanup efforts were observed and progress, to date, has been satisfactory. An inadvertant introduction of resin into the Unit 2 spent fuel pool, vessel cavity and dryer/separator cavity occurred during this inspection period. Cleanup efforts were considered to be satisfactory. Analysis of the resin in the primary system which could not be removed prior to the reactor returning to power operations was considered satisfactory and the recommendations for chemistry control appropriate. Outage ALARA goals were exceeded at Unit 2, but were appropriately trended and adequately accounted for by the Niagara Mohawk staff.

#### Safety Assessment/Quality Verification

Overall performance during this inspection period was satisfactory. Despite personnel errors observed at both units, station personnel generally appeared to be more deliberate and careful in their actions and station management was stressing personnel accountability and increased oversight of field activities.



## DETAILS

### 1.0 PLANT OPERATIONS

#### 1.1 Unit 1

During this inspection period, the reactor was operated at full power with the exception of two reactor shutdowns. An automatic scram on November 17, 1990, due to personnel error and a forced shutdown occurred on December 29, 1990 due to an equipment failure.

- A. At 9:09 p.m. on November 17, 1990, a reactor scram from 96% power occurred as a result of operator error during a surveillance test on a main steam line (MSL) radiation monitor. The Unit 1 operators were performing N1-ST-W4, Main Steam Line High Radiation Instrument Channel Test, on the 112 MSL radiation monitor for post-maintenance testing purposes. By procedure, half-scram and half-vessel isolation signals were inserted in reactor protection system (RPS) channel 12. At step 8.3.29 of the procedure, the operator was instructed to pull fuse F53 (yellow), with yellow being the color coding associated with channel 12. However, the operator mistakenly pulled fuse F53 (green) which is associated with MSL radiation monitor 111 and inputs to RPS channel 11. As a result of pulling the wrong fuse, full vessel isolation logic was satisfied and the unit's main steam line isolation valves went closed generating the reactor scram.

The inspector determined that three anomalies were observed during the scram and subsequent cooldown. First, power board 11 failed to transfer from the site transformer to the off-site reserve transformer. Operators manually closed the breaker to supply the bus from the reserve supply. The loss of power board 11 also resulted in the 11 and 12 recirculation pumps losing power. Both pumps were subsequently restarted November 18. Secondly, during the cooldown, the low condenser vacuum scram signal was received twice. However, with the plant pressure less than 600 psi and the mode switch not in RUN, this signal should have been bypassed. A problem with the 600 psi relay contacts was found and corrected on November 18. Lastly, following the scram, rod 22-11 indicated at position 02. The rod was manually driven into the 00 (fully inserted) position. Later, it was determined that the rod had inserted fully during the scram but had bounced back to the 02 position. This condition has been reviewed by General Electric and has been observed at several other boiling water reactors. Adequate shutdown margin is maintained when this condition occurs.



- B. On December 29, 1990, the reactor was shutdown due to problems encountered with an inboard main steam isolation valve (MSIV). Specifically, during the performance of N1-ST-Q26, FW-MSIV Exercise Test, the circuit breaker for the power supply to the motor for inboard MSIV 01-02 tripped during the closure stroke of the valve. Troubleshooting identified that all three phases of the power supply to the valve's motor were grounded. The inboard MSIV was declared inoperable and power reduced from 98% to 40% to allow closure of the associated outboard MSIV for compliance with TS requirements for an inoperable containment penetration. Additionally, a half scram was inserted on the effected reactor protection systems channel (12).

After evaluating the situation, Niagara Mohawk management made a prompt decision to shut the unit down so that a containment entry to identify the problem with MSIV 01-02 could be performed. Additionally, the drywell leakage rate had been slowly increasing for the last month and measured 3.5 gpm on December 29. This was also a factor in the decision to shutdown to allow drywell entry. During the shutdown and while at low power (range 6 in the intermediate range neutron monitor scale), a spurious spike on IRM channel 11 gave a half scram on RPS channel 11 and resulted in a full reactor scram. All plant systems functioned as designed. No cause for the spurious IRM spike could be determined.

Upon entry into the drywell, three sources contributing to the increasing drywell leakage rate were identified. All were packing related and were repaired during the forced outage. The root cause of the MSIV failure is discussed in the maintenance section of this report.

- C. (Updated) Violation (50-220/90-06-01): Violation of Administrative Procedure (AP)-4.2 involving two examples of improper blue markups control. On November 29, 1990, the plant managers notified the inspector that a target date for completion of a revision to AP-4.2, Markups, and implementation could not be achieved. Niagara Mohawk's response to the Notice of Violation, dated September 14, 1990, stated this action would be completed by November 30, 1990. However, further revisions to AP-4.2 were necessary prior to station employee training and procedural implementation. The inspectors plan to review the final revision to AP-4.2 and its implementation in a subsequent inspection period. This violation remains open.



## 1.2 Unit 2

Reactor fuel reload, vessel reassembly and the vessel hydrostatic leak test were completed during this inspection period. Reactor startup was planned subsequent to the end of the period.

- A. The inspectors observed portions of fuel reload, vessel reassembly and the hydrostatic testing and found these activities to be well executed. Proper fuel location verification was observed during fuel movements. Strict compliance with tool accountability requirements during reload and vessel reassembly was observed. Radiation workers followed the protective measures specified in the radiation work permits. Proper source range instrumentation availability was noted. The inspector observed that Niagara Mohawk personnel proceeded in a deliberate and safe manner while performing these outage activities.
- B. On December 7, 1990, a reactor building isolation occurred due to operator error. Surveillance Test N2-OSP-HUR-Q002 specified to place switches for the reactor building fans that are in a standby condition in the pull-to-lock position. The operator erroneously secured an operating fan which caused a low flow condition to occur and resulted in a reactor building ventilation isolation. The operations staff made the proper notification to the NRC via the Emergency Notification System of an unplanned Engineered Safety Feature actuation. The inspector noted that this incident appeared to be the result of inattention to detail and was similar in nature to the inadvertent standby gas initiation that occurred on October 9, 1990. The inspector will review the corrective actions taken in response to this event upon issuance of the respective Licensee Event Report.
- C. Safety System Operability Verification - The inspectors directly examined portions of selected safety system trains to verify that the systems were properly aligned in the standby mode. The following systems were examined:
- Low Pressure Core Spray
  - Division II Emergency Diesel Generator

The inspector found the systems to be properly aligned and fully operational.



## 2.0 MAINTENANCE AND SURVEILLANCE OBSERVATIONS

### 2.1 Unit 1 - Review of MSIV 01-02 Work

The inspector determined that upon access to the drywell, maintenance personnel verified that the motor for MSIV 01-02 was indeed burned. Subsequent disassembly of the valve revealed that valve movement was restricted due to misalignment of the valve internals, specifically the main disc poppet.

When the main disc poppet is viewed vertically from the top down, several features are revealed. First, the top of the poppet has four tabs spaced at 90 degree intervals which project inward and to which the valve stem retaining collar is attached with bolts. Secondly, along the lower outer circumference of the main disc poppet, there are three small projections, called guides, spaced at 120 degree intervals. The guides are designed to slide down on guide rails, wedge-shaped metal pieces machined onto the internals of the valve itself, to ensure proper alignment and seating of the main disc poppet when the valve is closed. Thirdly, the valve stem is aligned to the main disc poppet by a pinned lower stem and internal poppet. The lower stem poppet has alignment tabs (called dogs) which engage recesses in the valve stem retaining collar. Lastly, and most importantly, only one of the main disc poppet tabs (spaced at 90 degree intervals) is aligned with one of the guides (spaced at 120 degree intervals) when viewed vertically. This one guide is the one required to be aligned with the guide rail located at the "six o'clock" position which ensures proper alignment of the valve internals when connecting the valve stem with the motor actuator via the coupling block.

Niagara Mohawk discovered that upon disassembly of the valve, the entire valve internal assembly had rotated approximately 15 degrees and that the poppet guides were no longer riding upon the guide rails. In addition, the poppet was found to have been installed in the valve incorrectly (rotated 120 degrees). Niagara Mohawk's root-cause investigation revealed that 01-02 was reassembled early in the refueling outage and that the maintenance procedure was silent regarding proper internals alignment. Furthermore, the vendor representative was not present when the valve was reassembled to ensure its proper alignment.

Niagara Mohawk concluded that due to the internal misalignment, when the valve was being coupled with the actuator, personnel conducting the evolution physically rotated the stem and disc assembly in the valve body to align the coupling block with the actuator assembly. However, they were not aware that the consequence of this was to rotate the guides off the guide rails. Subsequent operation of the valve in this condition damaged the valve internals and eventually lead to the valve binding on December 29, 1990.



The inspector concluded that while the vendor manual and maintenance procedure were silent with respect to proper valve internals alignment and the vendor representative was not on site during the valve reassembly, it appeared that the maintenance personnel involved demonstrated poor judgement and knowledge level in both the reassembly and coupling of the valve with the actuator.

## 2.2 Unit 2

Surveillance and maintenance activities observed by the inspectors during this period are listed below. Performance of the activities observed was satisfactory. The following activities were observed:

- 24 hour run of the Division II emergency diesel generator.
- Testing of the auxiliary relays in the high pressure core spray switchgear performed by Metering and Test Department personnel.
- Scram accumulators check valve leakage and reverse flow testing.
- Service water system zebra mussel biocide treatment per procedure N2-PM@11.
- Corrective maintenance and modification performed on main steam isolation valve MOV-6C.

## 3.0 REVIEW OF LICENSEE EVENT REPORTS (LER) AND SPECIAL REPORTS

### 3.1 Unit 1

The following LERs were reviewed and found satisfactory:

- LER 88-14, Supplement 1, Failure of core spray high point vent isolation valve to meet stroke requirement due to procedural deficiencies.
- LER 90-22, Nonconservative Technical Specification setpoint due to incorrect design calculation.
- LER 90-23, Loss of offsite power due to equipment failure (115 kv "drop" line broke).
- LER 90-24, Misinterpretation of surveillance requirements.



- LER 90-25, Reactor scram due to equipment failure (relay 12k39) and spurious trip signal.

LER 90-26, Reactor scram during surveillance test due to personnel error.

The following Special Reports were reviewed and found satisfactory:

- Special reports dated November 26, December 11 and December 22, 1990, file codes NMP 73952, 73970 & 73977 respectively. These reports discussed inoperability of the Containment Hydrogen Monitoring System due to various technical problems. The inspector determined that appropriate manual sampling procedures to meet TS requirements were implemented following discovery or determination of system inoperability.
- Special report dated October 29, 1990, file code NMP 73934. Report discussed inoperability of the Suppression Chamber Water Level Channel 11.

### 3.2 Unit 2

The following LERs were reviewed and found satisfactory:

- LER 90-12, Technical Specification violation of control rod operability requirements. This event was reviewed in Inspection Report 50-410/90-04 and a Non-Cited Violation was issued.
- LER 90-13, Reactor scram caused by turbine generator trip.
- LER 90-15, Standby gas treatment initiation due to a personnel error during the preparation of a protective markup.

### 4.0 SAFETY ASSESSMENT AND QUALITY VERIFICATION

Overall performance during this inspection period was satisfactory. Inspector observations of activities in progress and discussions with station supervisors and managers indicated that station worker procedural adherence practices continued to improve and the higher standards of performance are being demonstrated and expected by station managers. Implementation of station accountability meetings and, on occasion, disciplinary action taken on both the station employee and the management level was evidence of senior management commitment to adhere to their policy of more defined responsibilities and subsequent enforcement of individual accountability.



#### 4.1 Unit 1

- A. On November 30, the NRC Unit 1 Restart Assessment Panel held a conference call with Niagara Mohawk to discuss the results of the Unit 1 Power Ascension Test Program (PATP) Test Phase III. Both specific Phase III testing results and the Niagara Mohawk management self-assessment of performance were discussed during the conference call. In addition, significant plant operating events were reviewed by Niagara Mohawk and the lessons learned were discussed.

The inspectors followed up a question raised by the Assessment Panel involving the Shield Integrity Test results. The actual shielding survey results were often found to be higher (dose rates) than the expected dose rates and the question focused on what overall assessment or justification could be made for these higher dose rates. By internal memorandum dated December 17, 1990, Niagara Mohawk documented their assessment of the higher than expected shield survey results.

The assessment stated that the expected dose rates were based upon historical survey information which was incomplete (i.e. survey maps did not reflect reactor power level at the time of the surveys). Higher than expected values were, in many cases, trending downward while the PATP was in progress. The higher dose rates were attributed to an initially high crud level due to the extended shutdown. The observed dose rate decreases were attributed to the reactor water cleanup system being in service. In addition, the actual values were typically less than a factor of two or three above the expected value (i.e., 10 mr/hr versus 5 mr/hr) and no actual dose rates were an order of magnitude higher than expected values. Lastly, actual survey results for all drywell penetrations exceeded the expected values. This was because the expected values were set at zero mr/hr due to no previous survey information being available for specific drywell penetrations.

In addition, Niagara Mohawk reviewed actual shield survey results with previously determined Environmental Qualification (EQ) radiation survey readings measured at 100% reactor power in July 1985. The 1985 readings were used for determining the normal radiation value complement of specified accident radiation values. In all cases the EQ accident radiation values enveloped the higher than expected values identified by the Shield Integrity Test. Based on the above, the inspector concluded that Niagara Mohawk had appropriately assessed the Shield Integrity Test results.



- B. The inspectors noted that the December 29, 1990, shutdown was the third forced outage of the unit since its restart in July 1990 which resulted from poor mechanical maintenance performance. However, in retrospect, these specific maintenance activities all took place early in the refueling outage, and, if anything, are representative of the poor maintenance program which existed at that time and are not reflective of the current maintenance program and the more recently observed improved maintenance staff performance.
- C. On December 20, 1990, the NRC Regional Administrator met with Niagara Mohawk senior management at the site and conducted plant tours with the plant managers and resident inspector. A variety of plant specific, organizational, programmatic and industry topics were discussed during his visit in preparation for the NRC Senior Management Meeting in January 1991.

## 5.0 RADIATION PROTECTION AND CHEMISTRY

### 5.1 Unit 1

At various times during the inspection period, the inspectors monitored cleanup activities of the Unit 1 Radwaste Building 225 foot elevation. During this inspection period Niagara Mohawk completed the emptying and removal of the last barrel of spent resins and sludge in the storage aisles. The remaining tasks include decontamination and removal of the steel carriers and overall decontamination of the walls and floor of the 225 foot elevation.

To date, radiation doses to radwaste and radiation protection personnel involved in the cleanup effort have remained significantly under the expected exposure goals originally established for the job. To date, man-rem exposure has been approximately 20 man-rem versus the original 42 man-rem ALARA goal. The inspectors have observed a generally cautious and calculated day-to-day control of the specific cleanup activities and good supervisory oversight. There have been no recent personnel contamination events associated with the cleanup effort.

### 5.2 Unit 2

- A. During this inspection period and the previous report period the inspectors noted that the man-rem exposure goal for Unit 2 had been exceeded for the refueling outage. Outage exposure, to date, exceeded 405 man-rem compared to the outage goal of 150 man-rem. The inspectors determined that contributing to this were the following: increased outage work scope that could not have been anticipated by Niagara Mohawk; additional outage work activities needed as a result of failed surveillance or local leak rate testing; and, generally poor dose rate projections due to insufficient drywell survey data. These observations were discussed with station management and they were well aware of the exposure rates and totals for the outage. They indicated that management would be applying the knowledge gained from this first refueling outage to the planning of future



outage activities. The inspectors also noted that the radiological control and ALARA personnel were maintaining accurate records and frequent and detailed status reports of personnel exposure for trending and future reference.

- B. On November 11, 1990, approximately 12 cubic feet of Epifloc-21H powdered resin was inadvertently added to the water in the reactor cavity, fuel pool and dryer/separator cavity. The resin was released from a filter demineralizer in the fuel pool cleanup system. As of the end of the inspection period, an investigation was underway to determine the root cause of the resin intrusion.

The initial cleanup of the powdered resin was performed with an underwater vacuum cleaner/filtering system. Approximately 11 cubic feet of resin was collected during vacuum filtering operations. The reactor water cleanup and fuel pool cleanup systems were placed in operation to assist in the cleanup of the resin. Niagara Mohawk contracted General Electric to analyze the effects of any residual resin on reactor water chemistry during reactor startup and power operations. Based on this evaluation, the Niagara Mohawk chemistry department developed chemistry control recommendations for reactor startup.

In essence, these recommendations establish hold points during reactor heatup to allow reactor water chemistry limits to stabilize within prescribed limits. The inspectors reviewed the General Electric evaluation and the Niagara Mohawk chemistry recommendations and concluded that they were appropriate. The inspectors plan to review the root cause of the resin intrusion when the Niagara Mohawk investigation is completed.

## 6.0 MANAGEMENT MEETINGS

Management/Exit Meetings conducted by Region Based inspectors during this inspection period:

<u>Date</u>	<u>Subject</u>	<u>Report No.</u>	<u>Inspector</u>
12/18	Public Meeting to discuss Self-Assessment Report	None	Wiggins
12/21	Security Review	90-29/90-25	Dexter
12/20	Radiological Controls and Transportation	90-30/90-26	Furia
12/20	Regional Administrator visit	None	Martin



## 7.0 PRELIMINARY INSPECTION FINDINGS

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.

