UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

February 7, 1992

Docket No. 50-410

Mr. B. Ralph Sylvia
Executive Vice President, Nuclear
Niagara Mohawk Power Corporation
301 Plainfield Road
Syracuse, New York 13212

Dear Mr. Sylvia:

SUBJECT: REPORT OF AUDIT OF EFFECTIVENESS OF LICENSEE ACTIVITIES REGARDING THE PERFORMANCE OF SAFETY-RELATED CHECK VALVES - NINE MILE POINT NUCLEAR STATION, UNIT 2 (TAC NO. M81189)

The NRC staff conducted an audit of the subject activities during the period August 5-9, 1991, and the enclosed Audit Report documents the audit team's efforts and findings. The check valve testing program at Unit 2 was assessed to be comprehensive, well thought out and organized, and good management involvement was evident. However, the check valve preventative maintenance program was only in the initial phase of development and several areas of concern were identified by the audit team. As discussed with your staff in the exit meeting on August 9, 1991, we request that Niagara Mohawk Power Corporation provide a schedule for responding to the Audit Report areas of concern within 30 days of receipt of this letter. We also request that your response include a copy of the approved administrative program document for the Check Valve Program as discussed in Section 3 of the Audit Report.

This requirement affects one respondent and, therefore, is not subject to Office of Management and Budget review under P.L. 96-511.

Sincerely,

Richard Laura

Richard A. Laura, Acting Project Manager
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Enclosure:
Audit Report

cc w/enclosure:
See next page

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NRC STAFF AUDIT OF THE PROGRAM DEVELOPED AT NINE MILE POINT UNIT 2
TO ADDRESS THE PERFORMANCE OF SAFETY-RELATED CHECK VALVES

AUDIT DATES: AUGUST 5-9, 1991

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BACKGROUND

The NRC regulations require that check valves be treated in a manner that provides assurance of their performance. Specifically, Criterion 1 of Appendix A of 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants," states, in part, that structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. The quality assurance program (which includes testing) to be applied to safety-related components is described in Appendix B of 10 CFR Part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants."

In addition to the general requirements of Appendices A and B of 10 CFR 50.55a references the ASME Boiler and Pressure Vessel Code. Paragraph (g) of 10 CFR 50.55a requires that the provisions of Section XI of the ASME Code be met for inservice testing of components covered by the Code.

On August 29, 1988, the NRC staff issued Information Notice (IN) 88-70, "Check Valve Inservice Testing Program Deficiencies," as a result of inspections of check valve activities at several nuclear power plants. A common finding from those inspections was that not all safety-related check valves had been included in the Inservice Testing (IST) programs. Another finding was that some of the check valves within the IST programs were not being tested in a manner that verified their ability to perform their safety-related functions.

On April 3, 1989, the NRC staff issued Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," to assist licensees in correcting several weaknesses that the staff has found in IST programs. Positions 1 through 4 and 10 address the inservice testing of check valves. Position 11 indicates that certain valves have been erroneously omitted from the IST programs in the past. Position 11 further reminds licensees and permit holders that, while 10 CFR 50.55a delineates the testing requirements for ASME Code valves, the testing of valves is not to be limited to only those components covered by 10 CFR 50.55a. Detailed information on the implementation of GL 89-04 is provided in the minutes of the public meetings held by the staff to discuss the generic letter. These minutes were compiled and issued on October 25, 1989.

The NRC Office for Analysis and Evaluation of Operational Data (AEOD) has been performing diagnostic evaluations of check valve activities at nuclear power plants and has identified numerous deficiencies in those activities. For example, certain check valves have been improperly omitted from the testing programs, testing did not demonstrate all safety functions of check valves, check valve failures were not being tracked, and testing programs were not consistent between plants operated by the same licensee.

The overall NRC staff plans to organize activities aimed at identifying and resolving the concerns about testing and performance of check valves is described in NUREG-1352, "Action Plans for Motor-Operated Valves and Check Valves," issued in June 1990. The activities outlined in that document include: a discussion of check valve problems and performance; evaluation of the adequacy of current regulatory requirements; development of inspection

guidance; ongoing staff research; cooperation with industry groups; participation in the development of codes and standards with national engineering organizations; and the evaluation of overall NRC staff and industry efforts.

The NRC staff has developed a draft Temporary Instruction (TI 2515/110) to assess the effectiveness of licensee programs regarding the performance and testing of safety-related check valves as part of this action plan. The staff is proceeding with implementation of the action plan as presented during the NRC Regulatory Information Conference held in Washington, DC, on May 7 and 8, 1991.

AUDIT PLAN

The NRC team used the draft TI titled "Effectiveness of Licensee Activities Regarding the Performance of Safety Related Check Valves" as a guide in conducting the audit of the program being developed at Nine Mile Point Unit 2 (NMP2). The first purpose of the draft TI is to verify that the licensee has a program in place to ensure the operational readiness of check valves in safety-related systems. The second purpose is to perform specific reviews for a sample of check valves from the population of check valves in safety-related systems. The presence of these valves in a testing program is to be verified, related maintenance activities are to be reviewed, types of testing and testing methodologies are to be reviewed, design application aspects are to be reviewed, and system walkdowns are to be performed. The third purpose is to verify that appropriate trending of check valve failures, maintenance, and test results is conducted, and that effective action is taken to prevent repetitive failures. The fourth purpose is to verify the involvement of licensee management in the development and implementation of a comprehensive program to provide assurance of the operability and reliability of check valves in the plant.

The NRC audit team reviewed the licensee's programs against the draft TI. The areas addressed were (1) determine the scope of the licensee's programs to address check valve issues, (2) assess management involvement in the development and implementation of programs and activities that provide assurance of the operability and reliability of check valves, (3) review program organization, assigned responsibilities, coordination, authority, and control of implementation of check valve programs and activities, (4) evaluate the extent of the licensee's design review to assess whether appropriate factors were considered in selecting the valves for their applications, (5) review the licensee's process of receipt, control, evaluation and implementation of third party recommendations, vendor reports and industry information, (6) review the effectiveness and implementation of check valve testing for a selected set of sample valves, (7) review the maintenance program and maintenance history records, repeated failures and failure rates for check valves, (8) evaluate the licensee's activities in trending check valve failures, maintenance and test results, (9) review the licensee's deficiency reporting, adherence to NRC regulations and technical specification requirements for system operability and reporting, and process of initiating and implementing appropriate corrective action, (10) review the

licensee's preventative maintenance program, (11) evaluate the status of the licensee's use of nonintrusive test methods, (12) assess the adequacy of training for check valve maintenance and testing activities, and (13) walk down and inspect sampled check valves for condition of parts and material and for installed configuration.

The results of the audit are described below. Attached is a list of the licensee documents reviewed by the audit team.

GENERAL COMMENTS

The Nine Mile Point plants were listed in Table 1 of GL 89-04. Certain Table 1 plants, including NMP2, had NRC Safety Evaluations (SEs) pending on their inservice testing (IST) programs and were not required to respond with the conformance letters discussed in GL 89-04. However, GL 89-04 positions were used in the preparation of SEs and provided licensee guidance for correcting deficiencies in procedures and for preparing future program modifications. (The SE for NMP2 was issued on October 29, 1990.)

At the entrance meeting, the NRC team described the objectives of the audit. The licensee provided an overview of check valve activities in a presentation following the entrance meeting. The presentation was very useful in describing the programs to address check valves in plant systems and in describing the organizations addressing check valve issues in the corporate engineering offices and at the Nine Mile Point Station.

The audit team noted that utility engineers were actively involved in the Nuclear Industry Check Valve Group. At the exit meeting the audit team informed the licensee that all check valve issues and anomalies identified in the NRC-issued SE for the current IST program had been reviewed and were resolved, and the team concluded that a satisfactory and effective IST program for check valves was in place at NMP2.

The audit team observed that the training program for maintenance craft could be enhanced, and identified concerns with inadequate corrective actions for certain Service Water System check valves.

The audit team found the check valve reliability program to be in the initial stages of being addressed in procedures, with implementation of the program scheduled for September 1991. The program had been developed without an overall program document as guidance. The team concluded that the overall effectiveness of the check valve reliability program could not be evaluated until the program was completed and implemented. At the exit meeting, NRC management expressed concern over the lack of progress to date in addressing check valve reliability issues, and that the licensee take a more aggressive approach to documenting and implementing the Check Valve Program.

EFFECTIVENESS OF LICENSEE'S ACTIVITIES REGARDING SAFETY-RELATED CHECK VALVES

1. Scope

Nine Mile Point Unit 2 developed a check valve activities program consisting of two parts. The major activities of one part were confined to ASME Code Section XI Inservice Testing requirements. The other part included the preventative maintenance activities for valves in selected safety-related and reliability-related systems and was referred to by the licensee as the Check Valve Program. This part of the program was established under the guidelines of INPO Significant Operating Experience Report (SOER) 86-03, and included valves based on engineering studies in accordance with Electric Power Research Institute (EPRI) application guidelines and valves with the potential for operational degradation due to internal parts configurations. Although many valves are included in both parts of the program, in general the valves in the IST part of the program are subject to periodic Code test requirements, while the valves in the Check Valve Program are prioritized to determine the schedule for preventative maintenance activities. The IST program was represented by the licensee to encompass those aspects of GL 89-04 applicable to check valves.

The Check Valve Program was reviewed in detail by the audit team, and the findings are reported in the following sections. In general, there was a good overlap of valves between the IST program and the Check Valve Program, with over half of the non-Rod Drive Systems IST program valves being included in the Check Valve Program (check valves associated with hydraulic control units in the Rod Drive Systems (RDS) were excluded from consideration in the Check Valve Program). All check valve sizes were addressed, with the only categorical exclusion of small valves being the excess flow check valves used in instrumentation lines for isolation of line breaks outside primary containment. The valves were selected based on a study by the Architect-Engineer (AE) for Unit 2, and were prioritized for potential for degradation and impact of degradation. The bases for excluding valves from the Check Valve Program were provided to the audit team by the licensee during the course of the audit. The formulation used to prioritize the program valves led to the exclusion of some valves important to safety, which the audit team considered a weakness. A discussion of the formulation and the corrective actions taken by the licensee is provided in Section 4.

2. Management Involvement

The audit team interviews with corporate and station staff and a review of a variety of documents were used to assess the degree of management involvement in the development and implementation of a comprehensive check valve program. As described above, NMP2 has a two-part check valve program consisting of an IST program and a program that provides for preventative maintenance. The Niagara Mohawk Power Corporation Nine Mile Point Nuclear Station Administrative Procedure (AP) 5.2.1, "Surveillance Test and Inspection Program," and AP 5.2.3, "Preventive Maintenance Program," describe the controls and responsibilities

for implementing surveillance testing and equipment reliability activities at NMP2. These documents were approved by management for NMP2 implementation. The IST program plans, preparations, revision and control are contained in Nuclear Engineering and Licensing Procedure NEL-831, Revision 4. The IST program developed by Corporate Engineering and implemented by Site Engineering is in place. Corporate IST is developing the Check Valve Program that provides for preventative maintenance and Site Engineering will coordinate its implementation upon completion. A check valve coordinator exists onsite to ensure coordinated implementation of both programs. Both programs have the full support of the Plant Manager. Further evidence of management commitment and involvement was found in the inclusion of check valve concerns in the Plant Manager's "Top Ten" list of most visible issues affecting plant performance as noted in Section 9.

Based on interviews and the review of documentation, management support for and involvement in check valve activities is evident. However, the delays in implementing the Check Valve Program, lack of an overall program guidance document, and continuing problems with Clow check valves in the Service Water System indicate that this support and involvement was not as timely and aggressive as it should have been.

3. Licensee Check Valve Program

The audit team reviewed procedure NMP2-CV-001 and associated engineering reports and memoranda, which detailed the check valve program developed by the licensee in response to INPO SOER 86-03. The program included 94 safety-related check valves and 60 non-safety-related check valves. A number of the valves were selected based on an Engineering Design review performed in accordance with EPRI applications guidelines. Attributes such as valve position in the system, valve orientation, system flow rates, and maintenance history were considered. Additional valves were included based on internal parts considerations which could increase the potential for operational degradation over time due to design deficiencies.

Both safety-related "active" and "passive" check valves (based on safety function) were included in the program. Excluding the check valves present in the RDS and Excess Flow Check Valves in instrumentation lines, 78 of the 149 active valves in the IST program and 16 of the 52 passive valves excluded from the IST program were included in the Check Valve Program. The 740 check valves associated with the hydraulic control units in the RDS were not considered for the Check Valve Program due to the monitoring provided by technical specification surveillance requirements. The 78 active valves were included due to the need for internal parts monitoring in addition to Section XI testing. Some of the other active valves were not included in the Check Valve Program because they were in systems not considered under the guidelines of the program, such as the Instrument Air System, the Spent Fuel Cooling System, the Reactor Coolant System, and others.

The disassembly and inspection and/or non-intrusive testing frequency for each valve was established based on consideration of the valve safety classification, existing test requirements, and input from the design review. All valves in the program will be tested/inspected within a period of 8 years, providing a practical assessment of check valve condition within five to six operating cycles. Many valves will be inspected at least once in the first 6 years of program implementation, consistent with the guidelines of GL 89-04. These valves are presently included in the IST program. The frequency for testing/inspection will be adjusted based on actual test/inspection results.

Section 7 of procedure NMP2-CV-001 provided a listing of all check valves included in the Check Valve Program, and identified the inspection type, frequency, and methodology of inspection to be used. In reviewing these listings, the audit team observed that a heavy reliance was being placed on non-intrusive testing (NIT) methods, as opposed to disassembly and inspection (D-I) methods to determine valve degradation. As an example, only 17 of the 94 safety-related valves were specified for D-I, while the remaining 77 were specified for NIT. None of the valves was specified for both methods. The audit team was concerned that the program lacked a means of benchmarking the NIT results against D-I observations and measurements, especially since the NIT methodology was not firmly developed and the process to be used had not yet been selected by the licensee. The licensee discussed the concern with the audit team and indicated that such benchmarking and comparison of NIT results with D-I results was intended, but the administrative program document establishing such guidance was still in the process of preparation. The audit team considered the development of the Check Valve Program without an overall administrative program document approved by management to be a weakness, and requested that the licensee provide a copy of the program document to the NRC when responding to the audit report.

The audit team also observed that valves had not been grouped for size and type in order to establish the inspection/test order for each program valve. The licensee responded that work was ongoing to designate valve groups, and provided a memorandum dated August 7, 1991, entitled "Groupings for NMP2 Check Valves in the SOER 86-03 Program," File Code SM2-M91-0211. The valves were placed in the same group based on:

Same size
Same type
Same orientation
Similar actual flow velocity/full disc lift flow velocity ratio
Similar frequency of operation under flow
Similar upstream piping configuration
Similar fluid (e.g., lake vs. demineralized water)

The valves were categorized into 31 groups of two or more valves, with an additional 21 individual valves that did not fall into any grouping. The valve groupings at this stage of program development appeared satisfactory to the audit team.

4. Design Application Review

A check valve design application and installation review was conducted in several stages by the licensee to determine if: (1) installed valves were of the proper type for the intended service; (2) valves were properly sized for operating flow conditions; and (3) valves were correctly oriented and located with respect to flow and upstream sources of turbulence.

The original request for the review was issued by the Technical Support Department in Problem Report (PR) document PR08075, dated August 25, 1988. A response to the PR was provided by Corporate Engineering on December 7, 1988, and addressed 119 system check valves in the review. The response was reviewed by the Operational Experience Assessment Group (OEA), who considered the response inadequate, as documented in Niagara Mohawk Internal Office Correspondence (IOC) of P. Mazzaferro to K. Ward dated March 9, 1989. The Unit 2 AE was subsequently directed to perform an indepth review of system valves and prioritize the check valves based on the potential for failure considering the misapplication considerations outlined above. The valve prioritization list, which included an additional 12 valves from the Reactor Core Isolation Cooling System, was completed on July 31, 1989. As noted in Section 3, 23 valves were added following the engineering study based on industry-identified problems with similar valves, for a total of 154 valves in the program.

The methodology for prioritization of the valves in terms of failure potential was reported in a memorandum from R. J. McCullum to R. K. Duevall, entitled "Check Valve Applicability - INPO SOER 86-3," July 27, 1989, File Code NMP54324. The methodology used in evaluating the valves and assigning priority was based on the following 10 criteria:

ACTIVE CRITERIA

1) Flow Characteristics with respect to Full Disc Lift Flow
2) Location with respect to Flow Disturbances
3) Orientation (vertical or horizontal)

PASSIVE CRITERIA

4) Potential Safety Impact
5) Type of Check Valve
6) Size
7) History
8) Likelihood of Transients
9) Frequency of Operation
10) Location with respect to Primary Containment (In or Out)

The three active criteria represented the potential causes of failure defined by the Institute of Nuclear Power Operations (INPO), while the seven passive criteria further defined the likelihood and consequences of such failures. Each criterion was given a relative worth score and the total score for each valve was arrived at by the weighted sums of the passive and active criteria. The formulation for combining the criteria and arriving at the priority rankings provided that if a valve scored 0 on each of the active criteria, it received a 0 score overall, indicating that the valve was not a problem with respect to the INPO concerns. Nineteen valves were found to have a 0 score, while the remaining 112 were ranked in terms of their potential for service-induced degradation.

In response to audit team questions, the licensee indicated that corrosion and cleanliness were considered in the relative worths assigned by systems in the safety and frequency criteria.

The audit team observed that the criteria satisfactorily covered all the important characteristics for determining the likelihood and consequences of check valve failures, but found that six swing check valves ranging in size from 3 inches to 12 inches were screened out of the Check Valve Program just because they met the three active criteria. Each of these valves had a high safety worth, and two of the valves had a significant prior maintenance history worth. The audit team was concerned that valves which were considered to be of high safety significance and had some prior degradation history, as well as those of a type most susceptible to service-induced degradation, could be screened out of the program based on the priority formulation. In response to the audit team's concern, the licensee committed to revise the formulation such that the lowest minimum value for "active" criteria would be a value of 1, thereby allowing all valves with significant "passive" criteria to be considered and assigned a priority.

5. Control, Evaluation and Implementation of Industry Information

The audit team reviewed the licensee's process of receipt, control, evaluation and implementation of third party recommendations, vendor reports and industry information and discussed the process with personnel in the Quality Assurance-Operating Experience (QAOE) organization. The Nuclear Licensing organization receives and screens NRC Bulletins and GLs, the QAOE organization receives and screens industry event documents (such as INPO SOERs and Significant Experience Reports, GE Service Information Letters and RICSILs, and NRC INs) and vendor letters (such as TILs, 10 CFR Part 21 Notices, PRCs), and the Nuclear Network coordinator receives and distributes network documents (such as O&MRs, OEs, SENs, and others). Each document is screened for applicability to the Nine Mile Point Station (Units 1, 2, or both); if the document is applicable, a Deviation/Event Report (DER) is issued and processed in accordance with procedure NIP-ECA-01. The manager of the affected Unit concurs in both the action assignment and the

evaluation and disposition of the DER. The DER process was implemented in April 1991 and replaced a multiple deficiency reporting process. The Operating Experience function was moved from the Generation division to the QA organization in September 1990 and staffing levels were increased to provide the required screening and evaluation functions.

The audit team reviewed several screening documents generated by QAOE and DERs associated with INPO SOER 86-03 and other documents involving check valve problems. In the response to NRC GL 90-03, the licensee identified the above processes to disposition industry and vendor information, and identified enhancements in the interface of technical information with General Electric and interface with non-NSSS vendors which would be developed and implemented by December 31, 1991.

The audit team concluded that procedures and programs were established which should be effective in ensuring that vendor and industry information on check valve problems and failures are assessed by the licensee and important information incorporated into the Check Valve Program.

6. Check Valve Testing Program

The audit team selected check valves from the Service Water (SWP), Main Steam (IAS), Emergency Diesel Generator Air Start (EGA), High Pressure Core Spray (CSH), Feedwater (FWS), Reactor Core Isolation Cooling (ICS), and Residual Heat Removal (RHS) Systems for review in accordance with the draft TI. A total of 60 valves were selected from a review of system Piping and Instrumentation Drawings. The sample of safety-related check valves selected was based on a review of system function, Technical Specifications, Licensee Event Reports, and licensee responses to GL 87-06 and GL 89-04. The sampled valves were consistent with the NMP2 IST Program Plan and the NRC SE of the Plan and associated approved relief requests.

The program, systems and documentation for selected valves were reviewed and discussed with the Corporate Pump and Valve Coordinator, the Corporate Lead Mechanical Design Engineer, and the Station IST Coordinator. The discussions and associated reviews were conducted to assess the following:

- Determine the manner and the extent to which the systems were reviewed to identify and include safety-related valves in the IST and Valve Programs.
- Determine if appropriate valves in the selected sample were in the NMP2 IST program.
- Determine, for a sample of the valves in the IST program, if the testing modes were appropriate for the safety-related functions.
- Determine if the test methodology demonstrated that valves were capable of performing all the required safety functions.
- Determine if the licensee IST program commitments as reviewed by NRC in the preparation of the IST program as defined in the SE have been implemented.

- o Determine if test procedures correctly reflected valve testing requirements.
- o Determine if valve history records showed that appropriate testing was performed.
- o Determine if the guidelines and issues of GL 89-04 were addressed in the valve testing.

The audit team noted that the NMP2 IST program had been revised (Revision 3, dated May 1, 1991) to address the NRC SER of the IST Program for Pumps and Valves. It appeared that all omissions and inconsistencies identified in the SE have been resolved. The station computer was found to have a program that controlled and scheduled the performance of check valve testing and provided biweekly reporting of upcoming surveillance tests. The licensee developed a basis for each safety-related valve excluded from the IST program, which was reviewed and found to be acceptable.

The test procedure required in the IST program for each sampled valve was reviewed for appropriateness and to determine if it demonstrated the required performance capability of the valve. The test procedure acceptance criteria for forward flow rate, back leakage flow, and/or pressure were evaluated for acceptability. The acceptance criteria were determined by analyses performed by engineers from Mechanical Design who based their calculations on the Updated Safety Analysis Report and Technical Specifications.

One of the procedures reviewed did not have an appropriate acceptance criteria based on the expected and observed system conditions during the test. Procedure N2-OSP-RHS-Q004 stated an acceptance criterion of observing a pressure less than 150 psig on the system pressurizing pump discharge pressure gauge to verify the reverse flow closure of series check valves 2RHS*V47 and *V48. However, the RHS pump (2RHS*P1A), which pressurizes the downstream side of this check valve pair, can have an acceptable discharge pressure as low as 134 psig. Therefore, it would have been possible for these valves to fail to close upon being subjected to reverse flow differential pressure and be declared operable by the test procedure. The licensee determined that the 150 psig criterion was a clerical error since the procedure for another train of RHS had an acceptance criterion of 100 psig for the valve pair performing the same function. The licensee initiated the process to correct the clerical error in this test procedure.

Unlike other utility procedures reviewed by the team, NMP2 procedures included assessments of reverse flow closure; however, the licensee's test procedures were found to rely on subjective acceptance criteria. The procedures were found to contain criteria such as "observe little or no flow," "observe less than a solid stream of water," and "verify that the valve checks flow." Such criteria may be interpreted differently by the different individuals performing the testing. Although the reverse flow closure verification need not determine a leakage rate or contain a great deal of rigor, the team concluded that, where practical, the licensee should make these acceptance criteria more objective or quantifiable. This would reduce the possibility of a severely-degraded valve being declared acceptable.

The Pressure Isolation Valve (PIV) list for NMP2 was reviewed and valves from the selected systems were reviewed for appropriateness of the test requirements and procedures. Leak testing of PIVs following maintenance or repairs was controlled satisfactorily. The audit team concluded that the IST program was well organized to control and direct the activities and procedures which ensure the Code required valves are subjected to required inservice testing.

The team was concerned that some valves included in the IST program may not be subject to the preventative maintenance requirements of the station Check Valve Program and, in turn, certain Check Valve Program valves may not be subject to inservice testing. For example, out of 29 valves in the CSH, Low Pressure Core Spray, and ICS systems included in the IST program, 11 were not included under the Preventive Maintenance program as listed in procedure NMP2-CV-001. These valves were not included because they fell outside of the licensee's selection criteria which are based on INPO SOER 86-03. The team concluded that the basis for not including these 11 valves was acceptable.

The staff reviewed the diesel generator starting air system to determine which check valves were included in the IST program. The system design incorporates two air receivers and air start trains per diesel to provide starting air. A check valve is located between each air receiver and the diesel generator and the two headers are cross connected downstream of the check valves. These valves perform a safety-related function to prevent loss of air from both receivers during diesel start if there is a rupture or catastrophic failure in one air start train. These valves are included in the IST program and are forward and reverse-flow tested during refueling outages. Due to the unique inverted installation of these check valves, however, the testing may not verify their capability to perform their safety function under all accident conditions.

Station personnel indicated that the diesel vendor installed the valves in the inverted position because there had been many failures during testing due to disc fluttering and impact against the open stop. They further stated that the safety function of the valves is to prevent loss of air from both trains given a catastrophic failure in one train. The reverse flow testing of these valves involves removing a flexible hose in one air start train and starting the diesel using the other train. This testing verifies that the check valves will close when subjected to approximately 250 pounds of differential pressure, however, the testing does not verify that the valves will close when subjected to differential pressures less than full pressure. It also does not appear that the vendor or the licensee has performed testing or calculations to demonstrate that the diesel will start in the technical specification time limit if the line break in the air start train is substantial but less than a complete line break, i.e., where the differential pressure across the inverted check valve is insufficient to close the valve but there is still enough loss of starting air back through the valve so the diesel does not start and come up to speed as required. The team concluded that additional justification of the testing methodology should be provided to ensure proper justification of the starting capability under all postulated failure mechanisms.

The licensee has adopted the requirements of ANSI/ASME OM-1 for testing all safety-related relief valves in their IST program. Valves that perform a vacuum breaker function are also being tested per OM-1. Some vacuum breakers are basically check valves that were previously tested per the requirements of ASME Section XI, Subsection IWV, which involved quarterly or cold shutdown exercising. The licensee is currently testing these valves once every 10 years per OM-1. These valves are constructed identically to check valves and have the same degradation mechanisms. Some, such as the RCIC turbine exhaust line vacuum breaker check valves, are subjected to steam and open to permit flow from the wetwell quarterly during RCIC pump teting. The audit team was concerned that testing these valves once every 10 years could allow a failed or seriously degraded valve to go undetected for extended periods of time. This concern has been discussed by the ASME O&M Code Working Groups for Pumps and Valves and the Working Group for Check Valves. The audit team requested the licensee to evaluate the testing frequency for these vacuum breakers and determine if the testing is sufficient to verify their operational readiness.

7. Maintenance Program

Administrative Procedure (AP) 5.2, "Maintenance Program Technical Requirements," established the general technical requirements for the Nine Mile Point Station maintenance program. The staff reviewed the current maintenance program and maintenance practices in place at NMP2, and found that the programs and practices did not yet focus attention on industry check valve problems and lessons learned. The Check Valve Program was developed and was in the process of implementation, as described in Section 3 of this report. Initiation of the program was originally scheduled for December 31, 1991, but was accelerated by station management to September 9, 1991, in preparation for an INPO visit in September.

The staff found that the Technical Support and Maintenance organizations had not upgraded check valve maintenance procedures to make them specific to different style check valves. This was observed to be a key factor in the lack of a data base that could be used to provide meaningful data for trending. For example, mechanical maintenance for most Velan valves (gate, globe and check valves) is currently performed using procedure N2-NMP-GEN-216. The audit team observed that its use for check valves does not result in the differentiation of deficiencies between various valve sizes and types.

8. Trending Program

The licensee employs a computerized work tracking system (WTS) to track work in progress as well as maintenance work history. Maintenance work records can be readily retrieved through the WTS as demonstrated by the various work packages provided to the staff during the audit.

Section 5.7 of AP 5.2 notes that Nuclear Engineering and Licensing (NE&L) is responsible for many equipment failure trending duties such as determining parameters to be trended and issuing quarterly trending program status reports. It appeared that the NE&L trending responsibilities may have changed since the last equipment failure trending report, which was issued on December 21, 1989.

However, the various NMP2 maintenance groups perform an annual review of all work requests (WRs) concerning equipment for which they are responsible. Those components with many WRs (usually more than five) are evaluated for adverse trends. The audit team reviewed the results of the 1990 review of mechanical maintenance WRs. While the review noted six WRs for two RDS check valves, it did not identify any adverse trends for these or other check valves.

The above observations did not provide evidence of strong trending activities, especially in light of the check valve concerns identified by the audit team in Section 9. Also, as noted in Section 7, the licensee's procedures did not provide for the recording of consistent, meaningful check valve data to perform trending. Thus, the audit team concluded that the licensee should consider improvements to their current trending activities.

9. Corrective Action Program

Niagara Mohawk Power Corporation Nuclear Division Directive NDD-ECA, "Evaluation and Corrective Action," states, in part, that its purpose is "to establish requirements for the identification, documentation, notification, evaluation, disposition and correction of events or conditions adverse to quality." This upper level management directive is to be implemented by various station, working group, and individual Unit 1/2 procedures. However, the audit team identified several concerns regarding inadequate corrective action taken on certain Service Water System check valves.

The audit team determined that two groups of check valves have experienced frequent failures. The most significant check valve group contained the Anchor Darling testable check valves in the Residual Heat Removal System. This item was on the Plant Manager's "Top 10" list, which included the most visible issues affecting plant performance. Failures of these valves have resulted in significant outage extensions at NMP2 and contributed to maintenance and ALARA overruns. The failures have been discovered through performance of local leak rate tests in accordance with the IST program.

The audit team discussed with maintenance personnel the recent experience with repairs to these valves during the last refueling outage (RFO). It appeared that maintenance personnel have taken appropriate actions to repair these valves consistent with the level of engineering and management support provided to them. Additional actions were ongoing to avoid the identified problems during the next RFO. In addition, NMP2 intended to procure a spare Anchor Darling check valve for use in training their mechanics.

The second check valve group where frequent failures have occurred involves the Service Water Pump discharge check valves (designated SWP*V1A through *V1F). These are 18-inch valves manufactured by Clow (now C&S Valve Company). The valve has an external lever arm mounted to the drive shaft which provides local valve position indication. Following review of various maintenance WRs and Engineering Design Changes (EDCs) associated with these valves, the audit team concluded that certain aspects regarding the licensee's past corrective actions of known deficiencies were inadequate, as follows:

a. Failure to Issue a Nonconformance Report (NCR) for SWP*V1E

Maintenance had been performed in December 1990, on this valve per WR 191720. Upon valve disassembly, the disc to shaft anti-rotation key was found to be missing. This condition placed torsional stresses on the disc to shaft dowel pins above that considered in the design. The dowel pins were provided to align the disc/shaft assembly within the valve body.

The maintenance supervisor considered the issuance of an NCR but elected not to issue one. Also, although QA/QC witnessed portions of the work and signed off on WR 191720, they did not question why an NCR had not been written. It appeared to the audit team that an NCR should have been issued to (1) ensure that the other five check valves of this size, type and manufacturer were not missing the key, and (2) evaluate the reportability of this deficiency in accordance with NRC requirements.

b. Lingering Problems with SWP*V1 Valves Since 1986

It was apparent to the audit team that the root causes for the frequent failures observed with these valves had not been established to define clear, long-term corrective actions. In March 1991, the licensee stated in EDC 2F00293, related to the repair of SWP*V1C, that "in the past this valve and other service water pump discharge check valves have had similar or exacerbated problems, namely: broken keys, worn keyways, sheared dowel pins and excessively worn seal packs." Furthermore, the C&S Valve Company field representative informed the licensee at this time that the site maintenance information (i.e., procedures and vendor manual) did not reflect the latest (1985) vendor installation instructions for the disc/shaft dowel pins.

Site Engineering subsequently issued PRs 9591 and 9603 in March 1991. PR 9591 addressed specific problems concerning valve SWP*V1C and PR 9603 addressed general problems applicable to all SWP*V1 valves. The audit team concluded that Site Engineering had made reasonable attempts to correct individual valves and had recognized the need for Design Engineering support to establish long-term corrective actions. At the time of the audit, it was apparent to the team that long-term solutions to these PRs were not being aggressively pursued by Design Engineering, in that no action plan had been developed to address the deficiencies identified in the PRs.

c. Corrective Actions Concerning Lack of Vendor Information

As noted above, the NMP2 maintenance procedures and the vendor manual did not include the correct installation instructions for the disc/shaft dowel pins. The licensee determined that the C&S Valve Company had not sent this information to NMP2 in 1985. However, it was not apparent to the audit team that NMP2 QA and Design Engineering had initiated the necessary actions with the vendor in March 1991 to correct and prevent recurrence

of the problem concerning the flow of vendor information. The responsible site engineer agreed to follow up with the vendor concerning these matters and indicated that other facilities would be alerted by including a description of this problem in the nuclear utility information network.

In March 1991, the 1985 vendor instructions for the disc/shaft dowel pins were incorporated into corrective actions for SWP*V1C as part of EDC 2F00293, which involved replacement of the valve disc. Initially, the responsible site engineer assumed that the 1985 vendor instructions would be incorporated on the other five SWP*V1 valves at their next disassembly. This was not accomplished by Maintenance as evidenced by failure to replace the disc/shaft dowel pins during disassembly of SWP*V1B and V1F in July 1991. Following review of this matter, the licensee indicated that subsequent SWP*V1 valve disassemblies would include a specific inspection of the disc/shaft dowel pins to determine if replacement was needed. If new dowel pins were installed, the correct vendor instructions would be used.

d. Corrective Actions for Other Clow (C&S Valve Company) Valves

The problems noted in paragraphs a., b., and c. above may be generic concerns that are applicable to other Clow check valves at NMP2. In addition to the six SWP*V1 valves, there are five 30-inch safety-related check valves in the Service Water System. The NMP2 responsible site engineer agreed that these valves needed to be evaluated for possible corrective actions arising from the findings associated with the SWP*V1 valves. Additionally, 15 non-safety related Clow check valves are installed in the condensate and turbine building closed loop cooling systems.

Other check valve degradation problems have been experienced at NMP2. During the performance of the service water operability test (N2-OSP-SWP-Q001) in August 1989, the licensee observed a reverse flow leakage of approximately 0.8 liters/minute through 8-inch Velan swing check valve SWP*V259. This check valve is located in one train of service water to the Division III Diesel Generator heat exchangers. A similar valve designated SWP*V260 is located in the other service water train. The licensee's IST supervisor evaluated the observed backleakage and concluded it was acceptable. He recognized that the test results indicated the presence of scale or sludge buildup and initiated WR 164313 on August 25, 1989, to clean the valve internals at the next Division III outage. The maintenance was completed on June 22, 1990. Scale buildup was noted and corrected.

While both SWP*V259 and V260 check valves are tested quarterly, the licensee has not taken other possible corrective actions to monitor for scale buildup on these valves. For example, SWP*V260 had not been identified for disassembly and inspection and more frequent monitoring of SWP*V259 had not been accomplished. The audit team concluded that this item represented a weakness in the current process at NMP2 for identifying check valve degradation prior to failure.

Based upon the above findings, the staff concluded that, in general, the NMP2 performance was weak concerning the assessment of check valve failures and the establishment of long-term corrective actions. Certain corrective actions regarding past failures of the SWP*V1 valves were inadequate. These issues were addressed in NRC Region I Inspection Reports Nos. 50-220/91-17 and 50-410/91-17.

10. Preventative Maintenance Program

As described in other sections of this report, the preventative maintenance program for check valves at NMP2 was based on the station Check Valve Program. The program provides the mechanisms to determine the valves which are subject to disassembly and inspection, diagnostic testing, or other forms of review. At the time of the audit, the licensee had identified 236 check valves that were subject to the program, but to date had not tested or inspected any of these valves under the program. In addition to the reviews and findings summarized previously, the team reviewed the Valve Disassembly and Inspection Procedure, N1-NMP-GEN-241, for adequacy and for conformance to the criteria specified in procedure NMP2-CV-001. The process for visual inspections of check valves appeared to be very superficial. Specific measurements and acceptance criteria were missing from the check valve inspection procedures. The licensee relies predominantly on the subjective judgement of the mechanics performing the work to determine inspection results.

11. Use of Non-Intrusive Test Methods

The Nine Mile Point Station had not developed NIT diagnostic capabilities at the time of the audit. Evaluations of NIT equipment from several suppliers were being performed on Unit 1 and Unit 2 valves during the audit period, with the intent of purchasing the selected equipment and conducting training for plant personnel by early September 1991. The goal was to perform some NIT inspections as part of the initial check valve program implementation in September. The equipment being evaluated was based on acoustic monitoring methods. The licensee was also considering the value of ultrasonic and magnetic methods in the long term.

The audit team witnessed NIT of valves SWP*V1B and V1D utilizing acoustic diagnostic equipment supplied by Liberty Technologies. Data was recorded for one closing and opening operation. After review of the low frequency acoustic signal plot for steady state flow through SWP*V1D, Liberty personnel concluded that some disc flutter was occurring. This confirmed observations by the audit team and the licensee's IST supervisor, where a definite periodic, slight movement of the valve's external lever arm was noted. Data was also collected on two small diesel fuel oil transfer system check valves. No deficiencies were found with the testing evolution.

12. Training

The audit team reviewed the training provided to personnel involved in the maintenance, inspection, testing, and diagnostic evaluation of check valves at the Nine Mile Point Station. The training for use of NIT equipment and interpretation of test results had not yet begun, since the licensee was in the process of evaluating test equipment and NIT processes at the time of the audit.

A training program for the station Technical Staff was begun in October 1990, with a goal of providing initial training for Technical Staff members involved in the program within 3 years. Determination of training needs was made by Technical Staff management, considering the qualifications and previous experience of each staff member. As a result, over half of the 150 Technical Staff members were scheduled to receive some portion of the initial training program, tailored to their needs. The training program also provided for continuing training on a 6-week cycle, which addressed plant and regulatory changes and industry events (such as check valve failures). Attendance in the continuing training program was required for all Technical Staff personnel, and was required even if the initial training program had not been completed. The audit team found the Technical Staff training program to be acceptable.

The audit team reviewed training lesson plans and referenced plant procedures used in training plant operators and maintenance personnel. The information contained in the documents pertaining to check valves provided basic valve descriptions and operational requirements, but provided no detailed information on disassembly, inspection, troubleshooting, identification of valve degradation and reassembly of check valves, nor did the documents address specific types of check valves used at the plant (such as Clow tricentric or excess flow check valves). Check valve maintenance procedures were general in nature and did not contain the level of detail expected for comprehensive determination of valve degradation. The licensee was in the process of obtaining an Anchor Darling testable check valve that could be used as a training tool to assist in alleviating the problems experienced with these valves in Unit 2.

It was apparent to the audit team that the maintenance organization's capabilities for performing adequate check valve maintenance were largely gained through on-the-job experience in lieu of formal training. The licensee identified the need for training improvements in a site working group meeting held on June 25, 1991, concerning INPO SOER 86-03 program development and implementation. The audit team encouraged the licensee to complete the upgrading of their check valve training to correct identified weaknesses.

13. Walkdown Observations

During the period of the audit, NMP2 was operating at full power. No inspections or maintenance activities involving disassembly and reassembly of check valves were conducted. However, the staff witnessed several check valve performance tests to meet IST requirements and conducted system walkdowns, as follows:

a. Service Water Pump Area

i. SWP*V1F - Discharge Check Valve (18" - Clow)

Disassembly and reassembly of the valve was recently completed in accordance with WR 179268 on July 5, 1991. The staff observed weaknesses in maintenance work practices, consisting of (1) insulation was not reinstalled, and (2) an eyebolt was left installed on the valve body instead of being removed. These deficiencies were identified to licensee personnel.

ii. SWP*V1A - Discharge Check Valve (18" - Clow)

The extended lever arm, which rotates upon disc movement, was observed to be approximately 1/2" disengaged from its normal position, as determined by observing the orientation of the disc shaft to lever arm key-to-keyway. The licensee issued WR 192841 to correct this problem.

b. Control Room Ventilation Chilled Water Pump Area and Emergency Diesel Generator Fuel Oil Transfer Pump Area

Walkdowns were conducted in the above-noted areas to observe the pump and discharge check valve conditions and piping arrangements. No deficiencies were noted.

c. Residual Heat Removal Pump Minimum Flow Check Valve

The staff witnessed the surveillance test of the Residual Heat Removal pump (2RHS*P1B) minimum flow line check valve (2RHS*V8) to demonstrate full-flow open operation. The licensee used a strap-on ultrasonic flow rate instrument to ensure that sufficient flow was established through the valve to full-stroke exercise it per GL 89-04, Attachment 1, Position 1. No deficiencies were observed.

14. Conclusions

The audit team concluded that the check valve testing (IST) program at NMP2 appeared to be in place and comprehensive, well thought out and organized, with obvious involvement of management. The Check Valve Program was still in initial stages of development and implementation had not yet begun. The audit team identified areas of concern with certain key aspects of the Check Valve Program.

During the exit meeting on August 9, 1991, the licensee was advised that it would be requested to provide a schedule for responding to these issues within 30 days of receipt of the Audit Report. The specific issues to be addressed by the licensee are summarized below.

a. The formulation used to prioritize Check Valve Program valves leads to the exclusion of some valves important to safety, as well as those of a type most susceptible to service-induced degradation. Based on the audit team's concerns, the licensee committed to revise the formulation. (Sections 1 and 4)

b. The development of the Check Valve Program without an overall administrative program document approved by management was considered a weakness. This document was still in the process of preparation at the time of the NRC audit. (Section 3)

c. Although current management support and involvement in check valve activities is evident, the delays in implementing the Check Valve Program, lack of an overall program guidance document, and continuing problems with Clow check valves in the Service Water System indicate that this support and involvement were not as timely and aggressive as it should have been. (Section 6)

d. Procedure N2-OSP-RHS-Q0040 did not have appropriate acceptance criteria. (Section 6)

e. Where practical, the acceptance criteria in test procedures that assess reverse flow closure should be more objective or quantifiable. (Section 6)

f. Some valves included in the IST program may not be subject to the preventative maintenance requirements of the Check Valve Program. (Section 6)

g. Due to the unique inverted installation of certain diesel generator starting air system check valves, current testing may not verify their capability to perform their safety function under all accident conditions. The audit team concluded that additional justification of the testing methodology should be provided to ensure proper diesel generator starting capability under all postulated failure mechanisms. (Section 6)

h. Valves that perform a vacuum breaker function are being tested once every 10 years per ANSI/ASME OM-1. These valves are constructed identically to check valves and have the same degradation mechanisms. The audit team requested the licensee to evaluate the testing frequency for these vacuum breakers and determine if the testing is sufficient to verify their operational readiness. (Section 6)

i. The audit team found that the Technical Support and Maintenance organizations had not upgraded check valve maintenance procedures to make them specific to different style check valves. This was observed to be a key factor in the lack of a data base that could be used to provide meaningful data for trending. The team observed that the use of procedure N2-NMP-GEN-216 for mechanical maintenance on Velan check valves does not result in the differentiation of deficiencies between various valves sizes and types. (Section 7)

j. The audit team concluded that improvements in current trending activities should be considered. Evidence of strong trending activities was not observed by the team. (Section 8)

k. Weaknesses were observed in the training program for personnel performing check valve maintenance. Training materials including related procedures were general and did not provide detailed information. (Section 12)

LICENSEE DOCUMENTS REVIEWED BY THE AUDIT TEAM AT NINE MILE POINT UNIT 2

NMP2-IST-001, "Pump and Valve First 10 Year IST Program Plan," Revision 3

Docket No. 50-410, TAC 63429, "SER of the Inservice Testing (IST) Program for Pumps and Valves, Nine Mile Point Unit 2," August 2, 1990

NMP2-CV-001, "Check Valve Program," Revision 0, 6/26/91

NDD-ECA, "Evaluation and Corrective Action," Revision 03

NDD-MAI, "Maintenance," Revision 00

AP-5.0, "Maintenance Program," Revision 00

AP-5.2, "Maintenance Program Technical Requirements," Revision 00

AP-5.4, "Conduct of Maintenance," Revision 03

AP-5.5, "Work Control," Revision 02

NIP-ECA-01, "Deviation Event Report," Revision 3

NIP-ECA-03, "Operating Experience Review Program," Draft, For Information Only

NTP-17, "Training for Technical Staff and Technical Staff Management Personnel," Revision 01

Lesson Plan #MM-204, "Basic Valves," Revision 0

CORE-OS-NPF-001-5-9, "Lesson Plan - Nuclear Power Plant Fundamentals, Chapter 9 - Valves, Traps and Pipes," Revision 0

01-NLO-1-002-T20-01 and 01-LOT-002-303-1-10, "Lesson Plan - Nuclear Power Plant Fundamentals - Valves, Traps, Pipes and Valve Positioning," Revision 2

02-NLO-002-310-2-01, "Pump and Valve Fundamentals," Revision 1

N1-MMP-GEN-241, "Overhaul and Inspection of Station Gate, Globe, Plug, Ball, Check, and Butterfly Valves," Revision 02

N2-MMP-GEN-216, "Maintenance and Repair of Velan Bolted Gate, Globe, and Swing Check Valves 2-1/2" - 24"," Revision 0

N2-MMP-GEN-213, "Maintenance of Air Assist and Testable Check Valves"

S-MMP-GEN-919, "Check Valve Inspection," Draft

N2-ISP-ISC-R001, "Reactor Instrument Line Excess Flow Check Valve Operability Test with Process Fluid and Pressure," Revision 2

N2-OSP-IAS-CS001, "Instrument Air System Check Valve Reverse Flow Exercise Tests," Revision 01

N2-OSP-RHS-Q004, "RHR System Loop A Pump & Valve Operability Test and System Integrity Test," Revision 05

N2-OSP-CSH-CS001, "HPCS Cold Shutdown Valves Operability Test," Revision 03

N2-OSP-CSH-Q002, "HPCS Pump and Valve Operability and System Integrity Test," Revision 05

N2-OSP-CSL-CS001, "LPCS Cold Shutdown Valves Operability Test," Revision 01

N2-OSP-CSL-Q002, "LPCS Pump and Valve Operability and System Integrity Test," Revision 06

N2-OSP-EGA-Q001, "Diesel Generator Air Start-up System Valve Operability Test," Revision 01

N2-OSP-EGA-R001, "Diesel Generator Air Start Valve and Air Start Check Valve Operability Test - Division I and II," Revision 01

N2-OSP-FWS-CS001, "Feedwater System Valve Operability Test," Revision 02

N2-OSP-GSN-Q002, "Nitrogen System Check Valves Exercise Test," Revision 01

N2-OSP-HVK-Q001, "Control Building Chilled Water Loop A Pump and Valve Operability Test," Revision 03

N2-OSP-IAS-Q001, "Instrument Air System Valve Operability Test," Revision 02

N2-OSP-CSH-Q002, "HPCS Pump and Valve Operability and System Integrity Test," Revision 05

N2-OSP-ICS-CS001, "RCIC Cold Shutdown Valve Operability Testing," Revision 03

N2-OSP-RDS-CS001, "Scram Accumulator Check Valve Reverse Flow Test," Revision 0

N2-OSP-RHS-CS001, "Residual Heat Removal System Loop A Cold Shutdown Valve Operability Test," Revision 01

N2-OSP-RHS-CS003, "Residual Heat Removal Head Spray Check Valve Operability Test," Revision 01

N2-OSP-RHS-Q002, "Residual Heat Removal System Loop B Valve Operability Test," Revision 05

N2-OSP-SFC-Q001, "Spent Fuel Pool Cooling Cleanup Pump and Valve Operability Test," Revision 02

N2-OSP-SWP-CS002, "Service Water Valve Check Valves Forward and Reverse Flow Exercise Test," Revision 02

N2-OSP-SWP-CS001, "Service Water Valve Operability Test," Revision 03

N2-OSP-SWP-Q002, "Service Water Pump and Valve Operability Test," Revision 03

Memorandum regarding SOER 86-03 Inadequate Problem Report Response, P. Mazzaferro to K. Ward, File Code NMP45969, March 9, 1989

Memorandum regarding Your Memorandum, NMP45969 Regarding SOER 86-3 and PR#8075, K. D. Ward to P. Mazzaferrro, File Code SM2-DM89-0253, July 20, 1989

Memorandum regarding Meeting Minutes, P. Brunsgaard to OEA File, File Code NMP51300, July 24, 1989

Memorandum regarding Check Valve Applicability - INPO SOER 86-3, R. J. McCullum to R. K. Deuvall, File Code NMP54324, July 27, 1989

Memorandum regarding Memorandum #SM2-DM89-0253, 7/20/89, Regarding SOER 86-3 and PR #8075, K. D. Ward to P. Mazzaferro, File Code SM2-DM89-0262, July 31, 1989

Memorandum regarding Unit 1 Meeting Minutes - INPO SOER 86-03, M. Friedman to Distribution, File Code NMP75406, June 25, 1991

Memorandum regarding Manpower Support for INPO SOER 86-03 Check Valve Program Implementation, M. Friedman to W. Yaeger, File Code NMP82526, July 10, 1991

Memorandum regarding NRC Audit of NMP2 Check Valve Activities, S. Leonard to M. Jaworsky, File Code SM-ISI91-0153, August 6, 1991

Memorandum regarding Groupings for NMP2 Check Valves in the SOER 86-03 Program, R. J. McCullum to S. Leonard and J. Neyhard, File Code SM2-M91-0211, August 7, 1991

Memorandum regarding Check Valve Design Review, NMP2, J. Halusic to S. Leonard, File Code SM2-M91-0212, August 9, 1991

Letter regarding Niagara Mohawk Power Corporation Plan to Comply with Generic Letter 90-03, C. D. Terry to USNRC, No.NMP1L 0584, May 15, 1991

DER 2-91-Q-0262, "Check Valve Failures," 5/20/91

WR 191720, Service Water Pump 1E Discharge Check Valve, Originated on 12/4/90

WR 189661, Service Water Pump 1C discharge Check Valve, Originated on 10/14/90

WR 179264, Service Water Pump 1A Discharge Check Valve, Originated on 4/4/90

WR 179265, Service Water Pump 1B Discharge Check Valve, Originated on 4/4/90

WR 179266, Service Water Pump 1D Discharge Check Valve, Originated on 4/4/90

WR 179268, Service Water Pump 1F Discharge Check Valve, Originated on 4/4/90

WR 164313, Service Water Check Valve 2SWP*V259, Originated on 8/25/89

WR 192907, Service Water Check Valve 2SWP*V240A, Originated on 6/1/91

WR 184896, Feedwater Pump Low Flow/High Pressure Discharge Check Valve 2FWS*V129A, Originated on 7/14/91

EDC No. 2F00355, Leak Repair of 2FWS*V129, Released on 8/2/91

EDC No. 2F00293, Incorporate 1985 Vendor Dowel Pin Installation Instructions into 2SWP*V1C, Released on 3/8/91

EDC No. 2F00070B, Repair Keyway and Add New Keyway/Key for Disc/ Shaft of SWP*V1C, Released on 4/7/90

Nine Mile Problem Report 09591, Dowel Pins Backing Out of Disc/Shaft Holes of SWP*V1C, Initiated on 3/7/91

Nine Mile Problem Report 09603, Multiple Problems Over Several Years Concerning Service Water Pump Discharge Check Valves, Initiated on 3/12/91

Clow Drawing D-0282 Rev. E, 18" Check Valve

February 7, 1992

Docket No. 50-410

DISTRIBUTION:

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ACRS (10)	Plant File
JMenning	

Mr. B. Ralph Sylvia
Executive Vice President, Nuclear
Niagara Mohawk Power Corporation
301 Plainfield Road
Syracuse, New York 13212

Dear Mr. Sylvia:

SUBJECT: REPORT OF AUDIT OF EFFECTIVENESS OF LICENSEE ACTIVITIES REGARDING THE PERFORMANCE OF SAFETY-RELATED CHECK VALVES - NINE MILE POINT NUCLEAR STATION, UNIT 2 (TAC NO. M81189)

The NRC staff conducted an audit of the subject activities during the period August 5-9, 1991, and the enclosed Audit Report documents the audit team's efforts and findings. The check valve testing program at Unit 2 was assessed to be comprehensive, well thought out and organized, and good management involvement was evident. However, the check valve preventative maintenance program was only in the initial phase of development and several areas of concern were identified by the audit team. As discussed with your staff in the exit meeting on August 9, 1991, we request that Niagara Mohawk Power Corporation provide a schedule for responding to the Audit Report areas of concern within 30 days of receipt of this letter. We also request that your response include a copy of the approved administrative program document for the Check Valve Program as discussed in Section 3 of the Audit Report.

This requirement affects one respondent and, therefore, is not subject to Office of Management and Budget review under P.L. 96-511.

Sincerely,
ORIGINAL SIGNED BY:
Richard A. Laura, Acting Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Audit Report
cc w/enclosure:
See next page

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