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LICENSEE: Niagara Mohawk Power Corporation
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FACILITY NAME: Nine Mile Point, Units 1 and 2

INSPECTION CONDUCTED: November 28 - December 9, 1988

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1/24/89
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INSPECTION: Special announced Maintenance Team Inspection on November 28 - December 9, 1988 (50-220/88-80; 50-410/88-80).

AREAS INSPECTED: An in-depth team inspection of the Nine Mile Point Unit 1 maintenance program and its implementation was performed. The inspection included a walk down of equipment and observations of maintenance work in progress at Unit 2. The inspectors used the NRC Maintenance Inspection Guidance, dated September 1988, and Temporary Instruction 2515/97, dated November 1988.

RESULTS: Overall, the maintenance program and its implementation were found to be adequately organized and functioning well. Areas of strengths and weaknesses were identified and are outlined in the executive summary and discussed in the report.



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EXECUTIVE SUMMARY

BACKGROUND

The Nuclear Regulatory Commission considers effective maintenance of equipment and components a major aspect of ensuring safe nuclear plant operation and has made this area one of the NRC's highest priorities. In this regard, the Commission issued a Policy Statement, dated March 23, 1988, that states, "It is the objective of the Commission that all components, systems and structures of nuclear power plants be maintained so that plant equipment will perform its intended function when required. To accomplish this objective, each licensee should develop and implement a maintenance program which provides for the periodic evaluation, and prompt repair of plant components, systems, and structures to ensure their availability."

To ensure effective implementation of the Commission's maintenance policy, the NRC staff is undertaking a major program to inspect and evaluate the effectiveness of licensee maintenance activities. This inspection was performed in accordance with the newly developed guidance provided in NRC Temporary Instruction 2515/97 and Maintenance Inspection Guidance, dated September 1988. The temporary instruction includes a "Maintenance Inspection Tree" that identifies for inspection the major elements associated with effective maintenance.

CONDUCT OF INSPECTION

The maintenance inspection at Nine Mile Point, Units 1 and 2 was initiated with a memorandum to NMPC dated October 5, 1988. At that time a list of requested site specific information was submitted to Niagara Mohawk Power Corporation (NMPC). This information request is shown in Appendix 1 to this report. A comprehensive pre-inspection submittal of information based on this request was provided to the team by NMPC on November 9, 1988.

The NRC inspection team spent the two weeks from November 14 to November 25, 1988, in the NRC Region I office preparing for the inspection and examining the information submitted by the licensee. The team conducted an onsite inspection at the Nine Mile Point sites from November 28 to December 9, 1988.

The inspection was directed toward observation of maintenance work in progress at the site and licensee activities supporting this work including engineering, training and management. Maintenance activities selected for detailed review included equipment identified by the application of the probabilistic risk assessment (PRA) for a similar plant as having significant contribution to core damage accident sequences or to the reduction of the risk associated with plant operation. Other components and maintenance activities were selected for inspection based on the scope of work in progress during the inspection, recent failures of safety related equipment, special interest items, and NRC inspector experience.



Daily meetings were held by the NRC Team Leader with Plant Maintenance Supervision to summarize the inspection team findings and identify areas where additional information was required. On December 8, 1988, a communication session was held for each NRC inspector to present the inspection scope and significant findings to NRC management. The summary of the inspection team findings, including a presentation of an evaluated maintenance inspection tree, was discussed with licensee representatives including management, supervisors and engineers at the December 9, 1988, exit interview (see Appendix 2 for attendees). The NRC team inspection activities were observed by Mr. Paul Eddy of the Public Service Commission of the State of New York.

RESULTS

Figure 1 is the maintenance inspection tree completed by the inspection team for Nine Mile Point, Units 1 and 2. As indicated in the figure, the inspection team evaluated three major areas: (I) overall plant performance as affected by maintenance; (II) management support of maintenance; and, (III) maintenance implementation. Under each of these major areas, elements considered important for proper function of the area were inspected. For each element, the inspectors evaluated both the program and how effectively the program is implemented, with emphasis given to direct observation of work activities and discussions with those involved to verify the quality of maintenance implemented.

During the current shutdown, numerous changes have been made in licensee management and programs at Nine Mile Point. The plant organization and procedures affecting maintenance activities have and are continuing to undergo significant change. Where recent changes were made but not fully implemented, the inspectors evaluated the pre-change conditions and appraised the expected effects of the change.

OVERALL PLANT PERFORMANCE AS AFFECTED BY MAINTENANCE

There were insufficient performance measurement data under the revised maintenance organization and programs to effectively evaluate current overall plant performance. However, the Unit 1 plant operated for 415 days prior to the current forced outage setting a new international record for Boiling Water Reactors. The licensee's program currently tracks most INPO recommended criteria and the licensee is evaluating additional performance indicators to assess the effectiveness of plant maintenance activities.

MANAGEMENT SUPPORT OF MAINTENANCE

The station maintenance organization receives adequate support from station management in administering an effective day-to-day plant maintenance program. However, corporate and station management appeared to be slow in recognizing extra initiatives and in identifying troubled programs. Management did not follow through timely resolution of the maintenance self assessment items, although this assessment was an important initiative and a comprehensive



review of their maintenance program. Management did not recognize the need for improving technical support in a timely manner to prevent a backlog in the area of industry and regulatory information review and resolution. The licensee is currently involved in implementing major changes in the station organization and various programs.

MAINTENANCE IMPLEMENTATION

The licensee has developed a functional work control program. Work is being planned, prioritized and scheduled in accordance with directives. Backlog monitoring has been established through the use of Maintenance Performance Indicators and the Work Tracking System (WTS). Sufficient procedures have been developed to control the work orders and to provide the craftsmen step-by-step instructions for the maintenance activities. A Work Tracking System is used extensively to track the status of all maintenance work and to retrieve completed work records. Post maintenance testing criteria have been defined and are being applied by the operation personnel. Plant supervisors review completed work packages according to written instructions. Weaknesses identified in this area include: excess backlog of open work orders, lack of coordination for repair parts in the work planning process, and the lack of a Unit 1 Master Equipment List.

An adequate maintenance organization has been established with written procedures issued to perform maintenance related tasks. Contracted work is effectively controlled; however, need for improvement in the Construction Services Engineering contractor work check list is recognized as a weak area and is being improved by the licensee. A system for maintenance trending and root cause analysis has been established with both corporate and site personnel trained in the Kepner-Tregoe method of analysis. Nuclear engineering has established a central trending program that is intended to identify to management the systems and components that should be considered for evaluations based on data inputs from trending programs at the site such as NPRDS, Quality Control records and the results of the self assessments programs.

The site has adequate facilities for the conduct of maintenance. The licensee is in the process of combining the electrical, I&C and mechanical departments under one computerized calibration program. The licensee is reviewing the need to implement a mechanical tool recall program as a result of some minor deficiencies noted during the NRC maintenance inspection. Overall, the licensee's material control program is acceptable although minor deficiencies associated with storage practices were identified. Tool and equipment control is satisfactory, with only minor concerns noted. Satisfactory control and calibration of metering and test equipment is being provided. The overall housekeeping of the facility was found to be adequate even though some minor problems were noted in the area of the Unit 1 dry well. However, once the deficiencies were identified, the licensee took immediate actions in evaluating or resolving the deficiencies.

The licensee's staffing controls are generally effective with a low turnover rate. The management policy is to not tolerate poor performance or the use of drugs. Maintenance training programs and their implementation are well established and documented, with a test and qualification process in place.



MAINTENANCE INSPECTION TREE

One objective of the inspection was to indicate by colors (green, yellow, or red) on the maintenance inspection tree, the team's conclusion of the status of the plant maintenance for each block on the tree. For parts II and III of the tree, the upper left of each block indicates how well the topic of the block is described and documented in the plant maintenance program including adequacy of procedures. The lower right hand portion of each block indicates the team conclusion as to the effectiveness of implementation of the intent of the topic covered by that block. Green indicates that the program is well documented, essentially complete or that the program implementation is effective. However, even for blocks shaded green, some areas for improvement may be indicated in the report. Yellow indicates a marginal but acceptable condition and red indicates the topic is missing or the intent of that portion of the tree is not being met by the maintenance activities. Blue indicates the item was not evaluated or could not be properly evaluated due to recent changes. The maintenance inspection tree as completed by the team is attached to this report as Figure 1.

The inspection team concluded that the Nine Mile Point Site has developed a maintenance program that implements the significant attributes of the maintenance tree. The team identified a number of strengths and weaknesses that are discussed in the report. Weaknesses are potential problems or conditions presented for licensee evaluation and corrective action as applicable. As weaknesses were identified by the inspection team members, they were presented to licensee representatives for initial review and evaluation during the course of the inspection. Individual items of weakness are discussed in appropriate areas of the report and are summarized in Appendix 3 of this report. The licensee is encouraged to conduct their own evaluation of maintenance related activities using the maintenance inspection tree with the objective of finding areas for improvement not identified by the previous self assessment or this NRC inspection team.



INSPECTION FINDINGS

The inspection findings are presented to correspond with the inspection topic blocks on the maintenance inspection tree. This portion of the report is intended to outline what was examined, what was found in the site program and implementation, and the conclusion reached by the team relative to that topic. Selected systems or components and work in progress were examined during the inspection.

I. OVERALL PLANT PERFORMANCE RELATED TO MAINTENANCE (DIRECT MEASURES)

SCOPE

Overall plant performance with respect to plant operability, availability, and reliability can be related directly to effective plant maintenance. This area was assessed by reviewing performance indicators such as plant availability, plant operability, reliability, and radiation exposure to determine the impact of maintenance on plant operations. The inspector interviewed the Unit 1 Station Superintendent and the Plant Performance Engineer. The inspector also examined site performance indicator reports, INPO Comparative Performance Indicator reports, NRC systematic assessment of licensee performance (SALP) reports, licensee event reports (LERs), and NRC inspection reports.

The period used to assess the direct measures element was August 25, 1986 to October 31, 1988. Unit 1 was operational from August 25, 1986 until October 16, 1987 when an automatic scram terminated a power run that set an international record for continuous power operation of a Boiling Water Reactor (415 days). Unit 1 has remained shut down in accordance with NRC Confirmatory Action Letter 88-17 regarding resolution of various issues including inservice inspection findings, fire protection and plant operator qualifications.

FINDINGS

Program

Nine Mile Point management has adopted INPO's program, "Nuclear Plant Reliability Data System" (NPRDS), for tracking maintenance and plant performance indicators. The Performance Monitoring Coordinator routinely issued a "Performance Monitoring - Management Information" report and performance indicator reports for the Maintenance, Operations and Radiation Protection departments. In addition, management also supplied INPO with "Quarterly Plant Performance Indicator Data."

Based upon interviews conducted by the inspector, it was evident that Nine Mile Point management has recognized the strong impact that maintenance activities have on overall plant operability.



Implementation

Currently tracked performance indicators were reviewed by the inspector. Systems and/or components which INPO did not incorporate into the NPRDS system have not been tracked. For example, although instrument air (a non-safety related system) has direct impact on safety related equipment, no tracking capability for this system existed. Time critical in an LCO, number of failed surveillances, and percent rework are also not tracked by the licensee.

The man-hours necessary to reduce the maintenance backlog to zero appeared only in a performance indicator report compiled for a pilot NRC program. It received very limited distribution. The "Performance Monitoring - Management Information" report sent to upper management and the Maintenance Performance Indicator Report for plant distribution dealt only with the overall number of work requests.

Radiation exposure performance indicators are tracked within a separate Radiation Exposure Management System (REMS) maintained by the Radiation Protection department. The appropriate data are provided for incorporation into station and site performance indicator reports.

The Performance Monitoring Coordinator published the following documents on performance indicators:

- Performance Monitoring - Management Information (monthly)
- Maintenance Performance Indicators (monthly)
- Operations Performance Indicators (monthly)
- INPO Quarterly Report
- NRC Performance Indicators (not routine, limited distribution)
- Monthly report for the Radiation Protection department

The reports display the indicators in terms of absolute values, as well as in relationship to industry averages, INPO goals, and station and/or site goals.

Conclusion

Because of recent changes in the site maintenance organization, major program changes in the processing and control of maintenance work requests, and the extended forced outage, the effectiveness of the new site maintenance program cannot be properly evaluated based upon recent performance indicators. However, the inspection noted that the operational period prior to the current outage was internationally recognized and indicated an effective maintenance program in terms of overall plant reliability and operability. Systems and components which may affect safety but are not currently included in the INPO NPRDS should be considered for tracking purposes where improvement in reliability, safety or performance may result.



Service Water System Walk-down

The inspector performed a walk-down of the Service Water System starting from the Service Water Pumps Nos. 11 and 12 and ending at the discharge tunnel. Using piping and instrumentation (P&ID) drawings C-18027-C and C-27179-C, the inspector verified that the required system instrumentation was within the calibration dates and that motors, pumps and valves were operating and in the proper mode of operation for the site condition. During the walk-down Service Water Pump screen No. 12 was leaking water onto the floor and the top of the pump casing one floor level below. The maintenance engineer prepared a corrective action request on the pump screen component and it was repaired during the week ending December 3, 1988.

Reactor Building Cooling Water Heat Exchanger No. 12 was being inspected due to a broken tube within the heat exchanger. The heat exchanger inspection was in progress during this inspection period, therefore, the final results of the inspection were not tabulated or analyzed. The inspector did verify that the heat exchanger unit was well protected and that the area was clean and controlled by the licensee. Using the Service Water Work Request History Computer Program run, the inspector verified that the following work requests were completed and that the system/component conditions were as stated in the work request data packages.

- W010553 - No. 11 Service Water Pump Motor Cleaned and Inspected
- W010562 - No. 12 Service Water Pump Motor cleaned and Inspected
- W26277 - Install Top in Blind Flange for Rad. Monitor
- W010927 - Safety Relief Valve Test
- W105472 - Service Water Process Monitor Repair
- W33272 - Calibrate Service Water Pressure Switch

Inspection of the Service Water System (SWS) found the equipment clean, well maintained and the plant areas containing the SWS clean. The system leaks that were found during the walk-down were documented by the maintenance staff with Work Orders being issued to investigate and correct the conditions.

Plant Walkdown Inspection

During the inspection, the NRC evaluated the licensees activities and plant condition to determine how the facilities, equipment and material control area are integrated into the maintenance process. This required an extensive walkdown of both Unit 1 and Unit 2 facilities which included entries into the Unit 1 drywell to inspect and evaluate the extent that the facilities and equipment enhance the maintenance process.

Areas inspected were found to be acceptable with the exception of a contractor tool control storage area located at the northwest equipment hatch of the Unit 1 drywell. During the inspection of this area, electric grinders and non-electric tools such as lifting cables and slings were identified which did not meet the licensee's Safety Bulletin criteria. Also, several tools were noted obstructing personnel walk ways and access areas. Licensee personnel responsible for



interfacing with contractors took immediate action toward correcting the deficiencies identified. Further, the NRC inspector identified approximately eight nuts and bolts which were stored without the proper documentation for identification. The licensee was able to trace the bolts back through the procurement system and discovered that the bolts had been used in a safety-related modification on the reactor recirculation piping flanges. However, due to material incompatibilities the bolts were replaced and should have been disposed of per the requirements of procedure S-MI-GEN-012. The licensee took immediate action to dispose of the bolts.

During the walkdown of the Unit 1 drywell, the NRC inspector also identified several areas on the reactor pedestal where the pedestal coating was peeling in three inch and smaller pieces. The coating on the reactor closed loop cooling system piping was also peeling excessively. The licensee stated that engineering was in the process of evaluating the coatings problem and would take appropriate corrective actions. In the week following this inspection, the licensee established that the screen sizes at the pump suction are smaller than the containment and core spray discharge nozzles. As of January 1989, a modification was in progress to provide for painting of the reactor pedestal, containment dome and portions of the drywell floor. The modification includes a safety evaluation. During the walkdown in the drywell, the inspectors also noted other minor deficiencies such as:

- A safety-related snubber interfering with scaffolding,
- A leaking flange on the reactor closed loop cooling system, and
- A piping/sampling line interference.

The inspectors identified these deficiencies to the licensee, at which time the licensee took action in evaluating or correcting the deficiencies prior to the conclusion of the inspection.

CONCLUSION

Housekeeping was generally well maintained throughout the plant. However, the inspector noted during plant tours that several locations, not routinely frequented by personnel were in need of attention. Although some weaknesses were identified during the walkdown inspection, it was determined that the licensee's facilities equipment and material control areas are adequately integrated into the maintenance process.



II. MANAGEMENT SUPPORT OF MAINTENANCE

The objective of this part of the inspection was to assess plant and corporate management support with respect to establishment, implementation and control of the maintenance program. The major areas evaluated were management commitment to and involvement in maintenance, organization and administration; and technical support provided to the maintenance organization. Discrete elements within these three areas, such as the roles of PRA, Quality Control and Radiological Controls in the maintenance process, were evaluated to provide a basis for the overall assessment and are discussed under separate paragraph headings. The sections in the report are numbered to correspond to the blocks on the maintenance tree.

II.2.0 MANAGEMENT COMMITMENT AND INVOLVEMENT

This area of the inspection evaluated corporate and plant management's commitment to and involvement in assuring the adequacy of plant maintenance, as indicated by (1) their support for industry initiatives; and, (2) their interest and participation in a continuing assessment and improvement of the maintenance program.

The inspector determined the extent of management's support of industry initiatives and management's interest and participation in the maintenance program by discussions and review of licensee's actions with regard to INPO initiatives, industry event communication and licensee's implementing procedures and documentation. The inspector also had discussions with maintenance and technical support management.

FINDINGS

Program

There is no written program that describes upper level management's support for application of industry initiatives. However, various industry initiatives are addressed in implementing procedures and are being applied to improve performance of maintenance.

A written program that describes the extent to which plant management must be aware of and involved in the maintenance program was not available. However, the inspector determined that plant management closely monitors the performance of maintenance and has established methods of communication and feedback. A maintenance policy document is currently being prepared for incorporation into the Nuclear Division Management policies to better define management responsibilities.



Implementation

Through interview with plant maintenance personnel and review of documentation the inspector determined that the licensee used INPO guidelines to develop plant performance indicators and goals for performance which are reported in licensee's monthly "Maintenance Performance Indicator" reports. The licensee has participated in the INPO Maintenance Peer Evaluation Program and workshops and in the training accreditation program. With regard to the INPO Human Performance Evaluation System (HPES) and Equipment Performance Improvement Program (EPIP), the maintenance personnel interviewed were not familiar with the program and no evidence of licensee involvement in them was found.

The licensee actively participates in the Nuclear Plant Reliability Data System (NPRDS) and routinely enters plant equipment failure data into NPRDS. The maintenance personnel interviewed indicated that NPRDS data is used as an analytical tool to determine root cause of failures.

The plant management interviewed by the inspector indicated a strong support and interest in the proper performance of maintenance. Maintenance department management benefits from experienced and knowledgeable personnel who maintain continuity due to long term involvement. The inspector examined the goals for improvement of the maintenance program and the process for implementation of these goals. They are incorporated into the Nuclear Generation Goals for tracking and completion. Performance planning worksheets which identify the action plans, responsibilities and expected results are reviewed by maintenance personnel for monitoring effective completion of these goals.

Following INPO guidelines, performance indicators are included in monthly reports to management. The maintenance personnel interviewed were aware of strong management interest in this report. The inspector reviewed the September 1988 issue of the Maintenance Performance Indicator report and noted that the INPO suggested indicators of out of service control room instruments and total skin and clothing contamination were not included in the report.

The licensee has developed various methods of feedback between the station management and craft personnel. The maintenance department performs an annual review of work requests which are then reviewed by station management. Periodic meetings are held for feedback and communication. The inspector witnessed one



such daily morning meeting between a Maintenance Supervisor and his technicians, where a positive atmosphere of communication and feedback was evident. Station management performs plant walkdown on a periodic basis. Maintenance Supervisors utilize a comprehensive checklist to perform observation of work in progress. The inspector reviewed top management's plant tour schedule and documentation of the tours completed. An internal Niagara Mohawk memorandum indicated that the weekly Superintendent's tour will be performed with the General Superintendent and/or the Station Superintendent. It was noted that the Superintendent's weekly tour is being frequently delegated to personnel below the Station Superintendent's level.

The licensee performed a maintenance self assessment during 1987 following the INPO maintenance guideline (85-038). The review identified various weaknesses in the program including a fragmented maintenance department, lack of an upper level management's written policy on maintenance and need for additional engineering support in plant maintenance. Also identified in the assessment were certain weaknesses in the area of housekeeping, training and qualification, master component and parts list, trending, work planning, equipment control, root cause analysis and periodic review of maintenance program.

Subsequently, a joint Quality Assurance and Safety Review and Audit Board (SRAB) group (a part of site QA) performed an audit during November 1988 to verify completion of the action items developed to resolve the identified weaknesses. The audit found that management did not establish a program to oversee completion of the action items. As a result, various action items were not properly reviewed for acceptability or completed. The licensee expected the current and ongoing reorganization of the Nuclear Department to address some of these issues. Licensee's completion of the maintenance self assessment items will be reviewed in a future inspection. This is an unresolved item (50-220/88-80-02).

Conclusion

The overall management support of maintenance appeared to be adequate. The inspector found that problems previously identified by the licensee have not been fully corrected. For example the areas of maintenance self assessment followup, control and closeout of externally identified issues, and developing a working systems engineer group have been delayed. Therefore, the inspection team conclusion is that management support in terms of control and feedback in resolving problems should be strengthened.



II.3.0 MANAGEMENT ORGANIZATION AND ADMINISTRATION (CORPORATE AND PLANT)

The objective of this area of the inspection was to evaluate how management supports the maintenance organization and administration of the maintenance program. Specific areas inspected included maintenance program coverage; maintenance policy, goals and objective; allocation of resources; definition of maintenance requirements; conduct of performance measurements; maintenance document control system; and the decision process for scheduling maintenance.

FINDINGS

The licensee's program for station maintenance is currently addressed in various administrative and departmental procedures and instructions. Organizational layout, personnel responsibilities, duties and accountability are described in various maintenance department documents including flow charts and matrices. The licensee indicated that the station is currently undergoing a reorganization which will address the maintenance self assessment concerns on the organization.

The inspector could not identify any formal corporate directive which requires that a maintenance policy be established or updated. The maintenance management interviewed indicated that a station maintenance policy is currently being prepared for inclusion in the Nuclear Division Management Policy document.

The licensee has established a maintenance planning and work control system for control and scheduling of various maintenance activities. Outage planning and cycle specific maintenance activities are included in the schedule. The licensee indicated that this system is currently being upgraded to address the maintenance self assessment findings and provide for longer term planning capabilities.

A review of the maintenance department's staffing indicated an acceptable staffing level although the licensee regularly uses contracted help during high activity periods like a refueling outage, and for major physical work like cable pulling, equipment installation and welding.

The station maintenance program is effectively administered by the station maintenance management including individual maintenance department supervisors and staff. The program includes the necessary elements of preventive and corrective maintenance, surveillance testing and calibration. The inspector verified that the environmental qualification related



requirements are included in the program. Predictive and diagnostic examinations (e.g. vibration monitoring, infra-red profiles) are also being increasingly utilized to trend equipment performance and the need for maintenance.

The licensee has established methods for reviewing, tracking and implementing information from NRC Bulletins, Information Notices and Generic Letters; INPO SOERs and SER documents; and vendor information letters. The Operating Events Assessment (OEA) group within Technical Support is responsible for proper dissemination of information and development of appropriate corrective action. A discussion with the OEA Supervisor and the inspector's review of OEA files indicated substantial delay in closing out these items and as a result a considerable backlog has developed.

The inspector reviewed the licensee's program for incorporating industry and regulatory information. The program appeared to be lacking needed management support which is evident in the large backlog of approximately 340 open items including 183 Information Notices. Certain Notices issued in 1980 are still open. The technical support management indicated that the licensee is currently enhancing this area with needed manpower and resources. The inspector also reviewed licensee's evaluation of several Information Notices and INPO SOERs. The evaluations in general are adequate, however, licensee's review of Notice 82-25, "Failure of Hiller Actuators Upon Gradual Loss of Air Pressure" indicated that the identified make and model numbers were not used at Nine Mile 1. The licensee did not address an identified concern related to the failure of the air operated valves to go to their safe position upon slow depressurization of the instrument air header. Timely completion and adequacy of licensee's action in closing out Notices and industry information is an unresolved item (50-220/88-80-01).

The inspectors reviewed the status of Nine Mile 1 instrument air system maintenance. The licensee's inservice testing (IST) program does not include periodic testing to demonstrate the fail-safe capability of the non-safety related air operated valves upon loss of air as assumed in the FSAR transient analysis, and as discussed in the NRC Notice 85-84. The licensee stated that they had identified this deficiency in their IST program and is currently incorporating the requirements in the second 10 year IST program whereby 124 additional valves will be included in the fail safe testing program for a total of 130. The licensee has already notified NRC about an IST program deficiency. This item is unresolved pending NRC review of this portion of the revised IST program (50-220/88-80-03).



The inspector reviewed and witnessed various methods used by the licensee for measuring performance of maintenance. In addition to the periodic observations of work in progress and housekeeping tours by station management, the annual review of maintenance and the performance planning work sheets are used as performance measuring tools. Periodic reports on maintenance performance indicators and QA trend analysis reports are also used by the licensee to measure performance of maintenance.

Decisions to maintain, upgrade, replace equipment, or to defer maintenance work are made primarily by station maintenance management, including maintenance supervisors who are closest to the issue. Upper level station management is informed through regular channels of communication including maintenance annual review statements and monthly performance reports. Station maintenance tends to resolve problems on their own and contact corporate engineering based on the complexity of the situation involved via the problem report process.

Conclusion

Maintenance personnel are experienced and knowledgeable, and the station management is administering a well organized and planned maintenance program.



II.4.0 TECHNICAL SUPPORT

This area addresses the technical support the maintenance organization receives from other parts of the organization such as Engineering, Health Physics, Quality Assurance, Quality Control, Safety, Fire Protection and Operations.

The evaluation consisted of reviewing the licensee's established policy, goals, and objectives and assessing their effectiveness. The inspector selected maintenance related items from work in progress, Licensee Event Reports and generic issues identified by the NRC and other industry sources and evaluated how maintenance and other organizations interfaced on these issues.

FINDINGS

II.4.1 ENGINEERING - COMMUNICATION

The inspector reviewed the licensee's established system for internal communication and engineering support to station maintenance in an effort to ascertain their effectiveness. The inspector had discussions with various maintenance personnel and the EQ engineer in Nuclear Engineering and Licensing. The inspector reviewed various procedures and selected completed work requests to determine the degree and level of communication with and support from Engineering.

The inspector found that corporate (offsite) engineering is involved in maintenance on an as needed basis when requested by station maintenance. Corporate engineering is generally not accessible to or involved in day to day maintenance activities. However, offsite engineering does establish unique technical requirements for topics such as environmental qualification (EQ) of plant components. When requested, engineering provides review of maintenance procedures, resolves problems identified by station maintenance and provides root cause analysis of component failures. Engineering involvement in plant maintenance issues also occurs as part of the evaluation and disposition of Problem Reports (PR) and Nonconformance Reports (NCR).

The inspector reviewed several EQ Required Maintenance (EQRM) forms from engineering to plant maintenance supervision noting that the EQ requirements were incorporated in the applicable maintenance procedures.



During review of maintenance procedures, the inspector noted that technical requirements such as those of codes, standards and regulations are identified by the procedure writer. Exceptions to technical requirements are forwarded to engineering for review on an as needed bases. The problem report program provides the identification, review and resolution of problems and is a means to involve corporate engineering in maintenance issues.

CONCLUSION

Overall, the inspector found an experienced maintenance department that tends to make full use of internal resources, but has limited communication with corporate engineering disciplines. A need for enhancement in the area of engineering support including the use of systems engineers is currently recognized by the station management.

II.4.3 ROLE OF PRA IN THE MAINTENANCE PROCESS

SCOPE

The objective of this part of the inspection was to determine the extent that Probabilistic Risk Assessment (PRA) concepts are considered in the maintenance program and in such areas as planning, scheduling, and prioritization of work. The inspector reviewed licensee activities related to PRA and the application of PRA to the maintenance program.

FINDINGS - Program and Implementation

The licensee has no formal documented program or goals for the integration of PRA into the maintenance program. Support at the Corporate level consisted of a Senior Engineering Specialist familiar with the concepts of PRA. The licensee is addressing the future staffing requirements to support the Independent Plant Evaluation (IPE) required by the recently issued Generic Letter (88-20).

With regard to implementation, the licensee had a Probabilistic Safety Assessment (PSA) performed by a contractor in 1984. The licensee stated that since the analysis was of a limited scope and the results based upon very conservative and unrealistic assumptions, the PSA has not been routinely used nor implemented into the site maintenance program.

CONCLUSION

Licensee management had not established a program, goals, or the necessary training for the use of PRA concepts in the maintenance area. Maintenance activities of selected PRA significant systems or components were examined and the inspector found effective maintenance coverage and technical support.



II.4.4 ROLE OF QUALITY CONTROL

This part of the inspection was directed at determining the extent of Quality Assurance (QA) and Quality Control's (QC) involvement in the Unit 1 maintenance process. The inspector reviewed the licensee's procedures for implementing the QA surveillance and audit program, the QC inspection program, and trending of findings. Discussions were held with the QA and QC personnel; a review of multiple surveillance reports, QC inspection plan and work request packages for appropriate hold points, several audit reports related to Unit 1 maintenance, and status of open items, nonconformance reports (NCRs) and corrective action reports (CARs) was performed.

FINDINGS

Program

The site QA operations management has implemented an effective surveillance program at Nine Mile Unit 1. This program was revised at the beginning of the year to incorporate Unit 2 experience. This new program looks at attributes related to the scope of the work rather than at the broad scope QA criteria. Checklists are utilized for scheduled surveillance activities.

QC inspection coverage of work in progress is provided for safety related corrective maintenance activities. The preventive maintenance test and calibration procedures are reviewed by QC and QC inspection points are incorporated.

QA trends performance of maintenance as a percent of surveillance attributes that were satisfactorily addressed. Trend codes are assigned to identified quality problems (e.g. NCRs, CARs) to indicate their apparent cause, type of problem and program element involved and reported against the organization responsible for causing the problem. Periodic performance reports and overview analysis reports are issued to the involved disciplines.

Implementation

The QA surveillance checklists and reports reviewed by the inspector addressed important elements of the activity. The surveillance coverage provided to Unit 1 maintenance activities is comprehensive.

The completed work requests and maintenance procedures reviewed by the inspector had appropriate QC hold points and signoffs.



QA audits performed during 1988 covered various maintenance and related activities. Additional coverage included review of the status of the 1987 maintenance self assessment open items. An audit report, dated June 3, 1987 indicated that preventive maintenance (PM) requirements for items in storage were not being implemented at Unit 1. This audit further stated that this concern was previously addressed and being followed by CAR 85.3077.

The QA trend analysis program is being restructured for use as a management tool to improve quality performance.

CONCLUSION

The licensee's QA surveillance program is adequate and effective in identifying deficiencies in the maintenance program and its implementation. Biennial audits on various aspects of plant maintenance activities are provided.

II.4.5 INTEGRATION OF RADIOLOGICAL CONTROLS INTO THE MAINTENANCE PROCESS

SCOPE

The scope of this element involves an inspection of the coordination and integration of radiological controls into the planning and performance of maintenance work. The inspection includes a review of the ALARA steps that are incorporated into work planning as well as ALARA practiced during the performance of work.

FINDINGS

Program

Policies and procedures for ensuring integration of radiological controls into the maintenance process are well documented. Work requests are reviewed by a dedicated HP Planner within the Work Control Center to determine RWP and ALARA review requirements. A separate ALARA group performs required ALARA pre- and post-job reviews. Work schedules for each of the maintenance disciplines are published daily and widely distributed. To improve intra-departmental coordination, the Radiation Protection (RP) Department has implemented a pilot program for the Unit 1 outage whereby two senior RP technicians act as maintenance liaisons, one for Mechanical and one for Electrical and I&C. This allows for more efficient utilization of RP resources in support of maintenance activities.



Radiation Work Permits (RWP) are the authorizing documents to perform work. Time and Exposure Logs (TELs), which contain the protective clothing and other RP requirements and are used for tracking exposures received, may be issued for specific evolutions within a single RWP. Completed TELs are entered into the Radiation Exposure Monitoring System (REMS) by the Dosimetry Department. Updated exposure histories are issued daily by the REMS system for use in personnel selection and job planning.

Implementation

The integration of radiological controls into the maintenance process was conducted in accordance with policies and procedures. The HP Planner in the Work Control Center reviewed work requests and evaluated the need for Radiation Work Permits and job specific ALARA reviews.

Within the Maintenance Department, the HP liaisons coordinated the use of RP resources in support of scheduled work and resolved questions and problems as they arose. The use of dedicated HP liaisons has been well received and should be considered for continuation after the outage is concluded.

Since a single RWP may be associated with multiple TELs, and ALARA estimates are correlated only at the RWP level, important person-rem performance indicators necessary for post-job ALARA reviews may be lost. RP supervision has submitted a work request to modify the REMS system to more effectively track the necessary information.

Placement of temporary shielding currently must be approved by the Technical Services Department as per procedure S-TDP-10. Processing times are typically several days and, during outages, have taken as long as several weeks. The licensee intends to evaluate the feasibility of providing generic guidelines to the RP group for the placement and use of temporary shielding. This would reduce the number of requests to be processed and allow RP supervision more flexibility in reducing exposures to achieve ALARA goals.

Observations of work in progress indicated that job coverage by the RP technicians was adequate and that workers were sensitive to compliance with RWP requirements.



CONCLUSION

Radiological controls are effectively integrated into the maintenance program. The creation of the Work Control Center and use of an HP Planner has improved scheduling and coordination of RWP requests. The use of dedicated RP liaisons within the Maintenance Department has been a success and should be considered for implementation at Unit 2. In contrast, weaknesses in REMS has limited the information and processing capability of the ALARA group thereby reducing the effectiveness of post-job ALARA reviews.

II.4.6 SAFETY REVIEW OF MAINTENANCE ACTIVITIES

SCOPE

This inspection area evaluated the extent that industrial safety and industrial hygiene are integrated into the planning and performance of maintenance work.

FINDINGS

Program

The corporate safety program is implemented in accordance with an "Accident Prevention Rules" handbook which is provided to each new employee. The Safety Department is comprised of two corporate representatives having no direct responsibility for the actual site program implementation, functioning only in an administrative and consulting capacity. Responsibility for ensuring safe work practices lies with first line managers and supervisors. Supervision is held accountable for performance through their performance evaluation process. There are no site or station specific safety procedures. Maintenance procedures, however incorporate by reference (to the safety handbook) the appropriate safety guidelines. Management has adopted DuPont's "Safety Training Observation Program" (STOP) to increase worker awareness of safety in the plant. The program is comprised of multiple phases to facilitate implementation.

Implementation

Although the safety representatives administer the program, the responsibility for program implementation is clearly assigned to the job supervisors. The supervisors must ensure that safety equipment is available and that safety precautions are in place prior to the start of all work. Quarterly safety audits are performed by the corporate staff in addition to routine safety tours performed by the site representatives. A tour of the work areas by the inspector confirmed that work was being performed



in accordance with both OSHA and corporate requirements. Although industrial safety is generic in nature, site specific aspects such as the control of confined space entries had not been formally addressed. Procedures for confined space entries were only in draft form and a list of currently identified confined space locations was not available.

Industrial safety performance indicators show that the site lost time accident rate is five times the industry average as reported by OSHA. Management's emphasis on safety has been criticized by INPO in past audits. To increase overall awareness and performance in safety, management has implemented DuPont's STOP program. Management, down to first line supervisors, have received the necessary indoctrination training. The balance of workers will receive their training by the end of 1989.

All contractors are required by the Master Bid Specification to comply with both OSHA's and Niagara Mohawk's corporate policies. Major contractors are coordinated with site activities by Construction Services. The contractor groups are not provided a copy of the corporate safety manual to which they must abide. However, during the pre-construction briefing, they are informed that a copy of the manual would be made available, if so requested. In contrast, individual consultants brought in under a purchase order are neither provided a copy nor routinely told how to obtain one.

Each of the maintenance disciplines (mechanical, electrical, and I&C) meets monthly to discuss safety. Past incidents within industry, lessons learned and specific safety educational topics are discussed each month. The training is coordinated to allow attendance by all shifts.

CONCLUSION

Although a practical approach to safety has been implemented and is being strengthened through use of DuPont's STOP program, the lost time accident rate is well above the industry average. Weaknesses were evident in the methodology for informing sub-contractors of the site specific safety requirements and in the identification and control of access to confined spaces. Increased participation on the part of workers and subcontractors is necessary to effectively improve performance indicators in this area.

II.4.7 INTEGRATION OF REGULATORY DOCUMENTS IN THE MAINTENANCE PROCESS

SCOPE

This element involves an inspection of the methods used to integrate regulatory documents into the maintenance process. This includes changes to the regulatory documents resulting from periodic reviews and updates.



FINDINGS

Program

With recent organizational changes, the regulatory document responsibilities of Licensing have been transferred to the newly created Nuclear Regulatory Compliance Group, reporting directly to the General Superintendent. This group maintains the Nuclear Commitment Tracking System (NCTS) used to track internal and external commitments. Although the NCTS is described by procedure at the corporate level, implementing procedures for the Regulatory Compliance Group are still in draft form. Review of Technical Specification changes and amendments are documented in an internal memorandum until such time as the procedures are formalized.

Incoming documents such as Information Notices (INs), Significant Event Reports (SERs), and Service Information Letters (SILs) are processed by the Operating Experience Assessment (OEA) Group utilizing a separate tracking system. Implementing procedures for the OEA group are currently only in draft form.

Implementation

The NCTS has an extensive cross-reference capability to identify the originating agency, document type and responsible group. All commitments, both internal and external are tracked. OEA items are tracked by the Regulatory Compliance Group only after they have been reviewed and a commitment received for followup action. OEA items still under review are not tracked within the NCTS. During a review of selected NCTS commitments; the inspector noted that two INPO items were approximately nine months past the indicated due dates (RP.9-1 and RP.5-1). In addition, a significant number had no due dates, including a 1980 NRC Information Notice (80-17).

The OEA group is currently tracking over 1500 open items between the two units. Of the 340 open items associated with Unit 1, eight INs date back as far as 1980. Management has formulated an aggressive action plan for reducing the OEA backlog. Given the necessary resources and technical support, the current goal for zero backlog has been set to February 1, 1989 for Unit 1 and December 31, 1989 for Unit 2.

CONCLUSION

Once the Regulatory Compliance Group is fully established, additional review of existing items seems warranted to evaluate the timeliness of closeouts and the appropriateness of tracking a large number of items without a due date.



III. MAINTENANCE IMPLEMENTATION

The purpose of this part of the inspection was to determine the quality of the established controls and more importantly the implementation of these controls. The controls established in four areas were evaluated. These areas are Work Control (Section III.5), Plant Maintenance Organization (Section III.6), Maintenance Facilities Equipment and Materials Controls (Section III.7), and Personnel Control (Section III.8). The effectiveness was determined through a review of completed work orders, procedures, and other documentation associated with maintenance and training of maintenance personnel as well as physical observation of work in progress, tools in stock, spare parts, and discussions with all levels of personnel.

III.5.0 WORK CONTROL

SCOPE

The purpose of this area is to evaluate the effectiveness of the maintenance work control process to assure that plant safety, operability and reliability are maintained. Areas evaluated by the inspectors included:

- Review of work in progress
- Control of work orders
- Equipment maintenance records
- Job planning
- Work prioritization
- Work scheduling
- Control of maintenance backlog
- Maintenance procedures
- Post maintenance testing
- Completed work control documents

FINDINGS

Review of Work in Progress

The inspector observed work in progress and reviewed the upgrade work request packages for containment penetration repairs and fire protection sprinklers to verify that the requirements of these packages were understood by the craft personnel performing the task and that the cautionary and documentation prerequisites were complied with before working on the equipment. The inspector determined that the maintenance work request packages, listed below, were complete and the prerequisites were complied with:

- Contractor Work Request M-00458 - Penetration Repair
- Contractor Work Request M-00443 - M00448 - Fire Protection Sprinkler Upgrade



The inspector witnessed the cable termination effort that was in progress in the control room cabinets. The inspector verified that contractor and site electrical maintenance personnel were knowledgeable of their task and the control room operators were supporting the effort as required. The work was documented by the maintenance personnel and the information was being prepared to up-date the as-built drawings affected by the work.

The inspector also examined the storage condition of the Reactor Feedwater and Service Water Breakers during the inspection of the breaker cubicals of the 4160 volt power board Nos. 11 and 12 (reference drawings C-19423-C sheets 1 and 2). The cubicals were being cleaned while the breakers were in protected storage outside of their cubicals. The breakers were well protected and the cubicals were clean and dust free. In both 4160 volt power boards, the inspector verified that the equipment was in compliance with the requirements of the electrical preventive maintenance procedure No. N1-EPM-GEN-R150, 4.16 KV breaker/motor inspection.

The inspection included observations of the following maintenance activities in the field:

- Operational tests of both Unit 1 emergency diesel generators
- Operational and vibrational tests on EDG 102
- Torquing of flange and bonnet studs on four limitorque valves for containment spray system
- Three large bore (LB) hanger inspections per the LB hanger inspection program
- Partial observation of Unit 2 reactor water clean-up pump (RWCP) (No. WCS PIA)
- Replacement of spherical bearing on snubber in dry well for recirculating piping
- Snubber stroking, acceleration and lock up test for reactor core spray system
- Replacement of hydraulic oil and snubber internals for snubber on reactor core spray system
- Calibration of various torque wrenches and dial indicators
- Partial maintenance on Unit 2 MSIVs
- Partial maintenance on electronic SRV for main steam system
- Turbine Building supply fan 121/122 filter DP cell and indicator calibration

During the observation of these activities the inspector noted that engineering and management monitored the maintenance activities closely and the control of rework and repairs was handled adequately. It was observed that when problems were encountered during the maintenance activity, the work was put on hold and engineering was contacted for corrective actions or recommendations. When more complex work activities were being performed (i.e. pump alignments, snubber testing) the vendor



technical manuals and work procedures were observed at the work area and were complete and up to date. The dedication processes and procurement control for materials being used in safety related applications were also found to be adequately controlled and implemented for the support of the maintenance activities.

However, during a field walkdown and inspection of the mechanical tool storage area the inspector observed that the mechanical tool log appeared to be informal. The inspector also observed that tools in the log were signed out past the return due date. In addition, there were a limited number of tools in the field which were not in compliance with the applicable condition procedures (i.e. lifting cables, grinders, slings). It was also observed that there was no recall program for mechanical tools being signed out for use in maintenance activities.

The inspector identified one area which will require further licensee followup concerning the rebuilding of the Unit 2 reactor water cleanup pump (RWCP). During the rebuilding of the RWCP (NO. WES PIA) the licensee made a design change to the pump which eliminated the disaster seal. Should the pump primary seal fail under full power operating conditions without this seal installed, the pump will experience more leakage of reactor coolant than as originally designed. The licensee presented the inspector with a copy of the fall 1988 outage action item list which identified the disaster seal as an action item requiring resolution before Unit 2 restart. The licensee also stated that prior to the completion of the outage, engineering would evaluate the negative effects on the pump and the additional leakage rates the pump would experience with the elimination of the disaster seal.

The inspector observed work being performed at various stages for these maintenance activities:

1. WR #141020, Core Spray Pump Discharge Isolation Valve (MOV) - replace spring pack and degrease and regrease of gear compartment.
2. Surveillance test of Anticipated Transient Without Scram (ATWS)/Alternate Rod Insertion (ARI) Instrument Channels, Procedure #NI-IPM-Q-036-009 for 4 Reactor Water Lo-Lo Level Channels and 4 Reactor Pressure Hi Channels.
3. WR #136638 and WR #136636 (Unit 2), replace existing EPA 600 VAC breakers with new GE Breakers, due to high failure rate of existing breakers.
4. Simulated walkdown and maintenance record reviews of two 115 kV oil-blast circuit breakers (R40 & R10) and two 115-4.16 kV outdoor transformers (101S & 101N), all equipment is used for offsite power supplies.



The licensee has a good program to control these maintenance activities. The work requests used for corrective maintenance, preventive maintenance activities and surveillance tests are properly documented. The craftsmen performing the maintenance activities were found to be very familiar with their work. The maintenance/test procedures were being followed and test data were properly entered. The maintenance supervisors (mechanical, electrical, I&C) and assistant supervisors were knowledgeable of the related administrative and maintenance procedures.

Plant management attention to the progress of maintenance activities includes a daily morning management meeting to discuss the maintenance work for that day. Each afternoon a management meeting is held to discuss the progress of that day's maintenance activities.

Control of Work Orders

The licensee has three Administrative Procedures, AP-5.0, "Procedure for Repair," AP-8.1, "Preventive Maintenance" and AP-8.2, "Surveillance Testing and Inspection Program," to establish programmatic control of maintenance activities. AP-5.0 is for corrective maintenance and allows anyone working at the plant to identify a potential equipment or system problem and originate a work request (WR). Each activity not part of craft skill's for executing the WR is detailed by written procedure with authorization and approval requirements properly identified. Emergency maintenance is controlled the same as normal maintenance, except that the originator will hand carry the WR to various department supervisors for review, approval and execution.

Preventive maintenance (PM) and surveillance testing are controlled by AP-8.1 and AP-8.2, respectively. Implementation procedures for specific equipment are developed by each maintenance discipline (mechanical, electrical, I&C) to accomplish each maintenance work activity. Step by step instructions are provided in the implementation procedures to establish control of the maintenance activities.

The inspector reviewed samples of completed WRs and PM work and verified that the WRs and the PM documents included the necessary information to assure work is effectively accomplished, controlled, documented, and reviewed.



Equipment Maintenance Records

The licensee has in place a work tracking system (WTS), which is a computerized system, to track work in progress as well as maintenance work history. This system is easy to use and is widely accessed among the plant maintenance personnel. The work records and maintenance history can be readily retrieved through the WTS. The WTS is updated routinely, and it contains the current information such as maintenance status and the manhours expended. The inspector randomly selected two closed out WRs for retrieval and determined that the history retrieval system worked efficiently.

The Nuclear Plant Reliability Data System (NPRDS) is handled by the NPRDS coordinator. When maintenance work is completed, the WR package is routed to the NPRDS coordinator, who reports the data for equipment failure, cause of failure, and corrective actions to the INPO NPRDS system. The reporting activity is controlled by procedure S-TDP-6 "Nuclear Plant Reliability Data System Failure Reporting." The reported data is stored in the INPO system and is available for retrieval by all INPO members. The inspector witnessed a satisfactory demonstration by the NPRDS coordinator of the system.

Root cause analysis for equipment failures is performed by the licensee's engineering in their corporate office in Salina Meadow (Syracuse) using data retrieved from NPRDS. This data retrieval activity is controlled by Procedure S-TDP-33 "Nuclear Plant Reliability Data System Information Retrieval."

There is no complete Master Equipment List at Nine Mile 1. Instead there are numerous lists which the licensee uses to schedule their maintenance activities. Equipment lists include the Q-List (covering all safety related equipment), EQ Master List, I&C Maintenance List, Electrical Maintenance List and Mechanical Maintenance List. The licensee is planning to complete a Master Equipment List in about 2 years. Based on the interviews with 3 maintenance supervisors, the inspector determined that the lists used by the maintenance personnel includes all equipment requiring maintenance. The licensee stated that these lists were developed through review of system and electrical drawings, procurement records and plant walkdowns.

Job Planning

Corrective maintenance work is planned by the planner of the work control group. Each maintenance discipline (mechanical, electrical, I&C, etc.) has at least one planner. The planning requirements are defined in Procedure NI-MI-GEN-008 "Maintenance



Instruction for Staging of Maintenance Work." In addition to the planning process, the licensee's management personnel and maintenance supervisors hold a daily meeting to coordinate and discuss the maintenance work planned for that day.

One weakness in the licensee's planning process is insufficient provision for parts. As of December 2, 1988, 155 WRs were on hold because of unavailability parts. Some of these WRs were being held for an excessively long period, e.g. WR#133257, a priority 1 (for start-up) item issued on February 9, 1988, and was still waiting for parts at the time of this inspection.

Work Prioritization

The priority code of each Work Request (WR) is first determined by the originator. There are 7 classifications (during power operation) for the priority code. The determined priority code is reviewed by the maintenance supervisor and then by the work planner, who verifies this against a system urgency list, which is updated weekly. There is no PRA (Probabilistic Risk Assessment) for Nine Mile 1; therefore, PRA criteria are not used for work prioritization.

Work Scheduling

Preventive Maintenance, (PM) and surveillance tests are scheduled well ahead of the due date by the work planning group, with concurrence of the maintenance supervisors. This scheduled maintenance is incorporated into the daily planning process together with the planned work request maintenance activities.

The inspector reviewed work in progress for the surveillance test of the ATWS/ARI instrument channel, Procedure No. N1-IPM-Q-036-009, and checked the scheduled maintenance for several other instruments. The inspector determined that the work scheduling process is functioning properly.

Backlog Control

The licensee has a system to monitor and measure the maintenance backlog. The monthly Maintenance Performance Indicators charts contain information such as WR backlog due to parts, WRs generated vs. WRs completed in each discipline, average weekly hours worked by mechanical, electrical and I&C maintenance personnel, preventive maintenance and surveillance test information. This information is used to assist management in overseeing the maintenance activities. In addition, there are other monthly and weekly issued documents that provide more detail data for backlog monitoring and measurement purposes.



The inspector reviewed the November issue of the Maintenance Performance Indicators. This document showed that during the past 3 months, more WRs were generated than those being completed. As a result, an increased backlog of WRs was created. As of December 2, 1988, there were 1104 WRs open for maintenance work, and an additional 501 WRs on hold for post maintenance testing (PMT). Of the 1104 open WRs, 155 WRs are on hold because of a lack of parts and 222 WRs are being held for other reasons. At the time of the inspection, there were 32 mechanical maintenance craftsmen, 36 I&C technicians and 20 electricians at Unit 1 to perform the maintenance activities. The licensee estimated that the current backlog (excluding those being held for PMT) will require about 9500 manhours to close out.

Maintenance Procedure

The licensee's administrative procedure AP-2.0 "Production and Control of Procedures" provides direction for new procedure development. It establishes the requirements for technical review (including PORC review), safety analysis, and approval of new procedures. In addition, three site procedures are in place to provide guidance for generating new maintenance procedures. These site procedures are : (1) S-MI-GEN-002 "Maintenance Instructions for Writing Procedures"; (2) S-MI-GEN-003 "Maintenance Instructions for Writing Maintenance Surveillance Procedures" and (3) S-MI-GEN-004 "Maintenance Instructions for Review and Implementation of Technical Requirements in Maintenance Procedures."

The Maintenance Procedure Production Group including contractors is responsible for the generation of new maintenance procedures and periodic review of issued procedures.

The inspector selected a new procedure for review, N1-EPM-GEN-D131 "Timing of MSIV 7% Limit Switches" and determined that the new procedure was being developed in accordance with the controlling procedures.

Post Maintenance Testing (PMT)

The PMT requirements are identified in the WR form. After completion of the maintenance work, the WR is forwarded to the station shift supervisor (SSS) to determine if PMT is required. Appendix C of AP-5.0 "Procedure for Repair" establishes the PMT criteria and provides a list of equipment and systems which require PMT.



The SSS is responsible for verifying that appropriate PMT was performed prior to determining the equipment is operable.

The inspector interviewed the SSS and reviewed the records of 16 completed WRs (5 mechanical, 5 electrical and 6 I&C) and found that PMT requirements were identified in the WR and test results were properly documented.

Review of Completed Work Control Documents

The inspector interviewed the Mechanical Maintenance Supervisor and Assistant Supervisor, one Electrical Maintenance Assistant Supervisor and one SSS concerning the WR review process, and found them knowledgeable of this review procedure.

After the work for a maintenance WR is completed, the WR package is returned to the maintenance supervisor. Before he signs and accepts the completed work, he is required to review and check that the procedures attached to the WR are properly executed, that recorded data is within the procedure tolerance and QC has verified required hold points by signing the appropriate blocks. This review process is specified in paragraph 5.8 of AP-5.0. This same process also applies to the SSS before he signs and accepts the PMT.

When the WR is signed and accepted by the Maintenance Supervisor and SSS, the WR is closed and the package is forwarded to the NPRDS coordinator and then to Document Control for record keeping reproduction, microfilming and storage.

The inspector randomly selected 16 recently completed WR records for review and found them properly executed, dated and signed. The inspector found the WR records contained the appropriate maintenance procedures with data sheets properly dated and signed. The applicable QC inspection reports, PMT report, material list sign-off sheets were present.

CONCLUSION

Through the observations of maintenance field activities and review of work requests and maintenance procedures, the inspector determined that the maintenance work control process is functioning well and is documented through the use of work requests, maintenance records and procedures. The inspector also determined that the maintenance workers were knowledgeable in the use of the work control process as it pertained to the various maintenance activities.



III.6.0 PLANT MAINTENANCE ORGANIZATION

SCOPE

The purpose of inspection in this area was to determine the extent of control by the maintenance organization of maintenance activities, personnel, documentation and communication. The implementation of maintenance objectives and response to problems and events were also reviewed.

Inspection of this element was to determine the extent of established controls for performing maintenance activities and to verify that these controls have been properly implemented in the mechanical, electrical, and instrument and control disciplines. The review and inspection of the methods used for controlling maintenance activities included the following attributes:

- Identification of the need for action
- Assuring plant and system integrity
- Monitoring controls
- Rework and temporary repairs
- Vendor technical manual control and updating
- Control of personnel
- Control of procedures
- Control of material
- Control of tools and gauges
- Configuration control
- Work performance accountability

FINDINGS

The licensee has established written procedures and monitoring programs for the control and evaluation of the mechanical, electrical and instrumentation and control disciplines for the attributes listed above. There are programs in place to measure the effectiveness of these disciplines with results provided in a management summary report.

The maintenance organization is performing root cause analysis based on reported information documented on their Work Orders and Nonconformance Reports. In addition, the Nuclear Plant Reliability Data System (NPRDS) provides component data history which the maintenance organization uses to determine the status of their plant equipment. The maintenance organization has performed studies using NPRDS data to evaluate similar BWR type plant maintenance histories by comparing percent system failures per number of reportable systems. From this evaluation technique, the maintenance organization has performed evaluations of their site system failures to determine if potential system problems could be identified. These reports have caused the engineering organization to establish self assessment programs to investigate specific system areas.



The inspector reviewed the test plan, data and test set-up that is being used in the licensee's piping program entitled, "Carbon Steel and Low Alloy Piping System Erosion-Corrosion Review Program". This program is reviewing the present system design, as-built installations, operating histories of high-energy single and two-phase fluids flow in their carbon steel and low alloy piping systems. The inspector verified that the maintenance personnel supporting this task were knowledgeable of the program requirements and have been trained in the use of the special test equipment required for this program. The status of their evaluation program is documented in an engineering report which is circulated to licensee's management. The testing methods developed and the results achieved to date on this program are being used to evaluate flow rates of other piping systems at this site. During the review of the Service Water P & ID drawings, in preparation for the system walk-down inspection, the inspector reviewed the proposed test plan for measuring the flow rates of this system. This self assessment initiative of the Service Water System is another example of an engineering program that is planned, based on root cause analysis reports and NPRDS data evaluations performed by the licensee.

The maintenance staff has established and is performing trending analysis work histories on each of their three disciplines; mechanical, electrical and instrumentation and control. Site failure data is trended and analyzed using the Kepner-Tregoe (KT) method in conjunction with data from the Nuclear Plant Reliability Data System (NPRDS). The inspector verified that both the plant and the nuclear engineering staff have been trained in the KT method as well as the KT Analytic Trouble Shooting concepts. Procedure SUP-1 "Root Cause Evaluation Program", describes the method that is used in performing Root Cause evaluations. Using the Root Cause/Trending Interface Matrix, the inspector selected and reviewed reports completed on the Post Accident Sampling System, Westinghouse LPRM Plungers, and Tritium in the Unit 1 diesel generators. Using the KT approach, the inspector reviewed and concurred with both the method and findings in these reports.

The maintenance engineer reviews the completed work request data to determine if the recorded NPRDS cause codes are within the standard distribution limit (norm) of the NPRDS program. Shifts from the norm are identified by the maintenance engineer for additional investigation and corrective action. The inspector selected the following root cause analysis reports and the corrective actions performed or planned by the maintenance staff for compliance with their KT report findings.

- Condensate Demineralizer Valve Failures
- Instrument Air Compressors Failures
- Service Water Flow Meters Algae Problems
- Diesel Air Compressor Head Gasket Failures



With the exception of the Diesel Air Compressor Head Gasket failures, the corrective action performed on the above listed items have been completed and implemented. The results of the corrective actions are monitored by engineers in maintenance to ensure that the original problems have been corrected.

The Diesel Air Compressor Head Gasket failures were in the process of evaluation and the task has not been completed. The root cause reports on the items, described above, were well documented with a KT type analysis supporting the recommended corrective actions. A weakness the inspector identified during the review of these reports was that a lack of uniformity existed in the trending and root cause analysis presentation, depth of analysis and report detail. Also, there is no management summarization report analyzing the various trending and root cause reports issued by the site departments. The licensee has also recognized this weakness of the trending system and has assigned the Plant Productivity Department the responsibility to integrate and develop a site trending and root cause program that will encompass the various site programs. The schedule for completing this task is the second quarter of 1991.

The licensee has assigned the administration of their site sub-contractor program to the Construction Services Organization. For penetration work, (Work Order M-00458 Penetration Repair), the inspector determined that the contractors are required to comply with the site Administrative Procedure (AP) 5.0, "Procedure For Repair": This procedure describes the program elements for corrective maintenance and repair of structural, mechanical, instrument, computer, and electrical equipment at Unit 1. It also includes criteria for initiating, planning, scheduling, documentation, and post maintenance testing. The Construction Services Organization who manages the site contractor programs for maintenance, provides maintenance bid packages to each bidding contractor. The site maintenance requirements are listed in the request for bid documentation. Contractor bid submittals are reviewed and approved by the Construction Services Organization in conjunction with supporting inputs from the licensee's site organization. Review of contractor's training program and records indicated that contract personnel were given site specific training in health physics, security, quality assurance requirement and site specific job rules. The performance of the contractor's task is monitored by the Construction Services engineering staff and the site maintenance and quality assurance organization. The contractor's tasks are documented in their own quality control program reports which are integrated into the site work order system for tracking and noncompliance following. The inspector determined that the contractors were complying with their requirements, however, certain weaknesses were identified in .



their area of cleanliness and tool control. The contractors did not maintain their work area in a clean condition (CBI containment lay down area) and electrical tools were issued with defective ground connectors. These conditions were not identified by the Construction Services engineering staff, licensee QC organization nor the licensee area responsible manager. The licensee took immediate action to correct these conditions and maintain the areas and tools as required by both their site procedures and the contractors procedures. The reason for the condition occurring is being reviewed by the licensee's staff. Further, the Construction Services engineering staff does not have specific criteria to review the contractors compliance with site requirements during their daily walk-down inspections of the work areas. This subject is also being reviewed by the licensee to determine the actions required to correct this weakness in their program control area.

The support interfaces between the Maintenance Organization, Site Engineering, Quality assurance, Operations, Procurement and the Construction Services Organization are well documented both at the working and management level. The organization interface at the supervisory level and below was verified by the inspector and found to be well controlled and documented. There was indication that delays are experienced between maintenance and the off-site engineering organization due to their paper flow system, but these delays have not affected the safety of the site. The establishment of a System Engineering Organization, that is planned by the licensee, should help improve the interface between off-site engineering and the site organizations.

Conclusion

The maintenance organization has established procedures and analysis programs which are used in planning and controlling maintenance work and in evaluating the effectiveness of their corrective and preventative maintenance programs. The maintenance staff's use of the Kepner-Tregoe method of analysis and the Nuclear Plant Reliability Data System (NPRDS) information in root cause analysis has produced positive results in taking corrective actions on both component and system problems. The results have been applied to improving both preventative and corrective maintenance programs. The maintenance concepts described above are applied to control of contracted maintenance work implemented by bid packages and managed by the licensee's Construction Services Organization.

The weaknesses that were identified in the area of trending and root cause review, contractor control and construction services engineering evaluation check list are being addressed by the licensee. This inspection found that the site maintenance program has established and implemented controls and procedures that address the operability of their safety related systems and components.



III.7.0 MAINTENANCE FACILITIES, EQUIPMENT AND MATERIAL CONTROL

The purpose of this element was to inspect the extent to which the plant facilities and equipment provided by the licensee enhance the maintenance process. The inspector evaluated this element in part through interviews with operations personnel, maintenance supervisors, and craft. Tours of the maintenance offices, tool issue locations, and warehouses were also conducted. In addition, the inspector observed the following maintenance activities in the field:

- Operational tests and preventive maintenance activities performed for the emergency diesel generators (EDG) for Unit 1
- Replacement of the yoke studs for a limitorque valve located in the containment spray system
- Acceleration and lock-up tests for safety-related snubbers
- Large bore pipe support inspections
- Seal replacement for the Unit 2 reactor water cleanup pump
- Unit 2 modifications on the main steam isolation valves
- Partial work (NR108A) performed on the electromatic safety relief valves located in the main steam piping in the Unit 1 drywell

Observations of these activities afforded the inspector the opportunity to evaluate other elements critical to the maintenance process such as materials control including procurement, maintenance tool and equipment control, and providing controls for the calibration of metering and test equipment.

Findings

To assess the "Maintenance Facilities and Equipment", the NRC inspector performed an extensive walkdown of both Unit 1 and Unit 2 facilities which included entries into the Unit 1 drywell to inspect and evaluate the extent that the facilities and equipment enhance the maintenance process.

Those areas inspected were found to be acceptable with the exception of a contractor tool control storage area located at the north-west equipment hatch of the Unit 1 drywell. During the inspection of this area, the NRC inspector identified electric grinders and non-electric tools such as lifting cables and slings which did not meet the licensee's Safety Bulletin criteria. The inspector also noted several tools obstructing personnel walk ways and access areas. When the inspector identified this area to the licensee, the licensee personnel responsible for interfacing with contractors took actions toward correcting the deficiencies identified.



The walkdown also included the ALARA training and mock-up facility which was found to be available and adequately met the ALARA goals and objectives. During the walkdown, the inspector also observed the activities in the control room. The NRC inspector interviewed the station shift supervisor, reactor operators and maintenance personnel to discuss the communication and equipment tagout procedure requirements observed prior to performing maintenance activities in the field. The personnel interviewed stated that the communications and equipment system tagging are performed per Section 9 of the Accident Prevention Rules which states, in part, that operations is responsible for initial tagout of the system and is later verified by maintenance personnel prior to performing the work activity. Implementation of the equipment tag out and mark up procedure and interactions between maintenance workers and plant operators was observed by the inspectors.

To assess the licensee's "Establishment of Material Controls," the inspector reviewed the following procurement procedures:

- AP7.0, Control of Material and Services
- NEL-015.M, Evaluation and Dedication Planning Procedure
- SI-MI-GOW-012, Control of Parts.

The procedures were complete, up-to-date and adequately controlled.

The inspector also performed a walkdown of the licensee's procurement offices and warehouse facilities at which time the inspector interviewed material control engineers, warehouse personnel and quality control personnel. The inspector noted that departments involved with the more critical procurement processes such as receipt inspection, testing, dedication of commercial grade components and quality control activities were located in the same central area in the warehouse facilities. The licensee personnel stated that this arrangement allows for more accurate material traceability, better communications among the departments and aids in expediting emergency procurements. The inspector observed the licensee performing a dedication of commercial grade fuses for safety related applications, noting that the dedication process was described by a procedure, well documented, and the personnel performing the test (two engineers, one I&C technician, and one quality control engineer) appeared to be competent and knowledgeable of their tasks. The test performed to qualify the fuses also appeared to be well thought out and met the objectives of the dedication procedures.

In addition, the inspector verified the material traceability and specification requirements of components being used as



replacement parts in the maintenance activities that the inspector observed in the field. These components included in part, the replacement bolts for the limitorque valves, replacement gaskets for the electromatic safety relief valves and various components for an air start ball valve for the Unit 1 EDG. The inspector was able to verify that specification requirements were met and was able to trace the components through the complete procurement process. However, during a walkdown of the Unit 1 drywell, the inspector identified approximately eight used nuts and bolts stored in an uncontrolled area and no material request forms were available for identification. The licensee was able to trace the bolts back through the procurement system and discovered that the bolts had been used in a safety-related modification on the reactor recirculation piping flanges. However, due to material incompatibilities the bolts were replaced and should have been disposed of per the requirements of procedure S-MI-GEN-012. After notifying the inspector of their findings, the licensee took action to dispose of the bolts.

To assess the licensee's establishment of maintenance tool and equipment control an inspection was performed of the mechanical tool stations for Unit 1. The inspector interviewed the maintenance personnel in charge of issuing the mechanical tools, reviewed the tool control logs, observed the quality of the tools in the storage areas and inspected the segregation area for nonconforming tools. As a result of these inspections, the inspector identified the following weaknesses:

- One nonconforming tool stored with the tools ready for issue.
- Tools were still in the field past their recall dates.
- Approximately half of the tools in the segregated storage area were not properly tagged or identified as nonconforming tools.

The inspector also performed an inspection of all tools being utilized in the maintenance activities observed in the field and performed a walkdown of Unit 1 tool storage and laydown areas. All tools inspected during the inspector's observation of the maintenance field activities and walkdowns appeared to be acceptable with the exception of three nonconforming tools identified in the northwest laydown area in the drywell. The licensee stated that the mechanical tool control log would be updated and a formal recall program would be initiated to improve the issuance



and tracking of the tools. The licensee also took immediate actions to correct the identification tags in the tool segregation area and replaced or repaired all nonconforming tools identified prior to the conclusion of the inspection.

To assess the control and calibration of metering and test equipment, the inspector reviewed the calibration procedure AP-8.4, interviewed the calibration and control personnel, and observed the calibration personnel performing calibration checks on various mechanical tools returned from the field. The inspector also inspected the mechanical calibration program in the following areas: identification, tagging process, quality of tools, proper storage, segregation, traceability, and storage and handling of contaminated tools. Overall the calibration program was found to be adequate with the exception of the following weaknesses:

- There are no time requirements established for the review of the backlog to identify tools issued to the field past their recall date.
- The control log is not computerized and appeared to be informal.
- The Mechanical Department does not use the same tracking system as the Electrical and I&C Departments, which list the tool and the job activity the tool is used on for more accurate tracking.

As a result, the licensee stated that the calibration program was being revised to incorporate all three departments and the tracking of all calibrated tools would become computerized eventually resolving the weaknesses identified by the NRC.

Conclusion

Although some weaknesses were identified in the area of maintenance facilities, equipment and materials control, the NRC concluded that overall, the licensee's programs established for the more critical elements such as adequate maintenance facilities, material control, tool control, and tool calibration were adequately described in procedures, documented, and implemented by the licensee's programs and maintenance personnel.



III.8.0 PERSONNEL CONTROL

SCOPE

The personnel control area is divided into four topics consisting of staffing control, training, testing and qualification, and an assessment of current status. Inspection activities consisted of interviews, training facility observations, field observations, and document and record reviews. This inspection effort focused on determining the extent to which personnel control is proceduralized and implemented in the maintenance process. Subjects inspected for the staffing control element consisted of the following: Hiring, firing and promotion policies; organizational charts; turnover minimization policy; shift coverage control and emergency coverage control; job descriptions; manpower level; and disciplinary actions.

FINDINGS

An assessment of staffing control was made mainly through interviews with maintenance supervisors to discuss the licensee's program for the hiring, firing, and promotion of maintenance personnel. The NRC inspector also reviewed the agreement between the licensee and the Local 478 Union for mechanical maintenance personnel which was effective June 1, 1986. The inspector was informed that maintenance craft personnel must be at least high school graduates. Promotions are based on training success and performance appraisals. Personnel disciplinary actions are covered by a five step dismissal program where the individual receives at first, a verbal warning followed by written warnings, notification to upper management, time off and then final dismissal.

Organizational charts were found to be complete and up-to-date. The licensee was, however, in the process of filling some upper and lower supervisory positions in the Maintenance Department during the time of the inspection. The licensee does not have a turnover minimization policy in effect. However, turnover rates are tracked and appropriate management personnel are notified if turnover rates increase. Job descriptions are standardized, however, there were no instructions that specified an update interval for job descriptions. Maintenance personnel are tracked by computer management programs and organizational charts. Provisions for addition or reduction in craft levels is determined by planning and scheduling personnel with input from maintenance supervision.

Shift coverage control and emergency coverage control are determined by oral meetings, work schedules, and overtime procedure policies. Shift coverage control and emergency coverage control function according to the routine maintenance program. The maintenance supervisor interviewed stated that shift coverage was smooth and emergency maintenance was infrequent.



To assess the licensee's training of maintenance personnel, the inspector interviewed the Training Director, Maintenance Supervisor, and training instructors. It was noted that newly hired maintenance personnel are oriented to maintenance procedures, plant systems and radiation protection. All employees are required to take a General Employee Training (GET) course before entering the Nine Mile Point facilities. Entry level maintenance personnel are required to enter a core training program. During this period, the individual receives classroom, laboratory, and on-the-job training. Craft workers are required to enter the helper training program; the maintenance craft worker receives classroom and laboratory training as well as on-the-job training. Comprehensive examinations are given throughout the period for maintenance personnel trainees.

Specific training is provided to the maintenance personnel as they advance beyond the core training and helper training programs. Maintenance personnel receive training through the use of lesson plans, laboratory exercises, on-the-job training and modules. Comprehensive examinations are given throughout the process. Maintenance craft continuing training is carried out on an as-needed basis when special procedures or modifications are necessary. Examples include the the mechanical balancing machine, Raychem splices, CRD mock-up training, and the EDG analyzer.

The inspector did note, however, that the licensee's training matrix system which is a document used by the Training Department as a personnel progress tracking device is not proceduralized. It was also noted through interviews with maintenance supervisors that the matrix is used to determine which maintenance craft would be chosen to perform various maintenance activities in the field. The licensee Training Director stated that the training matrix has been a tool used by both the Training Department and Maintenance Department for approximately three years and that because of the dependance of both departments on the matrix, he was in the process of recommending to upper management that the matrix system be discussed in an appropriate procedure.

To assess the test and qualification process, the NRC reviewed the qualification records of the maintenance personnel which were observed performing various maintenance activities in the field (i.e. safety related snubber testing and Limitorque valve bolt replacement). The testing and qualification records for the maintenance personnel were well documented and traceable. In interviews with maintenance supervisors, the inspector was informed that maintenance personnel receive both in-class and on-the-job training. The maintenance personnel must also pass written examinations and adequately perform certain maintenance tasks prior to promotion to the next level. A one-on-one interview with the individual's supervisor is also conducted to assure that all requirements are met prior to the promotion.



- An assessment was performed of the current status of the licensee's fitness for duty program and of work performed by unqualified personnel. As a result of interviews with the maintenance supervisors, personnel manager, and a review of the licensee's fitness for duty program, it was determined that the licensee has a comprehensive drug program to ensure worker fitness for duty and they are implementing the policy aggressively. The qualification program for maintenance personnel is adequate and is being effectively implemented.

CONCLUSION

- Based on interviews with maintenance supervisors and training personnel as well as reviewing qualification records and observing maintenance personnel performing various work activities in the field, the inspector determined that the licensee's personnel control program is well documented and adequately implemented.



APPENDIX 1
PRE INSPECTION REQUESTED INFORMATION

ENCLOSURE

To aid us in preparation for the maintenance inspection please provide us with the following documents, procedures and information in accordance with the designated numbers. If you do not have the requested document or information, it is not necessary to generate it to comply with this request. We recognize that many of the documents requested separately may be inclusive in a larger single document. Please provide six sets of the requested documents. A member of our staff will contact you regarding the best method of transmitting the documents to us.

Section 1-Description of General Plant Maintenance Activities

- 1-1 Maintenance administrative procedures which describe your corrective, preventive and predictive maintenance activities.
- 1-2 Organization charts including the maintenance organization and plant wide organizations.
- 1-3 Procedures, charts and other documents which describe your Planning Department and its activities.
- 1-4 Documents which describe maintenance planning and scheduling meetings and status of maintenance reports.
- 1-5 Documents which describe the Maintenance and Operations interface during planning, scheduling, work start, work closeout and post maintenance/functional testing.
- 1-6 Documents which describe your work control process: how a work order is started, planned, executed, completed, closed out and equipment returned to service.
- 1-7 Documents which describe training and retraining of plant and contractor maintenance personnel. (For maintenance activities only, do not include GET.)
- 1-8 Documents which describe interfaces and communications among the technical support, engineering support and the maintenance/I&C Departments.
- 1-9 Documents which describe maintenance work procedure establishment and control: Criteria as to when a procedure is to be used; initial writeup; reviews and approval; revisions; human factors reviews; QA reviews; requirements for conduct of work; troubleshooting criteria; work closeout; post maintenance testing and restoration of systems.
- 1-10 Description of methods by which maintenance performance is measured. Are performance indicators used? What are they? Who is informed of the results?



1-11 Description of process for communications with vendors for technical services and latest technical information on equipment and systems installed at the plant, and interfaces with vendors or NSSS for training, modifications and equipment replacement.

1-12 Documents which describe the preventive maintenance and predictive maintenance programs.

- Which equipment is included?
- How is maintenance frequency determined?
- What is done with results of these maintenance actions.

1-13 Documents which describe management involvement in maintenance.

- Are there goals set for the maintenance and I&C Departments.
- Are these goals used in the performance evaluation of managers and supervisors?
- Are these goals communicated to first line supervisors and chiefs?

Section 2-Status of Plant and Contractor Personnel Who Perform Maintenance.

2-1 The number of craft personnel for electrical, mechanical and I&C maintenance organizations. Please include foremen and the foreman to craft ratio.

2-2 The average years of experience for each individual and the turnover rate.

2-3 Description of shift work and work assignments. How do foremen decide on which craft is to perform what type of work?

Section 3-Status of Plant Equipment and Plant Maintenance

3-1 What equipment failures occurred during the last year of operations?

3-2 What equipment failures have been found during shutdown of plant?

3-3 Describe maintenance and testing for diesel generators and electrical equipment including switchgear that would be required in case of loss of offsite power.

3-4 What component failures present greatest risk from a probabilistic risk standpoint to the plant?

3-5 What have been the areas of high maintenance activity on safety related and non-safety related equipment and components?



3-6 Provide the following status concerning Maintenance Work Orders (MWO).

- Current total listing and status of MWOs, number in planning, number in final sign-off, number on hold for lack of parts, number on hold for engineering assistance, number available to be worked on
- Projected number of corrective MWOs to be outstanding at start-up by priority
- Rate of completion of corrective MWO in terms of number completed/month and manhours expended (by craft)/month for the past 12 months
- Current number of preventive maintenance work orders overdue
- Rate of completion of preventive MWO for the past 12 months.
- Estimated manhours required to complete current preventive maintenance MWOs
- Number MWOs requiring rework over past 6 months

3-7 Provide five corrective maintenance procedures for work that is scheduled for the upcoming outage. MOVs, PRVs, ECS Pumps, Batteries, Switchgear, etc.

3-8 Provide five preventive maintenance procedures that are scheduled for the upcoming outage.

3-9 Provide your overall outage schedule.



APPENDIX 2
PERSONS CONTACTED

NIAGARA MOHAWK POWER CORPORATION (NMPC)

- * Anjian Athelli, Sr. EQ Engineer
- * Charles Beckham, Nuclear QA Manager
- * Rick Cohen, Construction Services Manager
- * Bill Connolly, QA Program Manager
- * Andy Curran, Site, Regulatory Compliance
- * Kim Dahlberg, Unit 1, Station Superintendent
- Robert Deuvall, Engineering
- Bill Drews, Maintenance Superintendent
- Steve Domago, Operations, Station Shift Supervisor
- Gary Eldridge, EQ Engineering
- * Mike Falise, Site Maintenance Superintendent (Acting)
- Curt Fischer, U1-Maintenance Supervisor-Electrical
- * Mike Goldych, Training
- * Ed Gordon, Supervisor, Radiological Support
- Greg Grescock, Manager Nuclear Design
- Bill James, U1 Maintenance Supervisor, I&C
- * Ken Johnson, Electrical Maintenance
- Rocko Longo, U1 Mechanical Maintenance Supervisor
- Louis Lagoe, U2 Maintenance Superintendent
- * Lee Klosowski, Manager U1 Nuclear Design
- * Ray Pasternak, Manager, Site Engineering
- Tom Picciott, Asst. Supervisor, Mechanical Maintenance
- * John Power, Nuclear Safety Consultant
- * Norm Rademacher, Director, Regulatory Compliance
- Robert Randall, Unit 1, Operations
- Al Rivers, Training
- * Al Smith, Construction Services Supervisor
- * Ken Sweet, Superintendent U1 Maintenance
- * John Snyder, Engineering Liason
- * C. D. Terry, Vice President, Nuclear Engineering and Licensing
- * Robert Tessier, Unit 1 Outage Manager
- * Gary Whitaker, Mechanical Maintenance
- * Don Wilcox, Training, Electrical
- * Paul Wilda, QA, Supervisor Operations Surveillance
- * Jim Willis, General Superintendent
- * Pat Volza, Radiation Protection Manager

OTHER

- * Paul Eddy, New York Public Service Commission

* Indicates presence at December 9, 1988 exit meeting.

NOTE - The inspection included discussions with other plant personnel not identified above.



APPENDIX 3
SUMMARY OF WEAKNESSES

REFERENCE

Weakness - A potential problem or condition presented for licensee evaluation and corrective action as applicable.

- I (P8) • The tracking system does not include certain plant systems for problem root cause review, for example instrument air, because they are not part of the INPO NPRDS system, even though the system or component may affect Nuclear Safety related item performance.
- I (P10) • Paint flaking with pieces up to 3" dimension on the reactor vessel pedestal and piping in the lower level of the drywell. What corrective actions and analysis are required to assure that core and containment spray systems will work as designed.
- I (P8) • Consider internal reporting of the number of failed surveillances, time in an LCO condition, percent maintenance rework and other items that are not included in the INPO NPRDS if the reporting will allow better focus on the impact of maintenance problems on plant reliability or performance.
- II.2.0 (P13) • Maintenance self-assessment items were not adequately followed up and management control of followup was not evident.
- II.2.0 (P13) • Management support of maintenance
Controls to initiate actions are not well defined. The decision making process to define what needs to be done is missing significant items, including proper evaluation of information from outside NMPC.
- II.3.0 (P14) • No written upper management policy or directive on conduct of plant maintenance was available.
- II.3.0 (P15) • Responses to NRC Information Notices (INs) reviewed did not indicate the full scope of the identified issues had been considered.
- II.3.0 (P15)
II.4.7 • Evaluate the number of operational events assessment (OEA) open items.



REFERENCE

- II.3.0 (P15) • Large backlog of INs, SOERs, SERs and SILs (OEA items)
II.4.7 (P24) • that have not been reviewed and analyzed to establish what should be done indicate a management support problem.
- II.3.0 (P15) • Fail safe testing of air operated valves upon loss of air was not incorporated into the IST program and tests have not been conducted to show what will happen upon loss of air.
- II.4.1 (P17) • Offsite engineering as technical support for maintenance is not accessible for involvement with maintenance work.
- II.4.3 (P18) • PRA principles not applied to maintenance work, planning or scheduling.
- II.4.5 (P20) • For ALARA implementation, a generic set of maximum temporary shielding loads for various pipe sizes and pipe support locations is not in use.
- II.4.6 (P23) • Root cause analysis and steps to reduce relatively high industrial safety (OSHA) accident rate require follow up.
- II.4.6 (P23) • In the area of industrial safety, no listing is available to identify confined space locations, and these areas are not clearly identified in the plant.
- III.5.0 (P27) • Tracking system for calibrated mechanical tools is not as
III.7.0 (P39) • complete as that for calibrated electric tools.
- III.5.0 (P27) • Unit 2, RWCU pump "disaster bearing," engineering analysis of problem report and disposition. Can Unit 2 be restarted without the disaster bearing on the RWCU pump.
- III.5.0 (P29) • No master equipment list available for Unit 1.
- III.5.0 (P31) • A large number of work requests are waiting for parts.
- III.5.0 (P31) • Number of work requests being held for "other reasons." Identify cause for delay and correct.
- III.6.0 (P36) • The systems engineering approach as support to maintenance implementation has not been implemented.
- III.6.0 (P36) • Control of contractors on site.
III.7.0
- III.8.0 (P42) • Matrix report of personnel qualifications is not included in procedure NTP-9 such that training matrixes are not controlled documents.



The following observations are not specifically discussed in the body of the report but were noted during the inspection.

- Not all personnel using the work tracking data base were as familiar or trained with the computer program to fully use the system.
- Pre-work steps required by maintenance foreman in getting approvals and signoffs prior to starting work are complicated with a possibility of error.
- Lack of summary information of maintenance data base useable by supervisors. For example, Work Request delay causes in summary form could allow supervisor to identify problem areas and therefore initiate changes.
- Identify maintenance procedure steps that are required by regulatory commitment such that deletion of these will occur only with adequate review and justification.
- IEN 88-43 on ASCO solenoid valves has not been addressed by technical support.
- Work Request program does not provide for tagging of components with outstanding Work Requests. Defective components or those requiring maintenance in the plant can not be identified by observing a WR tag on the component.
- Engineering involvement in plant aging and actions to be taken were not established.



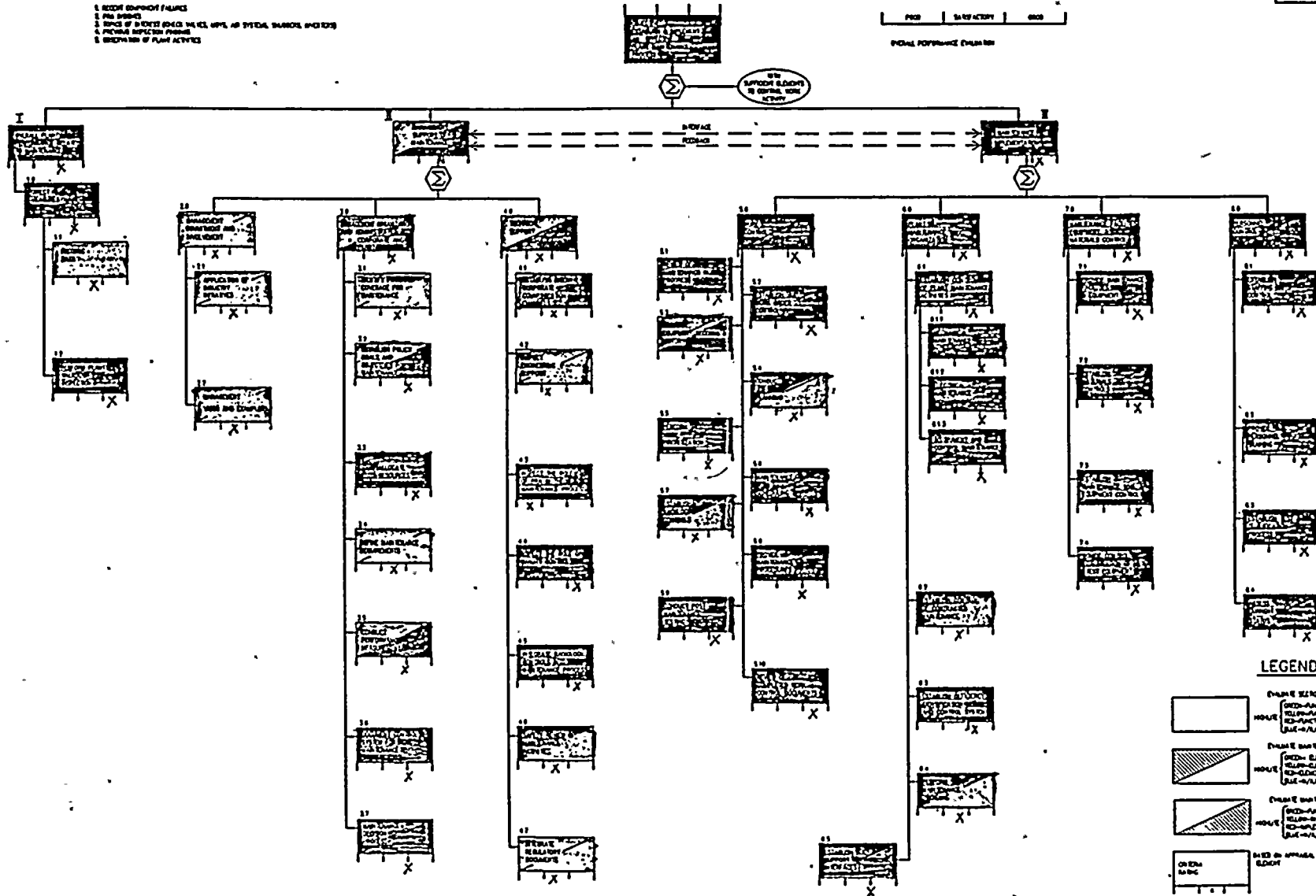
TREE INITIATORS

1. SCENE EVIDENCE FAILURE
2. PMA DEFECT
3. RINGS OF DEFECTS (RINGS INCL. W/PE, AP, SYDIAL, BARRELS, SPINDERS)
4. PITCHER DEFECTIVE PARTS
5. DISPOSITION OF PLANT ACTIVITY

PRESENTATION TREE - MAINTENANCE INSPECTION TREE -

FIG 1 SAFETY 800
SIGNAL PERFORMANCE EVALUATION

97M-1000
50-220/88-80
11/1/89



LEGEND

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| | BASED ON APPROPRIATE FORMS AND/OR RECORDS FOR EACH ELEMENT |

NOTE: THIS FORM IS USED IN CONNECTION WITH FORMS 4256A, 4256B, 4256C, 4256D, 4256E, 4256F & 4256G

FORM 425768-C

