INITIAL OPERATING LICENSE

.

REVIEW REPORT

FOR

NINE MILE POINT UNIT 2

DOCKET NUMBER 50-410

PREPARED BY

UNITED STATES NUCLEAR REGULATORY COMMISSION

REGION I

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1.0 INTRODUCTION

The Nine Mile Point Nuclear Station, Unit 2 (NMP-2) is located on a 900 acre site owned by the Niagara Mohawk Power Corporation (NMPC) on Lake Ontario in Scriba, New York. It is situated between two operating nuclear plants, Nine Mile Point Nuclear Station, Unit 1 (NMP-1) and the James A. FitzPatrick Nuclear Power Plant (FitzPatrick), owned by the New York Power Authority (NYPA).

NMP-2 is a General Electric boiling water reactor (BWR-5) with a Mark II containment. The designed net electrical output is 10.30 MWe. Stone and Webster Engineering Corporation (SWEC) has served as the Architect Engineer and Construction Manager.

NMPC currently operates NMP-1, a BWR-2 licensed in 1969, and previously constructed and operated FitzPatrick, a BWR-4 licensed in 1974, prior to its transfer to the NYPA.

This report describes the process used by NMPC to monitor and control quality of construction and preoperational testing, discusses the results of independent evaluations of NMPC's performance, and addresses both the inspection program and the Systematic Assessment of Licensee Performance (SALP) program conducted by NRC Region I. The report also discusses facility preparations for operation. The Region I staff has gained sufficient information to assess the performance of NMPC and its major contractors and subcontractors.

This report presents the basis for the Region I conclusion that (1) Nine Mile Point, Unit 2 has been constructed substantially in accordance with Construction Permit CPPR-112, the Final Safety Analysis Report (FSAR), and NRC regulations, and (2) the Niagara Mohawk Power Corporation is ready to safely operate the facility.

2.0 FACILITY CONSTRUCTION

2.1 Overview and Status

Construction of Nine Mile Point, Unit 2 is essentially complete.

While early construction work proceeded uneventfully, major quality assurance (QA) problems were found beginning in 1981. NMPC took proper corrective action in response to two civil penalties and completed construction in an acceptable manner.

2.2 Inspection Program

Region I inspections of construction activities at Nine Mile Point 2 have been conducted in accordance with the program established by the Office of Inspection and Enforcement (I&E). The objective of these safety inspections has been to obtain sufficient information through direct observation in the field, personnel interviews, and review of procedures and records to determine whether construction and installation of safety-related components, structures, and systems met applicable requirements. A portion of the inspection effort has been directed toward inspection of NMPC's Quality Assurance Program and its implementation, as described in the Preliminary and Final Safety Analysis Reports.

The Nine Mile Point 2 site was staffed with a construction resident inspector from October 1981 to May 1983 and from July 1983 to July 1986. A second construction resident was assigned in October 1984 through June 1985. In November 1984, an additional Senior Resident Inspector was dedicated on a part-time basis to follow the preoperational testing program. Presently a site senior operations resident and two unit resident inspectors are assigned. The direct observation, independent verification, and daily presence of resident inspectors at the facility have provided a means to detect quality problems, to track their resolution, and to monitor NMPC's compliance with the site QA programs.

2.2.1 Inspection History

Inspection of NMPC began in 1972 and has continued in conjunction with the completion of construction activities. Region I inspections monitored soils and foundations, concrete work, safety-related structures, piping, welding, electrical activities, safety-related mechanical components, instrumentation, and related areas. Enclosure 1 identifies the inspections performed, the areas inspected, and significant inspection findings. At present, about 150 inspection reports have been issued for the Nine Mile Point 2 facility.

A comparison of inspection hours expended at other BWR facilities at a similar stage of construction (up to ACRS hearings) is shown below:

NMP-2	Hope Creek	Shoreham	Susquehanna 1	Limerick
8250 hrs.	7600 hrs.	6500 hrs.	7100 hrs.	7800 hrs.

A total of approximately 12,000 inspection hours have been expended to date at Nine Mile Point 2. The early inspections conducted at Nine Mile Point 2 through late 1981 did not identify substantive deficiencies. The work activities at that time involved site preparation, concrete placement, reactor pressure vessel placement, and QA program reviews. While several violations and infractions were issued, no programmatic problems were apparent.

A Regional Construction Team Inspection conducted in November, 1981, in conjunction with the assignment of a site resident inspector, served to identify program deficiencies that were not previously apparent. The concentrated team inspection approach found several problems with the misapplication of site QA programs and found an inadequate NMPC program for monitoring their contractors. The Region I staff also identified deficiencies with the piping contractor's welding activities. These findings resulted in two enforcement conferences between Region I and NMPC in which Region I informed NMPC that greater management attention and surveillance were needed to ensure control of the piping contractor.

Further Region I scrutiny of the site QA programs resulted in the identification of Stone and Webster's use of trainees to perform inspections and the associated falsification of inspection records. This violation resulted in a \$100,000 Civil Penalty. Also, NMPC's steps to improve the performance of the piping contractor had been ineffective. Between October 1982 and August 1983, three management meetings were held with NMPC, during which Region I emphasized that the licensee needed to improve contractor oversight so that the subcontractors adequately performed their work.

The I&E CAT inspection in late 1983 provided further evidence that the site QA programs were deficient. The identified QA problems resulted in an enforcement action comprised of a Severity Level II Violation, a \$100,000 Civil Penalty, and an order requiring a management audit, a quality trending program, and an independent review of site corrective action programs.

In response NMPC instituted a major management reorganization to bring experienced personnel on site to guide the remainder of construction activity and to review past practices. Site software and inspection procedures were enhanced to closely identify inspection criteria. Numerous reinspections of plant hardware have been performed to assure its adequacy relative to the design criteria. Results of nondestructive examination activity have been reviewed to assure pressure boundary integrity. The new project management instituted changes in both construction and QA activity to enhance the quality and oversight of site construction. In response to the weaknesses identified in the site quality assurance and project management programs, an Augmented Inspection Program was initiated by Region I in June 1984, which supplemented the routine construction inspection program (MC 2512) by the following:

- Frequent meetings between NMPC and NRC management to assess the progress of licensee corrective actions.
- Additional team and individual inspections to assess the effectiveness of site quality programs.
- Assignment of additional site inspectors (a second resident and detailed senior resident inspectors).
- Monitoring of NMPC performance indicators.

The Augmented Inspection Program actions have been completed, and this was documented in a Region I memorandum on August 6, 1986. Verification of NMPC corrective actions was accomplished by closeout of NRC open items.

2.2.2 Special Team Inspections

For a more in-depth assessment of construction quality, several special team inspections were conducted along with the normally prescribed inspection program. These inspections are discussed below:

1981 Regional Construction Team Inspection

The first inspection was conducted from November 30 to December 18, 1981 by three region-based inspectors, the resident inspector and a section chief and involved 394 onsite inspection hours. The inspection covered site quality assurance activities; design controls; project management practices; procurement control; and construction controls in the electrical, mechanical and nondestructive examination areas. The primary inspection function was to assess NMPC management control of the Nine Mile Point 2 construction activities. Several problems were identified as noted below:

- Structural steel items improperly released from storage.
- Inadequate training of contractor personnel.
- Excessive dependence on contractor construction personnel to monitor quality-related activities.
- Nonconformances not evaluated to determine root cause.
- Untimely corrective action for QA identified deficiencies.
- Project Manual without defined position descriptions, leading to confusion on roles and responsibilities.

- Inequitable pay and benefits for QA personnel and ineffective management control over SWEC and subcontractor QA.
- Inadequate design control measures.
- Cable tray procurement documents not conforming to The National Electric Manufacturers Association (NEMA) standard.

The Notice of Violation issued with Inspection Report 81-13 indicated that the observed deficiencies, when viewed in total, were indicative of an ineffective Quality Assurance program at Nine Mile Point 2.

1983 I&E Construction Appraisal Team (CAT) Inspection

In November and December 1983 the Office of Inspection and Enforcement (I&E) conducted a Construction Appraisal Team (CAT) inspection to evaluate the management of construction activities and the quality of construction at Nine Mile Point Unit 2. The inspection team was comprised of eleven inspectors, including five consultants, and a team leader. The inspection consisted of detailed examinations of installed hardware after NMPC's quality control inspections, examination of procedures and records, observation of in-process work, and interviews of site personnel.

The inspection detected a broad range of problems in construction and inspection programs. The major findings are identified below:

- Electrical cable and raceway installations, particularly in the control room complex, exhibited separation problems that had either not been identified by QC, or NMPC had not determined how these deficiencies would be corrected. Indeterminate bolting material was utilized on the station battery racks and at shipping splits for switchgear and motor control center enclosures. Inspection records did not reflect the design documents to which the inspection had been performed. The inspection procedures were found to be deficient with respect to attributes on raceway marking, acceptance criteria for separation, bolting material identification, and protrusions into cable trays.
- The inspection found that HVAC and piping runs were generally erected in accordance with the applicable requirements. Several pipe supports were found to contain deficiencies not previously identified by contractor quality control (QC) personnel. The concrete expansion anchor installation program acceptability was questioned as the pre-qualification tests had been performed in a concrete mix of lower compressive strength than normally used for seismic Category I structures. A significant loss of preload was observed when the installed expansion anchors were torque tested.

- The inspection identified major deficiencies in the ITT Grinnell program for ASME code radiographs, involving weld quality, film quality, and inadequate documentation. The associated Stone & Webster Engineering Corporation and NMPC program for review and acceptance of these radiographs was found to be deficient. It was noted that some similar problems were also identified by site quality assurance/quality control programs, but timely corrective actions were not taken. Inadequate liquid penetrant surface examination of ASME pressure boundary welds was identified. The site structural welding to the AWS Code was found to be generally satisfactory.
- The concrete and structural steel installations met regulatory and specification requirements. Minor problems were identified with concrete placement activities and records.
- The project storage and maintenance programs were examined and found acceptable. Inadequate control of unused weld filler material was identified, and some pipe support members lacked the requisite material traceability.
- In the aggregate, the inspection findings indicated that NMPC had an ineffective audit program. Nonconforming items were dispositioned on documents other than formal QA documents such that the trend programs were bypassed. Inadequate document control measures were observed, in that out of date drawings were utilized in the field, and inspection records did not reflect the actual design documents used during the inspection. QC inspections were untimely as evidenced by the wide disparity between the number of items completed by construction in relationship to those inspected by QC.

On March 20, 1984, an Enforcement Action (EA) was issued for the CAT identified problems at Nine Mile Point 2. The Enforcement Action was composed of a Severity Level II Notice of Violation, an Order, and a Civil Penalty of \$100,000. The order called for a management audit, the development of a site quality performance trend program, and an independent review of site corrective action programs.

NMPC responded to the Enforcement Action with steps to address the specific deficiencies and an overall corrective action program. A consultant, Management Analysis Company (MAC), was retained by NMPC to perform the review of the corrective action program. NMPC committed to develop a site quality trend program that would serve to monitor the quality levels of various installation activities.

NMPC instituted a complete management reorganization at both the corporate offices and the site. NMPC retained MAC to provide key managers with nuclear experience to fill both project and quality assurance positions. Project management was relocated onsite, and the line organization was reorganized such that the Stone and Webster project director reported directly to the NMPC project director. Quality Assurance management was strengthened to enhance QA effectiveness. This significantly improved their control of site activities.

In order to provide for tracking and disposition of the inspection findings Region I reviewed the CAT report and classified items as violations or followup items. The Augmented Inspection Program was to utilized to closely monitored NMPC corrective actions via inspection report documentation.

1984 Regional Construction Team Inspection

The second inspection of this type was conducted by Region I from December 3 to December 14, 1984 by six region-based inspectors, the senior resident inspector, and a section chief, and involved 687 inspection hours. The inspection focused on the hardware associated with the High Pressure Core Spray system. The inspection noted an improvement in site quality activities following the I&E CAT inspection and found that the installed hardware met regulatory criteria with two minor exceptions. This inspection was used as a partial measure of the status and effectiveness of NMPC corrective actions.

1984 Nondestructive Examination Inspection

An independent nondestructive examination (NDE) inspection was conducted by Region I during the Spring of 1984 using the Region I mobile NDE laboratory and involved 662 inspection hours.

The purpose of the inspection was to verify the adequacy of NMPC's NDE program through independent testing. This was accomplished by performing the same tests that NMPC had performed, and then comparing Region I results to those of NMPC. The program also performed independent pipe wall thickness measurements and radiographic film comparison.

A random selection of welds was used to provide a representative sample of piping systems, components, and structural welds representing various pipe sizes, and shop and field welds fabricated to AWS and ASME Class 1, 2, and 3 standards. The items selected were previously accepted by NMPC based on vendor, shop, and onsite QA/QC records. The examinations were performed using detailed procedures specifically written for compliance with NMPC's PSAR commitments to the ASME Section III Boiler and Pressure Vessel Code. The intent was to duplicate, to the extent practicable, the techniques and methods of the original examinations. The independent examinations included: radiographic testing (RT), liquid penetrant testing (PT), magnetic particle testing (MT), thickness measurement, anchor bolt length ultrasonic examination, nardness measurements, and radiographic film review.

The independent NDE verification showed generally good agreement with NMPC's determinations. Further NMPC review of radiographic film was accomplished to provide additional assurance of the technical adequacy of the film interpretations.

1985 Nondestructive Examination Inspection

A second NDE inspection was conducted by Region I from December 9 to December 19, 1985. The scope of the inspection and types of welds examined were similar to the earlier NDE inspection. No unsatisfactory findings were identified. The inspection covered the following areas: radiography (RT), liquid penetrant (PT), magnetic particle examination (MT), thickness measurement, hardness measurement, visual examinations, and ferrite testing.

All items examined were found acceptable. The inspection results confirmed that sufficient corrective actions had been instituted to address previously identified deficiencies in the NDE area.

1986 As-Built Team Inspection

The As-Built Team Inspection was conducted from April 14 to April 25, 1986. The inspection was performed by Region I staff including a section chief and six region-based inspectors. The inspection focused on hardware associated with the service water, residual heat removal, onsite electrical power, and control rod drive systems. The inspection examined mechanical, electrical, instrumentation and welding areas to assure the as-built conditions reflected the FSAR and design document description. Four minor violations were identified. The overall conclusion was that the installed hardware was in accordance with licensing and design documents.

2.2.3 Enforcement History

The inspection program utilized by the NRC provides for enforcement measures to promote adherence to regulatory requirements, reduce repeated nonconformances, and encourage self-identification and correction of nonconformances. Notices of Violations were issued when applicable, and NMPC was required to respond with proposed corrective actions. NRC inspectors and management reviewed and evaluated these responses for acceptability. The inspection staff subsequently confirmed that NMPC properly completed the corrective actions.

The following table gives a comparison of the Nine Mile Point 2 enforcement statistics with those of four other BWR plants. Early enforcement actions were classified as violations, infractions, and deficiencies (in descending order of severity), while the more recent findings contain violations categorized into severity levels ranging from I to V (again, in descending order) in addition to deviations from commitments.

Facility	Issue of <u>CPPR</u>	VIOL	INF	DEF	Ī	II	111	IV	V	DEV	TOTAL
Limerick 1	6/19/74	0	45	20	0	0	0	11	19	5	100
Shoreham	4/14/73	0	38	6	0	0	0	17	13	1	75
Susquehanna 1	11/2/73	0	47	15	0	0	0	18	19	3	102
Hope Creek	11/2/74	0	19	5	0	0	0	19	13	2	58
NMP-2	6/24/74	0	12	1	0	1*	1	29	23	1	68

*numerous issues in 9 areas (see page 5)

The early enforcement history did not indicate any significant programmatic weaknesses at Nine Mile Point 2. However, a greater number of violations with higher severity levels were assessed later in the project. The level III violation was issued in 1982 for using trainees to conduct inspection efforts and the identification of falsified inspection records. A \$100,000 Civil Penalty was issued for the violation. The level II violation was issued in 1984 for a multitude of QA problems identified during the I&E CAT inspection, including significant deficiencies in QC inspection programs and the adequacy of nondestructive examination tests. A \$100,000 Civil Penalty and Order were issued to NMPC.

NMPC instituted numerous corrective actions including program revisions and hardware reinspections, as discussed above in the I&E CAT Inspection section (page 5). As a result of the post-I&E CAT Inspection Order, a third party evaluated the adequacy of the corrective actions, and NMPC addressed the recommendations of that third party audit. NMPC developed a performance indicator management tracking program to assess the overall quality of the plant construction. Based upon NMPC±s response to the third party findings and implementation of the Quality Performance Management Program, the conditions of the Order were terminated on March 13, 1986.

Overall, the number of violations at Nine Mile Point Unit 2 is below average relative to other recently licensed BWRs in Region I, but the large number of issues associated with the CAT inspection severity level II violation and the fact that it is the only construction facility in Region I to receive two civil penalties, give it the poorest overall enforcement performance in Region I for a construction facility. Close NRC scrutiny and strong enforcement action have been necessary to assure competent construction management and an acceptable construction quality at Nine Mile Point Unit 2.

2.2.4 Review of Construction Deficiencies

Significant deficiencies in design and construction, as defined in 10 CFR 50.55(e), are required to be reported to the NRC. The responsiveness of NMPC to this requirement and NMPC management's attention to this reporting activity are a measure of the licensee's commitment to quality and ability to identify abnormal conditions.

Continuing review by Region I indicates that NMPC's program of significant deficiency reporting has been effective. To date, NMPC has evaluated 265 potentially reportable construction deficiencies and has reported 164 deficiencies under 10 CFR 50.55(e). Of these, 76 were subsequently withdrawn after further evaluation.

The reported deficiencies covered a wide range of topics. The most significant deficiencies involved the main steam isolation valves (MSIVs), a unique ball valve design manufactured by Crosby. The MSIVs were unable to meet the FSAR and Technical Specification closure time criteria of 3 to 5 seconds, because the mechanical latching mechanism did not release quickly enough. In addition, during extensive testing the roller bearings associated with the latch mechanism cracked. The third significant MSIV deficiency involved the failure to meet the FSAR and Technical Specification leakage requirements following stroke testing due to flaking of the tungsten carbide coating from the ball and the apparently associated scratching of the seating surface. All of these deficiencies were reported in August and September 1986 and have received extensive review by NRC Region I and NRR.

2.3 Third Party Audits and Evaluations

Aside from their own quality assurance and quality control (QA/QC) oversight programs and project management evaluations of construction, NMPC participated in additional evaluation programs sponsored by independent organizations. These included the Institute of Nuclear Power Operations (INPO) and the Joint Utility Assessment Team (JUAT). Also, an independent team of SWEC engineers performed a Design Verification Program audit.

Region I has remained cognizant of the findings generated during the independent evaluations and concluded that no additional action by the NRC was required.

2.3.1 INPO Evaluations

In September 1982 NMPC conducted an INPO self-evaluation which involved approximately 2600 man-hours. Problems were identified with QA/QC staffing levels, design control, and segregation of nonconforming material. No substantial hardware deficiencies were identified. Following the I&E CAT Inspection and the resulting enforcement action, an INPO construction audit was conducted from September 24 to October 5 and October 15 to October 19, 1984. The audit addressed organizational structure, design control, material storage, residual heat removal system design verification, QA program implementation, equipment qualification, hardware installation inspections, plant safety, and test activities. Three Construction Deficiency Reports were prepared as a result of INPO concerns regarding control of equipment spare parts, diesel generator voltage profile study for 600 V Class IE starting loads, and the auxiliary system voltage profile without the 208/120 VAC systems.

The audit identified licensee strong points regarding NMPC assessment of contractor performance and the scope c. Stone and Webster Engineering Corporation (SWEC) Engineering Assurance Audits.

2.3.2 Joint Utility Assessments

The Joint Utility Assessment Team (JAAT) program provides independent audits by utility senior management of a licensee's QA activities. There have been four JUAT audits of NMPC corporate and site QA efforts. The most recent assessment covered the period of March 5 - 9, 1984. The scope of the audit included QA coverage of startup and test activities, effectiveness of nonconformance trending programs, and timeliness of corrective actions resulting from the I&E CAT inspection. Several enhancements were recommended for improving the trending efforts and resultant application of corrective actions. The audit identified examples of inadequate followup to QA nonconformances in that root causes were not identified and corrective actions to preclude recurrence were not specified in the nonconformance report dispositions.

2.3.3 Design Verification Program

The SWEC Engineering Assurance (EA) technical audit program was implemented in lieu of either an Independent Design Inspection or an Independent Design Verification Program. The final EA technical audit was performed from April 29, 1985 to July 11, 1985. The audit team was comprised of 20 team members that had no direct design responsibility for Nine Mile Point. The purpose of the audit was to assess the entire design process with respirit to FSAR commitments and regulatory requirements. The commitment implementation was verified in design criteria, diagrams, specifications, vendor documents, design changes, and as-built verification programs.

The audit scope included the following areas:

- Reactor core isolation cooling system
- Electrical AC and DC power distribution
- Control building structure
- Main steam turnel structure
- Structural load tracking

- As-built stress reconciliation
- Environmental gualification
- Raceway supports
- Electrical separation
- High energy line breaks
- Seismic interaction

Design documents were reviewed to ensure that the design met base requirements and commitments and was based on complete, accurate calculations and documents. Additionally, plant walkdowns were performed to supplement the document review phase to verify proper implementation of the design requirements.

The NRC Office of Inspection and Enforcement monitored the audit planning stage, audit conduct, and resolution of the audit action items. The SWEC audit concluded that the design process was adequate, in that none of the identified deficiencies were caused by a programmatic design weakness.

2.4 Quality Assurance for Construction

NMPC's construction quality assurance program was described in the PSAR and was implemented through the Stone & Webster Quality Assurance Manual. A summary of the activities of the quality assurance program is presented in Enclosure 2. This summary was based on data presented by NMPC.

As discussed in Section 2.2.2, the CAT Inspection concluded in early 1984 that the quality assurance activities at NMP-2 were poorly controlled and implemented and were generally ineffective. The resulting enforcement action required NMPC to undergo an independent management audit, which precipitated a major reorganization of construction and quality assurance management. Under the new management, site activities were reoriented toward assuring that proper quality was an integral part of construction and that quality assurance personnel independently confirmed the quality.

In addition to the management reorganization, NMPC took the following corrective actions concerning reinspection and review of the quality of completed work:

- Reinspected mechanical equipment bolting and structural steel on a sampling basis to verify acceptability.
- Inspected Power Generation Control Complex (PGCC) to identify electrical separation violations.
- Reinspected previously accepted hardware installations to establish the quality level.
- Repeated liquid penetrant tests on ASME pressure boundary welds.

- Reinterpreted ASME pipe weld radiographs to ensure that all rejectable indications had been resolved.
- Tested concrete expansion anchor bolts to demonstrate load carrying capacity.

As part of assuring proper quality in the remaining construction work, NMPC took the following corrective actions:

- Increased NMPC surveillances and audits of contractor performance, particularly hardware related activities.
- Reviewed inspection procedures and attributes to ensure adequate acceptance criteria definition.
- Assessed in-depth the adequacy of contractor QA organizations.

Also, NMPC developed a Quality Performance Management Program (QPMP) which monitored the quality status of the site. Key parameters such as quantity installed, quantity inspected, and QC acceptance rates were trended for construction hardware commodities. The program monitored outstanding design changes and open QA deficiency documents. Trending was performed on some of the documented nonconforming conditions. Region I monitored the utilization of QPMP by NMPC through management meetings, review of QPMP data, and attendance at the QPMP review meetings at the site.

Region I developed an acceptable degree of confidence in the NMP-2 nondestructive examination (NDE) program as a result of the independent verification of NMPC's examinations, using the NRC Region I NDE Van, as discussed in Section 2.2.2.

2.5 Construction Summary and Conclusions

The quality of design and construction at Nine Mile Point 2 has been the subject of extensive NRC inspection efforts. Significant weaknesses were identified in the application of the Quality Assurance Program as evidenced by both hardware and management deficiencies. The contractor Quality Assurance and Quality Control (QA/QC) functions were ineffectively implemented, and the NMPC QA overview failed to detect the problems. The root causes of the problems included a lack of NMPC management involvement at the project, excessive reliance by NMPC on the contractor quality and engineering organizations, and a weak NMPC QA program.

NMPC instituted a major management reorganization in early 1984 to bring experienced personnel onsite in both the quality and project management organizations. Project management created a goal of all personnel performing their job correctly the first time. Training and welder qualification testing was enhanced to improve the quality of pipe welding. Site inspection procedures were enhanced to clearly identify inspection attributes. A management trending program was developed which tracked parameters such as QC acceptance rates, amount of work remaining, open QA findings, and incomplete engineering design changes. Extensive hardware reverifications were performed by NMPC to assess the quality of the in-situ hardware. The site radiography program was extensively audited to verify assurance of pressure boundary weld integrity.

Routine NRC inspections have continued to identify specific instances of hardware or management deficiencies. Some of the concerns relate to improper translation of licensing commitments into the site design process. SWEC engineering has contributed to several concerns through the incomplete assessment of design basis events on plant systems. Recent inspections have verified that the NMPC corrective actions have effectively resolved previously identified concerns. The plant systems have been generally installed in accordance with the FSAR and design documents. System functional capability has been demonstrated in the associated preoperational tests and results review inspections.

NMPC's efforts to reinspect and review earlier construction activities and their improved commitment to quality assurance following the 1984 Enforcement Action have resulted in a quality project. Overall, Region I finds the construction program quality at NMP-2 to be acceptable.

3.0 PREOPERATIONAL TESTING

3.1 Overview and Status

The preoperational test program was composed of two phases, including the preliminary component testing and the preoperational and acceptance testing. To date, 124 of 140 integrated system preoperation and acceptance tests have been completed including results approval. The remainder of the preoperational and acceptance tests are in progress, in the results review phase, or will be deferred until after license issuance. All preoperational tests required for fuel load have been completed and reviewed.

NMPC has requested deferral of preoperational testing and post-test review of the following systems until after fuel load.

Hydrogen recombiner ' tem Offgas system Containment atmosphere monitoring system Electro-hydraulic control system

Completion of the deferred testing is keyed to post-fuel load milestones. Detailed technical descriptions of the requested deferrals have been submitted to both NRR and Region I for review.

3.2 Inspection Program

The preoperational test inspection program began in January 1985 and was conducted by both resident and region-based specialist inspectors. Inspections of management controls and procedures, including the quality assurance program, initially indicated inadequate test procedure review in that some design criteria would not have been confirmed by testing. In addition, NMPC initially took credit for preliminary tests to satisfy preoperational test acceptance criteria without prior notification to the NRC. After considerable interaction with Region I, NMPC corrected these deficiencies. Inspection of test procedures, test performance, and test results has progressed consistent with NMPC's activities.

NRC preoperational test procedure review, test observation, and review of NMPC's test results, including resolution of test deficiencies and retesting are complete.

During the course of Region I inspection activity, the following areas have been inspected:

- 29 preoperational tests reviewed
- 15 preoperational tests witnessed
- 26 preoperational test results reviewed

Inspection reviews concluded that the preoperational tests satisfactorily tested system function and logic, and the performance of preoperational tests has been generally acceptable. The few examples found in which the preoperational acceptance criteria were inconsistent with licensing commitments were corrected. The test engineers were found knowledgeable of their systems and the administrative test controls. Adequate test witness coverage by quality assurance personnel was noted.

The Containment Integrated Leak Rate Test was successfully performed in April 1986. The Loss of Power Test was successfully performed in May 1986.

3.3 Quality Assurance for Testing

Startup Quality Assurance and Quality Control performed both monitoring and auditing functions during preoperational testing. The presence of startup QA/QC throughout the preoperational test procedure review, test performance, and test results review processes has been evident.

Late in the preoperational testing phase (July 1986) contractor QC personnel assigned to the NMPC QA department raised concerns about their support from management in assuring the quality of work done during the testing phase and about programmatic issues not being properly resolved. These concerns were raised to NMPC's internal allegation clearinghouse system known as the Quality First Program, discussed further in section 6.0. After becoming aware of these concerns in August 1986, management meetings between Region I and NMPC were held on August 29 and September 4. NMPC concluded that while the concerned inspectors had raised some valid programmatic concerns, which were being addressed, these concerns had not resulted in any unsatisfactory hardware conditions. These conclusions were based on interviews with all QC inspectors, both NMPC personnel and contractors, who could not describe any unresolved hardware issues. In addition, NMPC stated that the QC function was overchecked by QA audits, QA surveillances, and QA engineering.

An NRC Region I team inspection was conducted from September 8 to 12, 1986, to independently assess these conclusions. After reviewing NMPC's investigation, interviewing a sizeable sample of NMPC's QA department staff including supervision and management, and following up on lingering concerns identified by these interviews, Region I agreed with NMPC's conclusion that hardware had not been adversely affected and that programmatic concerns needed to be addressed. These programmatic concerns apparently stemmed from the following factors.

- A poor transition from a rigidly defined Stone and Webster construction QA program to a more flexible NMPC operational QA program with little implementing policy guidance from management.
- An aggressive and sometimes overzealous Startup and Test Organization.

- Little feedback from supervision on the resolution of interdepartmental conflicts.
- Poor communications between the QC inspectors and their management concerning a QA department reorganization.

The inspectors also concluded that there was a lack of clearly defined limits and inspection criteria for troubleshooting activities during maintenance of equipment. The Region I team inspection also established that QA surveillance and engineering activities were identifying hardware issues not identified by QC and therefore, providing an effective overcheck of QC activities.

NMPC's initial corrective actions to these concerns included Vice President - QA meetings with all levels in the QA department to explain departmental policy and direct field involvement of QA engineers in defining inspection criteria for troubleshooting activities. NMPC identified additional corrective actions to Region I in a letter dated September 9, 1986. These corrective actions will be tracked by Region I.

3.4 Testing Summary and Conclusions

Region I inspections of the Nine Mile Point Unit 2 preoperational test program included programmatic reviews, test procedure reviews, test witnessing and test results evaluation. The technical adequacy of test procedures has been acceptable, and the personnel performing tests have been well qualified. NRC review has determined that the test results review and approval process and NMPC's resolution of test exceptions and deficiencies have been well documented and supported. The issues raised by the QC personnel did not cause any adverse effects on the installed equipment or its testing, and resolution of the programmatic concerns will be tracked and reviewed by Region I.

4.0 PREPARATIONS FOR OPERATIONS

4.1 Overview and Status

NMPC's activities in preparation for initial fuel load were closely monitored by Region I. Facility staffing, personnel qualifications, training, procedure development, and implementation and establishment of operational organization interfaces have been reviewed. The first new fuel shipment was received onsite on December 5, 1985. Fuel handling and receipt inspection were performed in a well controlled manner with one minor incident.

The Nine Mile Point site organization, similar to the multiunit site organization used when NMPC operated both Nine Mile Point Unit 1 and Fizz-Patrick, has been in place and functioning since before the preoperational test program began in April 1985. Except for the independent operations departments reporting to the Unit 1 and 2 Station Superintendents, all other departments will be site departments reporting to the General Superintendent of the Nine Mile Point site. However, each department will have dedicated unit supervisors and assistants but will draw from common manpower resources.

NMPC's efforts to prepare for the licensing and subsequent operation of Nine Mile Point Unit 2 have been guided by and focused through the Preparedness for Operations Plan, which identified all procedures, personnel qualifications, and training required prior to fuel load, assigned responsibility for completion to the appropriate department or individual, and established a schedule for completion. This readiness overview has been conducted by the NMPC Quality Assurance Department.

4.2 Operations Staffing and Procedures

The Nine Mile Point Unit 2 Station Superintendent and Operation Superintendent are responsible for the safe operation of the plant. The Operation Superintendent ensures that plant operation complies with the facility operating license, technical specifications, and all NRC and company regulations. He ensures that a properly trained, licensed and nonlicensed staff is available to support safe unit operation.

All licensed operators at Nine Mile Point Unit 2 were previously licensed on either Nine Mile Point Unit 1 or FitzPatrick. Therefore, NMPC does not plan to use shift advisors during plant startup, power ascension, or routine operations.

The shift staffing levels of licensed and nonlicensed operators will be adequate to support startup and low power operations. Each startup shift is composed of at least 2 SROs, 3 ROs, and 2 AOs.

The first set of reactor operator (RO) and senior reactor operator (SRO) license examinations were conducted on June 11, 1985 with the following results:

12 SRO candidates - 10 passed 12 RO candidates - 3 passed

The second set of RO and SRO license examinations was conducted on December 9, 1985 with the following results:

12 SRO candidates - 8 passed 20 RO candidates - 18 passed

The third set of RO and SRO license examinations was conducted on July 22, 1986 with the following results:

9 SRO candidates - 5 passed 5 RO candidates - 5 passed

Based upon the relatively poor results from the first examination, a special inspection of the NMPC training programs was performed during the week of October 28, 1985. The programs inspected were licensed operator training and technical training for technicians. Several factors were identified as having contributed to the high failure rate of initial license candidates, including an incomplete plant simulator, the lack of some operating procedures, the use of nonstandardized text books, and an insufficient number of written exams given during the training program. NMPC has addressed these problems. No concerns were identified with the nonlicensed personnel training program. Excellent physical facilities were available for training. Instructors were knowledgeable, and students had a positive attitude toward training.

The second set of licensing examinations was administered in December 1985. The results demonstrated a significant improvement over the first license examination results. Ninety percent of the ROs and 66% of the SROs passed the examination. The 34% failure rate of SROs is somewhat higher than normal. However, a distinct separation between passing and failing exam scores was observed, indicating that the cause for the failures was individual candidate deficiencies and poor screening of candidates and not programmatic deficiencies. Marked improvement in the simulator performance was noted during the second examination. A program for improving the simulator fidelity was determined to be warranted.

The third set of licensing exams was administered in July 1986. The results of the SRO exams (5 passes and 4 failures) again indicated individual weaknesses and poor screening of candidates versus training program problems. The 5 successful candidates all received high grades in each written section, whereas, 3 of the failures did poorly in all written sections. The fourth failure was due to poor performance on the simulator portion of the exam.

The Region I review of NMPC's preparations for operations included inspections of procedure preparation, review, and approval as well as implementation where possible. Management control of the process and safety committee actions were also evaluated. Specific inspections between April and July 1986 reviewed plant administrative, operating, maintenance, and emergency procedures. NMPC has prioritized the preparation process and has written those procedures needed for modes 4 and 5 first. Most procedures had been prepared, reviewed, and approved as interim operating procedures. NMPC's program has been to field test the procedures and after additional review and proof testing, convert them to plant operating procedures.

Inspection results indicate two additional areas where NMPC is continuing to finalize their program: 1) preventive maintenance scheduling for electrical instrumentation, and 2) completing the motor surveillance scheduling program.

NMPC's actions to date and plans for completion appear adequate for initial station operations.

4.3 Quality Assurance For Operations

The NMPC Quality Assurance (QA) organization for plant operation has been defined. The QA organization will report to a Vice President - QA. The four QA managers reporting to him will have the following responsibilities:

- <u>Nuclear QA Operations</u>: surveillance, QC inspection, trending, personnel training and certification.
- <u>Corporate QA</u>: audits, procedures, Quality First Program, trending, personnel certification.
- <u>Quality & Reliability Engineering</u>: Vendor surveys, procurement document reviews, inspection planning, Nonconformance Report (NCR) disposition, and trending.
- Non-Nuclear QA Operations: surveillance, inspection, trending, personnel training and certification.

A QA topical report, which endorses NQA-1 and ANS 3.2, has been submitted and approved.

During April 1986 a Region I mini-team inspection, consisting of 3 inspectors, was performed which reviewed nonlicensed personnel training, control of measuring & test equipment, QA staffing, QA training, QA audits, and QA implementing procedures. The operational QA program was determined to be satisfactory.

The implementing QA procedures were developed from existing Unit 1 procedures, which complied with ANSI N45.2 and its daughter standards. These implementation procedures referenced ANSI N45.2 and its daughter standards and generally exceeded the requirement of the NMPC QA topical report. NMPC, upon issuance of the QA topical report, initiated a consistency review of implementing procedures against the QA topical report. Several inconsistencies in references were identified by both NMPC and the NRC and are being corrected. NMPC's current schedule is to complete this effort prior to commercial operation.

As noted in Section 3.3, the transition from a construction QA environment to an operational QA environment was not smooth, particularly in the QC inspection group. It was complicated by more than one departmental reorganization, by policy guidance which was not well defined or communicated, and by less structured controls over troubleshooting activities than in the construction program. In spite of these weaknesses, a generally well qualified and experienced staff of NMPC and contractor auditors, inspectors, and engineers has identified and corrected hardware deficiencies during the testing program. In addition, a strong surveillance program has been helpful in identifying hardware problems and trends which were missed by the inspection staff.

4.4 Emergency Preparedness Program and Facilities

A full participation Emergency Plan exercise was conducted on November 13, 1985 for the Nine Mile Point site Unit 1 with joint NRC/FEMA observation. The newly constructed Technical Support Center and Emergency Operations Facility functioned acceptably during the exercise. The joint Operational Support Center was also found satisfactory.

The Nine Mile Point state and local plans and preparedness for radiological emergencies have been evaluated by FEMA and found adequate in accordance with 44 CFR 350. The adequacy of the public alerting and notification system was determined to be acceptable. An Emergency Preparedness Appraisal for Unit 2 was conducted on May 19-22, 1986, and the results were generally good. The open items from the appraisal were closed out in an followup inspection conducted on August 4-6, 1986.

4.5 Radiological Controls Program and Facilities

Region-based inspections have been conducted to assess the Radiological Controls Program. The inspections have evaluated the environmental monitoring, health physics, radioactive waste management, and radiological controls programs. As these programs at Unit 2 represent extensions of the existing programs at Unit 1, the main emphasis was on the installation and testing of the new equipment and the training of the new personnel. In general, the programs were found to be acceptable. The specific elements associated with fuel receipt were inspected and found to be acceptable.

4.6 Security Program and Facilities

Preoperational inspections were conducted in this area beginning in June 1984. The inspections covered the review of the Physical Security Plan and implementing procedures; security organization; security audit program; security records; security system testing and maintenance; control of locks, keys, and combinations; physical barriers for vital and protected areas; security system power supply; lighting; assessment aids; access control for personnel, packages and vehicles; detection aids; alarm stations; communications; personnel training and qualifications; and contingency plans.

The NMPC plans for Nine Mile Point 2 Physical Security, Safeguards Contingency and Security Training/Qualification have been approved.

4.7 Fire Protection Program and Facilities

Region-based inspections have assessed NMPC's operational readiness with respect to fire protection features. The inspection scope included the capability to safely shut down the plant in the event of a design basis fire and the emergency lighting system components. Several unresolved concerns were identified which involved minor hardware problems. Other concerns were identified due to many incomplete construction items (lighting, fire detectors, and fire seals). The Fire Protection Program organization, administrative controls, equipment maintenance, inspection and test program, fire brigade training, and QA audits were reviewed and determined to be acceptable.

4.8 Technical Specifications

The proof and review Technical Specifications (TS) were issued by NRR on November 22, 1985. NMPC and the staff provided comments back to NRR in January 1986.

A comparison inspection of the proof and review TS, FSAR, and as-built plant was performed from January 6, 1986 to January 17, 1986 by a Region I consultant team. The inspection verified through walkdown inspections that selected installed hardware was compatible with the TS. Preoperational and surveillance test procedures were examined to assure that their performance would fulfill the TS requirements. Both the program and procedures were adequate.

In addition, the resident inspectors and region-based staff reviewed the final draft Technical Specifications and found them to be acceptable.

4.9 Startup Test Program

NMPC has prepared drafts of all startup tests and has approved 111 of the 121 total. NMPC recognized that some inconsistencies could exist between the startup procedures and approved operating procedures, and therefore, a second review of the startup test procedures for consistency and workability will occur prior to use. NRC inspection findings also supported the need for a second review.

NMPC has proposed some reductions of their test program based on their review of the Hope Creek program, but the magnitude of the reduction proposals are far less than approved for Hope Creek.

The administrative controls for the implementation of the startup test program have been revised based on inspection findings and represent adequate controls to implement the program.

The staffing levels of the startup program are adequate to implement the program. Training of personnel including operators and test personnel will be performed prior to beginning the program.

4.10 Operations Summary and Conclusions

Region I has performed readiness for operations inspections in accordance with the I&E inspection program and generally found NMPC's programs to be well organized and consistent with regulatory requirements. Areas inspected included operational staffing, training, procedures, quality assurance, fire protection, emergency preparedness, water chemistry control, radiological controls, security and technical specifications. Because of previous licensed operator experience at Nine Mile Point Unit 1 and Fitz-Patrick the use of shift advisors in the control room will not be required during the power ascension program. Based on programmatic reviews and observations of activities, Region I feels that the Nine Mile Point Unit 2 facility and staff will be ready to conduct low power operations upon completion of the preoperational test program and applicable surveillance testing. 5.0 SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

5.1 Overview

NMPC's performance has been assessed five times under the SALP program. A tabulation of the results of these five SALP Reports is presented below in Table 1:

	SY	STEMATIC	ASSES	SMENT OF	LICENS	EE PERF	ORMANCE	SUMMAR	<u>IY</u>	
SALP No.				FUNC	TIONAL	AREA				
	SF	CONT	PIP	COMP	SYS	ELEC	INST	ENG	QA	LIC
1	2	2	2	2	2	2	2	-	2	-
2	1	1	2	2	2	2	N	-	3	2
3	1	2	3	2	-	2	2	-	3	2
4	-	2	2	1	1	3	2	3	2	2
	OP	RAD	SUR	POT	FP	SEC	CONST		QA	LIC
5	2	2	3	2	1	1	2		2	2
	CONT PIP = COMP SYS = ELEC INST ENG = QA = LIC = RAD = SUR = SUR = SUR = SUR = SUR = SUR = N = N	= Contai Piping = Safety Support = Electr = Instru Enginee Quality Licensi Readinolo Survei Fire pro Fire pro Securit = Const lo basis lot asset	nment and su relat syste rical p umentat ering Assura ing ss for ogical llance rationa otectio tructio for ra	and othe pports ed compo ms ower sys ion and nce Operation controls 1 testin n ting	er safet onents stems control	y relat	ed stru	cture		

TABLE 1

5.2 First SALP (February 1, 1980 to January 31, 1981)

Inspection activity had covered the containment structure, reactor pressure vessel installation, reactor pressure vessel internals, biological shield wall, and quality assurance. Only one notice of violation had been issued during the period for inadequate incorporation of design changes into the associated engineering drawings. NMPC had reported four 10 CFR 50.55(e) reports.

5.3 Second SALP (October 1, 1981 to September 30, 1982)

Two enforcement conferences (50-410/82-06 and 82-08) had been held to discuss a violation involving ASME Class 1 weld procedures that had not been properly qualified for impact testing. The following root causes were identified: inexperience of the piping contractor (ITT) personnel, ineffective Stone and Webster control of the piping contractor, and inadequate NMPC attention to subcontractor activities. NMPC committed to strengthen ITT engineering and QA staffs, to increase SWEC audits of ITT programs, and to reorganize the NMPC corporate offices to create two new positions of Vice President-QA and Senior Vice President Nuclear to serve as responsible NMPC management for all project matters.

There were several concerns in the Electrical Power Supply area including failure to specify design separation criteria in the installation specification, cable trays did not conform to procurement specifications, incorrect design of cable tray weldments, and inadequate weld deposit on cable tray cross braces.

There were significant weaknesses within NMPC and contractor QA programs including: inexperienced personnel on the QA staffs, failure of QA to identify programmatic weaknesses, NMPC overdependence upon SWEC QA to assure plant quality, inability of NMPC to resolve audit findings, lack of licensee control of SWEC activities, and inadequate NMPC management involvement in the project.

NMPC corrective actions to the QA shortcomings included: increased the site QA staff, created position of Vice President-QA, increased NMPC QA surveillances, increased SWEC surveillance of contractor activities, and increased overall NMPC management control of SWEC activities.

5.4 Third SALP (October 1, 1982 to September 30, 1983)

Region I identified two violations regarding the QC acceptance of nonconforming concrete expansion anchor bolts and the inadequate QC inspection of structural steel bolted connections. The NMPC performed extensive reinspections to assure the adequacy of other hardware. During the period, major deficiencies were identified by NMPC in the ITT radiography program. Several instances of film enhancement were discovered by NMPC. The questionable welds were radiographed again and found acceptable. NMPC project management and oversight of ITT were weak as indicated by inadequate QA review of weld planner packages, inadequate control of the NDE process, and ITT QA management's prohibition of personnel expressing quality concerns to the NRC.

An Enforcement Conference (82-13) was held on October 20, 1982 to discuss the improper use of QC trainees and the falsification of QC inspection records. Region I stated that greater NMPC overview was required of project QA activities.

On May 23, 1983, a Management Meeting (83-09) was held to discuss the necessity for increased NMPC control over ITT. Another Enforcement Conference (83-14) was convened on August 30, 1983 to discuss the prohibition of personnel from bringing safety concerns to the NRC. Steps were instituted to increase the ITT QA staffing and to increase the level of NMPC surveillance of ITT activities.

5.5 Fourth SALP (October 1, 1983 to January 31, 1985)

There were further problems with the application of the AISC acceptance criteria for high strength bolting. NMPC reinspected and reworked the associated structural steel connections.

Vendor Procurement Quality Assurance (PQA) activities had not been effectively implemented. Nonconforming hardware had not been detected by PQA as evidenced by: undersized shop welds, inadequate mechanical component bolt thread engagement, and electrical equipment vendor wiring deficiencies.

The NMPC Quality Performance Management Program identified improved QC acceptance rates for piping and pipe support installations. The SWEC small bore piping hardware was of high quality.

The control of Preventive Maintenance (PM) activities required greater levels of management attention to assure that plant equipment was properly maintained during the construction phase.

Electrical wiring deficiencies were identified throughout the PGCC panels. The entire PGCC was reinspected by GE and SWEC personnel to identify all locations of electrical separation problems. Additional concerns regarding the PGCC wiring terminations, harness supports, and as-built verification were identified.

Extensive project management and quality assurance personnel changes resulted in improved NMPC control of site activities. The Quality Performance Management Program served as a management trending tool to identify those areas on which to focus management attention. Numerous program enhancements were instituted to upgrade site nondestructive examination efforts.

The rate of design change remained high. Examples were detected in which the design change documents were inaccurate and not completely reviewed. Several components were identified which engineering had not designed to

appropriate seismic standards. Some instances were found where the design drawings had erroneously identified components as nonsafety-related.

An enforcement conference and several management meetings were held to discuss the CAT inspection findings and the implemented site corrective actions.

5.6 Fifth SALP (February 1, 1985 to January 31, 1986)

This assessment concentrated mainly on readiness for operations and construction transition. It found NMPC's performance satisfactory. Improved craft attitudes regarding the necessity to build quality into the plant were apparent, while management maintained oversight of construction quality through a site trending effort that tracked key parameters. In addition, the acceptability of previously installed components was assured through reinspection efforts. Notwithstanding, poor housekeeping conditions, the occasional lapses in the implementation of complete corrective actions, and control of Final Safety Analysis Report commitments were areas where improvement was noted as being needed.

The preoperational test activities have been executed by generally knowledgeable personnel, and the field testing was well controlled. Close monitoring of preoperational test activities was maintained by Quality Assurance personnel. Also, permanent plant staff were actively involved in the system turnover and preoperational testing process to gain system familiarization and to exercise plant operating procedures. Increased management attention was warranted in performing more timely reviews of preoperational test results to assure that satisfactory test completion was achieved.

For the transition from the construction phase, NMPC conducted a self evaluation to assure that all necessary preparations were performed to support plant operations. The permanent plant staff positions were filled with technically competent personnel. Due to a high Reactor Operator failure rate on the initial licensed operator examinations, increased management attention was given to the operator training program to ensure that a sufficient number of licensed operators were available to support fuel load. As a result, significant improvement in candidate performance was noted on the second set of examinations. Some recurring program and individual shortcomings were noted on the thrid set of examinations for senior operators.

6.0 ALLEGATIONS AND INVESTIGATIONS

6.1 Overview

Allegations received by NRC Region I addressed both safety-related and nonsafety-related areas. Each allegation was reviewed by a board that included regional management, and appropriate followup was determined based on the potential safety significance of the allegation. Several of these allegations were investigated by members of the NRC Office of Investigations.

6.2 Unit 2 Allegations

Region I records indicate that 37 Nine Mile Point Unit 2 allegations have been received to date. Of those allegations which were substantiated, 5 resulted in enforcement action as discussed below:

- An allegation was received in September 1982 that uncertified quality control personnel were performing inspections. Subsequent Region I investigation verified that inspections of safety-related electrical equipment had been performed solely by uncertified trainees. The associated inspection records were falsified, as qualified Level II inspectors had signed the documents, which signified the inspections were performed by certified personnel. The deficient inspections and the falsified inspection records demonstrated the need for NMPC to increase its management involvement with contractor activities to assure proper implementation of site QA/QC programs. A level III violation and civil penalty were assessed. NMPC reinspected the work performed by the trainees and did not identify any substantive deficiencies.
- An allegation was received in February 1983 that ITT welders were not provided weld procedures for ASME piping installation. The concern was substantiated through interviews with craft supervision and weld rod room attendants, and a Level IV violation was issued. NMPC conducted extensive training programs to ensure that craft personnel were aware that weld procedures are maintained for reference at all ITT weld rod issue stations. NMPC verified that the weld procedures were indexed at the field stations.
- An allegation was received in April 1983 that inconsistent diesel generator loading sequences were assumed by General Electric and Stone and Webster Engineering Corporation. The FSAR load sequencing was found to be inaccurate, and a Level V violation was issued for inadequate design review. NMPC amended the FSAR to portray the correct load sequencing and instituted measures to enhance the review of FSAR submittals.
- An allegation was received in April 1984 that Quality Assurance Auditors involved in Audit 84-4 were harassed and intimidated. An OI

investigation completed in April 1986 substantiated that there was evidence to support four instances of Earassment and intimidation including stripping two lead auditors of their lead auditor status, denial of a promotion to a lead auditor, a reduction in points on a performance evaluation of a lead auditor and adverse comments on a performance evaluation of a QC inspector. ELD felt that only the first issue was enforceable and then only based on a preponderance of the evidence. Based on further information submitted by NMPC at an enforcement conference, the NMPC organizational changes since the incident, and other programmatic improvements resulting from the 1984 CAT order, Region I recommended against escalated enforcement action.

An allegation was received in May 1985 that neutron monitoring system cable had been damaged during pulling. Region I asked NMPC to review this issue through their Quality First Program(Q1P). NMPC's response indicated that the cable had been installed using a push (as opposed to pull) method. Subsequent Region I review found that there had been no procedure for the push method. The push method also required cable pulling, however this was not monitored by QC. A demonstration of a worst case installation configuration showed that the installed cable was acceptable, but a violation was issued for failure to implement procedures. The adequacy of the Q1P investigation of this matter is still under OI review.

Currently open allegations and actions to complete them are listed below.

- Harassment of QA auditors involved in Audit 84-4; Enforcement letter in preparation.
- Adequacy of Q1P review of neutron monitoring system cable pulling concerns; OI report being reviewed in OI headquarters.

The following late allegations were received in October 1986 and are under regional review.

- Ability of control room ventilation system to maintain suitable environment for personnel and equipment; awaiting licensee response to concerns.
- Two main steam isolation valves failed local leak rate tests and records were altered to show the valves passed.

6.3 Unit 1 Allegations

In July 1986 several allegations were received by both NRC and NMPC from an instrumentation and control (I&C) technician at Unit 1 which potentially implicated Unit 2 because of the common I&C management. The allegations involved installation of Local Power Range Monitor (LPRM) connectors of an unapproved design, replacement of LPRM connectors without documentation or QC inspection, replacement of Intermediate Range Monitor (IRM) connectors without documentation or surveillance testing, improper local leak rate testing of a containment isolation/feedwater check valve, an inadequate leak test of the stack gas sampling system, improper vibration testing on a control rod drive pump and harassment by his peers and super-vision for bringing issues to QA and the NRC.

Subsequently, the issues were presented to NMPC, an NMPC investigation was performed, management meetings between NMPC and Region I were held, and a special Region I diagnostic team inspection was conducted. Based on these actions and subsequent interaction with NMPC, Region I concluded the following:

- Most of the allegations are factually correct.
- The safety aspects of the allegations were minor and have been resolved by either prior NMPC action or subsequent evaluation.
- There are no direct implications of Unit 2 hardware, programs, or personnel.
- Programmatic weaknesses exist in the NMPC management system in that some problems are not brought to the proper level of management for resolution, root causes of problems are not routinely identified, and the QA organization is not effectively used to find problems.
- The harassment allegation was addressed by the licensee and remains under regional and OI review.

Notices of violations are being issued to NMPC for those parts of the allegations where regulations were violated. Further, Region I plans to closely monitor the ongoing NMPC corrective actions concerning the indicated programmatic weaknesses.

6.4 Quality First Program

In 1983 NMPC established an allegation clearinghouse program identified as the Quality First Program (Q1P). The Q1P program includes exit interviews, a toll-free telephone line to receive concerns, and feedback to the concerned employee after the investigation is completed.

The adequacy of Q1P has been closely reviewed by Region I due to allegations that concerns were not properly handled when reported to the Q1P office. A Region I team inspection of the Q1P was performed on January 27, 1986. The inspection scope included a review of identified concerns, interviews of Q1P personnel, review of concern resolutions, examination of related site procedures and hardware, and interviews of site personnel not affiliated with the Quality First Program. The resolution of safety related concerns was found satisfactory. Some program weaknesses were identified in the area of handling of wrongdoing issues and the level of the Quality First documentation to substantiate concern closure. A subsequent followup inspection conducted in June 1986 indicated improvements in these weak areas.

6.5 Allegation and Investigation Summary and Conclusions

The most significant allegations at Nine Mile Point Unit 2 have involved quality concerns and harassment of those raising such concerns. In an attempt to identify and deal with these issues NMPC developed their Q1P program in late 1983. While this program appears to be working adequately based in Region I reviews, its integrity has been questioned several times by allegers. However, most of these concerns seem to be more indicative of poor employee relations and communications rather than poor quality hardware.

7.0 FUTURE REGION I ACTIONS

Three resident inspectors are currently assigned to the Nine Mile Point site. Region I resident and specialist inspections will continue throughout the startup test program. Results evaluation will be closely monitored.

A Readiness Assessment Team inspection is currently planned during the low power portion of the power ascension test program.

A team inspection of the Post Accident Sampling System and related TMI Task Action Plan post-accident monitoring issues is planned during low power testing.

A plan is being developed to closely monitor the progress of the NMPC corrective action program resulting from recent reviews of the Unit 1 I&C technician's allegations and the QA program concerns brought to Q1P.

8.0 SUMMARY AND CONCLUSIONS

Region I has expended over 12,000 inspection hours at the Nine Mile Point Unit 2 facility and has determined that the project has been adequately managed while under close NRC scrutiny. Early in the project few problems were identified. Beginning in 1981 and continuing through the CAT inspection in late 1983, significant weaknesses were identified in control over contractors and quality assurance, which resulted in both hardware and management deficiencies. As a result, two civil penalties and an order were issued. Consequently, experienced project construction and quality assurance management were brought in to correct deficiencies and complete construction. Under continued close Region I scrutiny in the form of an Augmented Inspection Program, which continued to identify and ensure correction of deficiencies, the new management organization was verified as able to complete the construction of the facility with acceptable quality.

Although it developed and progressed very slowly, and early procedure reviews sometimes indicated an inadequate incorporation of licensing criteria, the preoperational test program was ultimately well executed and results indicated few test exceptions. In addition, surveillance test procedures have been completed after system turnover and prior to declaring systems operational in most cases.

At this time the remaining open issue that would prevent reactor operation at Nine Mile Point Unit 2 is the resolution of problems with the Main Steam Isolation Valves. Prior to initial criticality the deficiencies associated with the MSIVs must be resolved, and the valves must be satisfactorily tested. On the basis that the license meets such a condition, we believe it is acceptable to issue the low power operating license at this time.

We therefore conclude that Nine Mile Point Unit 2 has been constructed substantially in accordance with Construction Permit CPPR-112, the FSAR, and NRC requirements. We further conclude that NMPC has taken all necessary actions to permit initial license issuance subject to conditions of the license.

ENCLOSURE 1

NINE MILE POINT UNIT 2

INSPECTION SUMMARY

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
72-01 4/10/72 2	Initial management meeting	None	None
72-02 7/28-8/24/72 1	QA Program	3 UNR	None
73-01 6/14/73 2	QA Program	None	None
73-02 7/19-10/9/73 1	QA Program	None	None
74-01 9/26-9/27/74 1	QA Program	6 UNR	None
75-01 4/16-4/17/75 2	QA Program	None	None
75-02 7/9-7/10/75 1	Excavation progress, engi- meering review/approval program, review of construc- tion procedures	2 UNR	None
75-03 7/29-8/1/75	Environmental protection program	None	None

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INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
75-04 10/21-10/22/75 2	Site preparation activities and procedure review	2 UNR	None
76-01 2/24-2/26/75 2	Specification review, review of audits, material storage, corrective action controls, review of project manual	2 UNR	Infraction: Requisite QA requirements not in speci- fication. Infraction: Specification review not performed in accordance with proce- dures. Deficiency: Audit findings not properly documented.
76-02 4/12-4/14/76 2	Blasting records, QA proce- dures for concrete and foun- dations, site preparation, groundwater control	4 UNR	None
76-03 5/25-5/27/76 2	Site preparation excavation mapping, design review meetings, porous concrete foundation drainage system, batch plant qualification, concrete mixes	3 UNR	None
76-04 7/19-7/21/76 1	Concrete activities, batch plant operation	None	Infraction: Inadequate cadweld in- spections
76-05 8/16-8/20/76	Environmental protection activities	1 UNR	None

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VICLATIONS
76-06 3/28-9/30/76 1	Foundation backfill opera- tions, site preparation	3 UNR	Infraction: Concrete curing inspections not performed
76-07 11/16-11/18/76 1	Site preparation and founda- tion records, QC personnel qualification, batch plant operation	1 UNR	Infraction:
77-01 3/22-3/24/77 1	Containment base mat concrete, geologic investigation on rock stress	None	None
77-02 4/5-4/7/77 2	Containment reinforcing steel cadwelding, QA Manual review for containment liner contractor	2 UNR	None
77-03 4/14/77 1	Containment steel liner in- stallation, geologic investi- gation review.	None	None
77-04 5/2-5/5/77 2	Containment structural steel, containment concrete proce- dures, containment base mat concrete activities, noncon- formance program review	2 UNR	None
77-05 5/17-5/19/77 1	Containment base mat concrete, containment liner welding	1 IFI	None
77-06 6/8-6/10/77 1	Containment base mat concrete, containment structural steel welding, component storage, reinforcing steel erection	3 UNR	None
77-07 6/15/77 2	Containment base mat concrete	None	None
77-08 7/18-7/20/77 1	Primary containment steel liner welding, control of weld material, weld inspection	None	None

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
77-09 8/3-8/5/77 1	Environmental protection program	None	Infraction: Settling pond operation procedures not followed.
77-10 8/23-8/25/77 2	Component storage and main- tenance, containment basemat concrete records	1 UNR	Deficiency: Failure to perform proper preventive maintenance on recirculation pump motors.
77-11 10/11-10/13/77 3	QA record review for concrete basemat concrete	1 IFI	Infraction: Failure to follow procedures for batch plan uniformity tests.
			Infraction: Failure to document and report corrective actions to management relative to I&E Bulletins & Circulars.
77-12 11/15-11/17/77 2	Installation and welding of containment liner	1 UNR	None
78-01 1/31-2/2/78 1	Measuring and test equip- ment nondestructive weld examination	None	None
78-02 3/28-3/31/78 1	Reinforcing bar installa- tion, I&E Bulletins and Circulars	None	None

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
78-03 4/24-4/26/78 3	Piping and supports in- stallation, penetrations, geotechnical review	None	None
78-04 5/15-5/18/78 2	Equipment storage, sur- veillances, concrete activities	None	None
78-05 6/14/78 1	Cable tray support records	None	None
78-06 7/25-7/27/78 1	Mechanical equipment in~ stallation, equipment main- tenance, I&E Bulletins and Circulars	1 UNR	None
78-07 9/26-9/28/78 1	Risk release program equip- ment installation documentation	1 UNR	None
78-08 9/25-9/29/78 1	Management controls	2 UNR	None
78-09 10/30-11/2/78 1	Concrete activities, equip- ment installation	1 UNR	None
79-01 1/8-1/11/79 1	Structural steel erection, cadweld operations	2 UNR	None
79-02 3/20-3/23/79 2	Containment liner welding, structural steel erection, stud welding, equipment storage	None	Infraction: Required radio- graphy exami- nation not performed.
79-03 4/24-4/26/79 1	Reinforcing bar, concrete activities, backfill operation	1 UNR	None

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLAIIONS
79-04 7/10-7/12/79 1	Containment liner installation, piping, structural steel erection	Non-	None
79-05 5/14-5/17/79 1	Structural steel erection, containment liner installa- tion	None	Infraction: No procedure for ultrasonic examination.
79-06 8/27-8/31/79 1	Concrete activities, rein- forcing bar storage, elec- trical installation	1 UNR 1 IFJ	None
79-07 10/9-10/12/79 2	Suppression pool downcomers, electrical activities	4 UNR 1 IFI	None
79-08 11/6-11/8/79 1	Reactor pressure vessel transport/rigging/lifting	None	None
79-09 11/28-11/30/79 2	Containment liner welding, equipment rigging, valve installation	1 UNR	None
80-01 1/9-11/11/80 1	Equipment maintenance and storage	1 UNR	Infraction: Invalid preventive maintenance records.
80-02 3/19-3/21/80 & 4/10-4/11/80 3	Reactor pressure vessel storage, biological shield wall installation	None	None
80-03 4/24/80 2	Plant tours	None	None
80-04 5/12-5/15/80	Repair of biologica? shield wall welds	2 UNR	None

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INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
80-05 6/17-6/19/80 1	Containment reinforcing bar cadweld operations	2 UNR	None
80-06 7/14-7/18/80 1	Reactor pressure vessel storage and placement	None	None
80-07 7/15-7/18/80 2	QA procedure review, review of engineering design changes, nonconformance report disposit trend analysis, audit program	1 UNR	None
80-08 8/4-8/8/80 2	Reactor pressure vessel placem	ent None	None
80-09 9/9-9/11/80 1	QC record review, reactor pressure vessel storage, CRD hydraulic control unit storage	1 UNR	None
80-10 9/23-9/26/80 1	QA program review	None	None
80-11 10/21-10/23/80 & 11/4-11/6/80 1	Concrete record documenta- tion review	None	Infraction: Inadequate document control of engineering changes.
81-01 1/20-1/23/81 1	Concrete placement, rein- forcing bar cadwelds, engi- neering change document review	1 UNR	None
81-02 2/18-2/25/81 1	Environmental protection program	None	None
81-03 4/21-4/23/81	Plant tour, cadweld operations	None	None

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
81-04 4/22/81 2	SALP management meeting	None	None
81-05 6/23-6/25/81 1	Primary containment liner, equipment storage, house- keeping	3 UNR	None
81-06 7/14-7/16/81 1	I&E Bulletin and Circular review	None	None
81-07 7/27-7/31/81 2	Electrical procedure review, installed raceway, geologic fault study review, primary containment concrete	1 UNR	Violation: Pump motor electrical test data not submitted to engineer- ing.
81-08 8/4-8/6/81 1	QA program personnel certifications, licensee audits	None	None
81-09 8/18-8/21/81 3	Primary containment record review, biological shield wall welding, weld filler metal control, pipe welding	1 UNR	None
81-10 9/1-9/3/81 2	Plant tour, concrete aggre- gates, corrective action programs	1 UNR	None
81-11 9/29-9/30/81 3	Plant tour, review of QA organization	None	None
81-12 10/13-11/13/81 1	Containment penetrations, piping and structural steel erection	1 UNR 1 IFI	Violation: Incorrect date sheet. Violation: Inadequate

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corrective actions.

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED FI	INDINGS	VIOLATIONS
81-13 11/30-12/18/81 5	Region I CAT inspection, welding, nondestructive examination, electrical, structural, procurement	1 UNR	Violation: Ineffective QA program. Violation: Lack of design control. Violation: Inadequate equipment qualifica- tion.
81-14 12/21/81-1/15/82	Structural steel erection, piping activities, welder qualification	1 UNR 1 IFI	Violation: failure to implement checklists.
82-01 1/18-2/26/82 1	Pipe whip restraints, structural steel, welder qualification, nondestruc- tive examination, piping, procurement	3 UNR	Violation: Inadequate QC personnel training. Violation: Failure to follow instruc- tions.
82-02 3/1-3/26/82 1	Pipe supports, RPV nozzle modifications, structural steel, receipt inspection, nondestructive examinations piping	3 UNR	Violation: failure to record data properly.
82-03 3/29-4/30/82 1	Structural steel, cadweldin expansion anchors, piping, equipment, design control	ig, 4 UNR 4 IFI	Violation: Failure to correctly translate design informa- tion. Violation: Failure to impose QA requirement on purchase orders.

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED FIN	DINGS	VIOLATIONS
82-04 5/11-5/13/82 1	Electrical components	3 UNR	None
82-05 5/10-6/3/82 1	Piping, HVAC installation, structural steel	1 IFI	None
82-06 6/1/82 4	Enforcement conference on ITT Class 1 weld procedure	None	None
82-07 6/21-7/23/82 1	Piping, rigging, mechanical equipment storage, structura steel	1 UNR 1 4 IFI	Violation: Inadequate control of rigging operations.
			Violation: Failure to identify a nonconforming condition
82-08 7/16/82 5	Meeting on ITT welding procedures	None	Violation: Failure to control weld- ing processes.
82-09 7/13-7/16/82 & 7/20/82 2	Management controls	1 UNR	None
82-10 7/26-8/27/82 1	Concrete testing, concrete expansion anchors, piping, reactor head cavity, pit, review of engineering design changes	2 UNR	Violation: Underlength welds on cable tray braces. Violation: Aggregate material not

properly tested.

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INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
82-10 (Cont)			Violation: Inadeqate inspection of concrete expansion anchors.
82-11 8/30-9/30/82 2	Mechanical equipment ere piping diesel generator ing, weld rod control, w qualification, pipe supp raceway	ection, 4 UNR build- 2 IFI welder borts,	Violation: work per- formed with- out planner package. Violation: Weld filler material not properly stored.
82-12 10/12-11/12/82 1	Small bore piping, instr tation, structural steel circulation pipe welds, conformance reports	umen- 2 UNR , re- 2 IF1 non-	Violation: ASME piping planner package not properly reviewed.
82-13 10/20/82 1	Enforcement conference r garding use of trainees conduct inspection	re- None to	None
82-14 11/15-12/22/82 1	High strength bolting, e trical support welds, st tural steel welding qual cations, measuring and t equipment	elec- 1 UNR truc- 2 IFI ifi- test	Violation: high strength bolts not inspected per AISC. Violation: Weld material requisition improperly filled out. Violation: Improper concrete anchor bolt installa- tions.

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INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
82-15 12/13-12/17/82 1	Bioshield wall fill material placement, reactor building concrete activities	None	None
82-16 12/14-12/16/82 1	Equipment storage, raceway installation	2 UNR	None
83-01 1/3-2/4/83 2	Instrumentation, pipe whip restraints, engineering change documents, pipe supports, piping, cables	4 UNR 7 IFI	Violation: procedures not available to welders.
83-02 2/7-3/11/83 1	Safety related equipment, concrete installation, cables structural welding, piping	3 UNR , 2 IFI	Violation: Planner package adhered to for pipe installation activities.
83-03 3/1-3/3/83 1	Electrical equipment storage raceway installation	5 UNR	None
83-04 3/14-4/15/83 1	Piping, licensee surveillance and audits, instrumentation supports, structural steel, HVAC duct	s 2 UNR 1 IFI	None
83-05 4/25-5/27/83 2	Recirculation piping, con- tainment liner, procurement, corrective action, instru- mentation supports, piping and pipe supports	1 UNR 4 IFI	Violation: Inadequate trend analysis. Violation: Underlength fillet welds.
83-06 5/16-6/1/83 1	QA record review, design veri- fication procedures, as- built plant verification	- 2 UNR	Violation: Inconsistent FSAR diesel generator load sequen- cing.

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INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
83-07 6/13-6/17/83 & 7/13-8/5/83 1	Pipe supports, piping, struc- tural steel, weld filler material control, cable and equipment installation	- 3 UNR 3 IFI	None
83-08 6/7-6/9/83 1	Switchgear installation and instrumentation	3 UNR	Violation: Deficient vendor wiring on electrical equipment.
83-09 5/23/83 1	Management meeting regarding licensee overview of contrac- tor performance	None -	None
83-10 7/25-7/29/83 2	Corrective action programs, piping and plant housekeeping	2 UNR g 1 IFI	None
83-11 8/2-8/4/83 1	Cables, raceway, motor con- trol centers, electrical QA records	1 UNR 1 IFI	None
83-12 8/8-9/21/83 2	Preventive maintenance, pipe supports, cables, concrete placement, recirculation piping nozzle modification	5 UNR 5 IFI	Violation: Installed cable not properly inspected. Deviation: Inspection holdpoints not specified in QC inspec- tion plans.
83-13 9/14/83 2	Environmental protection program	None	None
83-14 8/30/83 1	Enforcement conference on licensee overview and investigations of the piping contractor	None	None

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INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	F	INDINGS	VIOLATIONS
83-15 10/18-10/20/83 1	Electrical cables, motor control centers and QA records	1	UNR	None
83-16 10/1-12/2/83/84 2	Equipment turnover, piping, pipe supports, reactor build- ing enclosure, CRD piping, fire protection, instrumenta- tion QA program	62	UNR IFI	Violation: Nonconforming welds accepted by quality control.
83-17 12/5/83-1/20/84 2	RPV storage, hydraulic con- trol unit installation, piping, pipe supports, welder qualification, HVAC systems	4 5	UNR IFI	None
83-18 11/7-11/19/83 & 11/28-12/9/83 7	I&E CAT Inspection	91	IFI	Violation: Inadequate review of design change documents, inadequate review of radiography film, defic- ient inspection procedures, nonconforming pipe supports, electrical separation violations, inadequate inspection documentation, inadequate weld filler metal control, Deficient NDE weld surface exams, non- conforming conditions not identified on NCRs.

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INSPECTION NUMBER INSPECTION DATE NC. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
84-01 1/23-3/2/84 2	Pipe supports, diesel gen erator cranes, reactor vessel internals, QA prog	1- 4 UNR 1 IFI gram	Violation: Nonconforming pipe supports. Violation: Failure to follow procedure for handling of significant deficiency.
84-02 2/7-2/9/84 1	Cables, switchgear and QA records	4 5 UNR	Violation: Wrong non- conformance form in use.
84-03 2/22/84 1	Management meeting on licensee corrective action for CAT findings	None	None
84-04 3/12-3/16/84 1	Concrete anchor bolts and and structural steel welding	d None	None
84-05 3/5-4/7/84 1	Electrical terminations, piping, pipe supports, Q/ surveillances, contractor audits, design control	3 UNR 1 IFI	Violation: Inadequate design control for Seismic II/I items.
84-06 4/9-5/11/84 2	Structural steel, weld material control, pipe supports, housekeeping, post inspection rework control	2 UNR 2 IFI	Violation: Weld filler not control- led. Violation: Rework to structural beams not controlled. Violation: Inadequate inspection of bolting and pipe supports.

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INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED FIND	DINGS	VIOLATIONS
84-06 (Cont.)			Violation: Lack of inspection status for structural steel. Violation: Inadequate plant house- keeping.
84-07 5/14-5/18/84 1	Large and Small bore pipe supports	None	None
84-08 4/30-5/25/83 3	NDE van inspection of ASME and structural weldments by independent examination	3 UNR	Violation: film indica- tion evaluated/ documented. Violation: Inadequate review of RT film. Violation: Minimum wall violation.
84-09 5/14-6/15/84 2	Corrective action programs, electrical penetrations, pipe whip restraints, component supports	1 UNR 4 IFI	Violation: trends not detected by analysis. Violation: Penetration NDE not per- formed.
84-10 5/21-5/24/84 2	Pre-operational security inspection	25 IFI	None

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INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDI	NG	<u>2</u>	VIOLATIONS
84-11 6/18-7/27/74 3	Document control, contain ment supports, design cha control, plant stack, bat installation, equipment p ventive maintenance	- nge tery re-	52	UNR IFI	Violation: Hold points violated during pipe whip restraint installation. Violation: Inadequate review of design change documents.
84-12	Cancelled				
84-13 7/30-9/6/84 1	Design change control, re vetment ditch, pre-op per sonnel qualifications, hy tests, preventive mainten standy liquid control sys weld filler metal control	- dro- ance, tem,	4	UNR	Violation: Inadequate thread engagement of strainer top bolts. Violation: Field issued weld filler metal not controlled.
84-14 8/20-8/24/84 1	Welder qualifications, we ing, welding records	1d-	4	UNR	None
84-15 9/10-11/2/84 3	Electrical cable separati containment penetrations, diesel generator modifica tions	on, -	63	UNR IFI	None
84-16 10/29-11/2/84 1	Radiological control staffing		No	ne	None
84-17 10/29-11/2/84 1	Safety related equipment stallation, inspection of equipment, preventive maintenance	in-	1	UNR	None

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INSPECTION NUMBER AREAS INSPECTED FINDINGS VIOLATIONS INSPECTION DATE NO. OF INSPECTORS 84-18 Region I CTI, QA, project 2 UNR Violation: 12/3-12/14/84 management, mechanical, elec- 5 IFI Failure to 9 trical, instrumentation, execute design control & welding adequate PM program. Violation: Undersized weldments on instrument support stand. MSIV cladding, instrument tubing, small bore supports, 84-19 2 IFI Violation: 11/5-12/21/84 to perform 2 concrete expansion anchors adequate QC inspections on supports. Violation: Lack of effective corrective action implementation. 84-20 Management meeting to None None 11/14/84 discuss CAT corrective actions 84-21 Concrete expansion anchors, 3 UNR Violation: 12/24/84-1/1/85 design control, HVAC supports 3 IFI Inadequate PSI, QA corrective action HVAC support inspection. systems Violation: Failure to translate FSAR OA commitments

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to site design docu-

ments.

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
85-01 1/15-1/18/85 2	Preoperational test program and procedure review	None	None
85-02 1/28-2/1/85 1	Review of Johnson Controls and Reactor Controls welder qualification and welding operations.	None	None
85-03 2/11-2/15/85 3	Instrumentation, electrical, HVAC, and preventive main- tenance	2 UNR	Violation: Inadequate HVAC baseplate installation. Violation: Inadequate PM for inplant elec- trical items.
85-04 2/4-3/18/85 2	FSAR verification, electrical equipment wiring, ACRS hearing participation	None	None
85-05 2/6/85	Management meeting to discuss CAT enforcement corrective actions.	None	None
85-06 3/4-3/8/85 3	QA/QC for system turnover control, pipe supports, CRD piping	4 UNR	None
85-07	Cancelled		
85-08 3/18-3/22/85 3	Electrical equipment install- ation, electrical QC records, instrumentation components	None	None
85-09 2/27 & 3/16/85	Management meeting to discuss conduct of Engineering Assur- ance audit and as-built veri- fication of RCIC system	None	None

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
85-10 3/19-4/26/85 5	Reactor coolant system hydro test, spent fuel racks, nitro- gen inerting system, allega- tions, QPMP	2 UNR	Violation: Improper concrete expansion bolt instal- lation.
85-11 4/2-4/4/85 & 4/9-4/12/85 2	Reactor coolant system hydro test	1 UNR	None
85-12 5/6-5/10/85 1	Cable pull tension calcula- tions and open items	None	None
85-13 4/29-6/7/85 3	EA audit, QPMP, diesel ex- haust system, CRD hydrotest, instrument tubing and supports, MSIV testing, pipe supports, allegations, SU-QA records, battery preoperational test procedure, CRD installation	4 UNR 2 IFI	None
85-14 4/22-4/23/85 7	Review of EA audit plan	numerous comments	None
85-15 6/11-6/19/85 2	Operator licensing exams	None	None
85-16 5/28-5/31/85 1	Preservice inspection activities	None	None
85-17 6/10-6/14/85 1	Open Items review	None	None
85-18 5/21-5/24/85 6	Review of EA program plan implementation	28 items	None
85-19 6/10-7/19/85 2	RPV internals, flood control berm, QA activities, OPMP, preliminary testing	2 UNR 3 IFI	None

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
85-20 6/24-6/28/85 3	Preoperational radiological controls, preop testing rad- waste systems, HVAC material control	1 UNR 8 IFI	None
85-21 6/17/85 3	Management meeting to discuss licensee reinspection of large bore pipe supports	None	None
85-22	Cancelled		
85-23 7/16-7/19/85 1	Preservice inspection program and examination data	1 IFI	None
85-24 7/22-7/26/85 1	HVAC duct supports and open item review	None	None
85-25 7/22-8/30/85 2	Piping and supports, hydro- static testing, diesel gen- erator testing, RPV internals QPMP	2 UNR 2 IFI	None
85-26 7/23/85	Management meeting to discuss licensee hardware verifica- tion, FSAR verification, and electrical separation	None	None
85-27 9/9-10/18/85 5	QPMP, local leak rate testing ing, pipe welds, HPCS walk-down, PM program, preoperational procedures, QA Audits.	1 UNR 2 IFI	None
85-28 8/12-8/16/85	Review of EA audit results and corrective actions	23 OI's	None
85-29 9/30-10/4/85 1	ASME C1.1 weld impact test data, bioshield wall weld- ments, pre- and postweld heat treatment, welder quali- fication, QC records	1 UNR	None

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
85-30 9/9-9/13/85 1	Preoperational test program implementation, QA/QC inter- face with test program	1 UNR	None
85-31 10/7-10/11/85 2	Review of licensee large bore pipe support verification, as-built pipe stress reconciliation program	1 UNR	None
85-32 10/14-10/18/85 1	Rad Controls program, fuel receipt planning, preopera- tional testing of radwaste systems, HVAC, shield survey program	9 IFI	None
85-33 10/21-10/25/85 1	Review of RPV hydrotest results and open item review	None	None
85-34 10/21-10/25/85 3	Fire protection review, safe shutdown capability, emergency lighting system	7 UNR	None
85-35 10/28-11/1/85 1	Electrical equipment install- ation	None	None
85-36 10/21-11/26/85 3	Allegation, QPMP, preopera- tional testing, preliminary testing, electrical equipment, walkdown	None	Violation: Undersized bolting hardware in preoperationa preparedness, RCIC mote shutdown panel
85-37 10/28-11/1/85 5	Training program review for licensed operators and tech- nical training for mechanics, electricians, and I&C technicians.	1 IFI	None

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INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
85-38 10/28-11/1/85 1	Security plan implementation for fuel receipt, preopera- tional security program	None	None
85-39	Cancelled		
85-40 11/25-11/27/85 1	Nuclear material control and accounting, shipping receiving, materials control system	None	None
85-42 11/12-11/15/85 1	Neutron monitoring system installation	1 UNR	Violation: Coaxial cable installed w/o procedure. Violation: Minimum cable bend radius violated.
85-43 12/9-12/19/85 3	NDE van inspection of ASME piping weldments	None	None
85-44 12/2/85-1/10/86 4	Allegation followup, fuel receipt, preoperational testing, information notices.	1 IFI	None
85-45 12/9-12/10/85 1	Fire protection program for fuel receipt	1 UNR	None
85-46 12/9-12/12/85 1	Preservice inspection activities	1 UNR	None
85-47 12/16-12/20/85 1	Radiological controls program, fuel receipt, pre- operational testing	3 IFI	None
86-01 1/13-2/21/86 5	IEB's, allegations, refuel- ing floor contamination, pre- operational testing, pre- operational service inspection CRD removal rework control.	2 UNR	Violation: Inadequate preopera- tional test procedure acceptance criteria.

INSPECTION NUMBER AREAS INSPECTED VIOLATIONS FINDINGS INSPECTION DATE NO. OF INSPECTORS 86-02 Tech Spec review 4 IFI None 1/6-1/17/86 3 86-03 Preop test procedures & 1 UNR None 1/21-1/24/86 test conduct 1 86-04 Implementation of Q1P None None 1/27-1/31/86 5 86-05 Preop test, interim surveillance None None 3/3-3/7/86 preliminary test procedure review 1 86-06 Management meeting: None None 1/22/86 Construction completion, preoperational test status and operational readiness. 86-07 Inspection of Engineering None None 1/3 and 1/7/86 Assurance audit results and corrective actions 86-08 Instrumentation components 1 UNR Violation: 3/3-3/7/86 and cables Unacceptable Cable separation. Violation: Use of uncontrolled drawing.

Unacceptable Cable separation. Violation: Use of uncontrolled drawing. Violation: Damage to instrument tubing. Violation: EQ cable connector integrity lacking.

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INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
86-09 2/22-4/18/86 4	Structural integrity test, raceway installation, pre- operational test procedure, preoperational test witness and TMI action plan items.	45 IFI 1 UNR	Violation: Improper design control for class IE cable routing.
86-11 3/31-4/4/86 3	Readiness implementation of operational QA program, Audits, QA/QC surveillances, M&TE, nonlicensed training, safety review committee.	2 UNR	None
86-12 3/24-3/28/86 2	Radiological controls, training, exposure control, ALARA, control of contaminated material.	1 IFI	None
86-14 3/31-4/4/86 1	Preoperational test program procedure review and test witnessing.	None	None
86-15 4/7-4/11 and 4/21-4/25/86 3	Preoperational testing, operational readiness, administrative procedures, operations procedures, design changes, and modifications.	None	None
86-16 4/7-4/15/86 1	Integrated Leak Rate Test (ILRT) and Structural Integrity Test (SIT).	1 UNR	None
86-17 4/28-5/1/86 2	Radiochemistry, liquid and gaseous radwaste, effluent radiation monitors, procedures, training and qualification.	3 IFI	None
86-18 4/19-5/31/86 8	TMI action plan items, generic letters, preopera- tional test procedures, pre- operational test witness, and preoperational test results.	4 IFI	None

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INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
86-19 5/19-23/86 2	Radiological controls inspec- tion covering the Preop Test program and licensee action on previous findings.	None	None
86-20 5/5-5/9/86 2	Preoperational test proce- dures, test witnessing, test results review, power ascension test program and QA/ QC interfaces.	1 UNR	None
86-21 5/12-5/15/86 2	Fire protection/prevention program readiness, admini- strative controls, training, QA audits.	None	None
86-22 4/30-5/9/86 2	Procurement, receipt, storage & handling document, records management programs, and licensee actions on previous inspection findings.	1 UNR	None
86-23 5/19-22/86 5	Emergency preparedness implementation appraisal, including organization, admini- stration procedures, training, facilities, and equipment.	13 IFI	None
86-24 5/12-16/86 2	Status of security program testing and maintenance, physical barriers, security system power supply, lighting, licensee action on NRC in circulars, bulletins and inspection follow-ups.	None	None
86-26 5/20-23/86 2	TMI action plan items, main- tenance organization, main- tenance staffing, proper QA/ QC interfaces, and emergency operating procedures.	None	None
86-27 5/19-5/23/86 1	Preoperational test program, test witnessing, test results evaluation	1 UNR	None

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
86-28 5/27-6/13/86 2	Inspection of licensee action or construction deficiencies, IE Bulletins and Outstanding Items	None	None
86-29 6/1-7/6/86 5	TMI action plan items, IE Bulletins & Circulars, NRR open items, QIP follow-up, preop test procedure review, test witnessing, and test result review.	5 IFI	None
86-30 6/2-6/6/86 1	Preop testing	None	None
86-31 6/16-6/27/86 2	Preop test program, prelim. test witnessing, test review, QA/QC interface with preop test program.	None	None
86-32 6/23-25/86 1	Preservice inspection program, review of installation procedure, and QC inspection of bolted piping joints	None	None
86-33 6/30-7/11/86 2	Preop testing	None	None
86-34 7/21-9/21/86 4	Operator licensing	None	None
86-35 7/7-11/86	Radiochemistry, liquid radwaste, and gaseous radwaste	1 IFI	None
86-36 7/7-11/86 1	Operational readiness of of instrumentation and control maintenance program	1 UNR	None
86-37 7/14-8/15/86 4	Previous findings, instru- mentation, electrical, equipment qualification	None	None

INSPECTION NUMBER INSPECTION DATE NO. OF INSPECTORS	AREAS INSPECTED	FINDINGS	VIOLATIONS
86-38 7/14-24/86 2	Preop testing results & startup program	2 IFI	None
86-39 7/7-8/31/86 5	Resident Inspector	None	None
86-40 7/28-8/2/86 1	Physical security & safeguards	None	None
86-41 7/29-8/1/86 2	Startup program; surveillance testing, ILRT	None	None
86-42 9/1-9/30/86 5	Resident Inspector	None	None
86-43 7/28-8/1/86 1	IE Bulletins & previous findings	None	None
86-44 8/4-6/86 3	EP appraisal followup	None	None
86-45 7/21-25/86 2	Environmental monitoring program	None	None
86-47 8/4-8/8/86 1	Tech. Spec. surveillance program		

ENCLOSURE 2

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

- A. Much of the information presented within this enclosure was compiled by the applicant's Quality Assurance (QA) organization. The data were extracted from NMPC QA report "Quality of Construction Report" dated March 10, 1986. The information has not been verified for accuracy by Region I.
- B. A multi-tier quality program has been implemented Guring the construction phase at Nine Mile Unit 2. First line Quality Control (QC) inspection responsibilities have been performed by Stone and Webster Engineering Corporation (SWEC), ITT-Grinnell Inc. (ITT), Johnson Controls, Inc. (JCI) and Reactor Controls, Inc. (RCI). Each of those contractors also had an affiliated QA organization that performed audit, surveillance, and other QA functions. SWEC site QA has performed surveillance of the sub-contractor efforts. SWEC QA audits have been performed by the Boston QA Auditing Department. The applicant has maintained a site QA organization that has performed both surveillances and audits of all contractors.

NMPC Audits and Surveillances

NMPC has conducted over 180 audits and 8,800 surveillances of SWEC, GE, and the other site sub-contractors. A summary of the NMPC audits and surveillances is shown in the following tabulation:

	AUD	ITS		TOTAL	
YEAR	OFF-SITE	ON-SITE	SURVEILLANCES	FINDINGS	
1972	1	0	0	20	
1973	4	0	0	39	
1974	10	0	0	20	
1975	10	1	74	25	
1976	6	3	302	58	
1977	9	4	800	73	
1978	7	4	673	65	
1979	5	2	569	34	
1980	9	5	359	40	
1981	7	4	742	30	
1982	7	9	822	54	
1993	10	4	1959	94	
1984	7	9	1570	263	
1985	_9	37	981	124	
Totals	101	82	8851	939	

As a result of the findings identified during the conduct of audits and surveillances, NMPC QA has exercised the authority to issue Stop Work Orders on nine occasions to cease work activities to prevent degradation of the conduct of safety-related activities.

SWEC Audits

SWEC has conducted audits of component suppliers, engineering activities, QA programs, construction activities and subcontractor activities.

SWEC Quality Assurance Auditing Division (QAAD) has performed site, subcontractor, ASME and supplemental audits as summarized by the following:

			No. of	Audit	S	Total
Year	Program	Site	Contractor	ASME	Supplement	Findings
1975	1	1				53
1976	1	4				112
1977	1	4	3			112
1978	1	4	2	1		111
1979	1	4	4	1		120
1980	1	4	3			49
1981	1	4	2			66
1982	1	4	9			112
1983	1	4	10	4		77
1984	1	4	11		6	94
1985	_1		_9	-	_4	77
Totals	11	41	53	6	10	983

Ten Stop Work Orders have been issued as a result of the deficiencies identified by the QAAD audits.

SWEC Procurement Quality Assurance Division (PQAD) has performed supplier audits as summarized below:

YEAR	SUPPLIER AUDITS	TOTAL FINDINGS
1974 1975	1 0	3 0
1976	3	19
1978	48	289
1979	40	241
1981	31	229
1982 1983	66 44	392 280
1984 1985	36	190
		101
lotal	337	2045

SWEC Engineering Assurance (EA) has performed audits and surveillances to ensure that the design control process has been adequately implemented. The EA activities are summarized below:

	NUMBER	NUMBER
YEAR	OF AUDITS	OF SURVEILLANCES
1972	3	
1973	10	
1974	8	
1975	8	
1976	8	
1977	8	
1978	10	
1979	10	
1980	3	
1981	1	2
1982	8	1
1983	8	11
1984	7	19
1985	_6	8
7 1	-	41
ISTOI	98	41

ITT Audits

Q

ITT was the major piping subcontractor responsible for fabrication and installation of large bore and small bore piping and supports. ITT performed audits of site and vendor activities as summarized:

YEAR	SITE	VENDOR	AUDIT FINDINGS
1977 1978 1979 1980 1981 1982 1983 1984 1985	1 4 2 2 4 4 4 4	2 2 2 4	0 2 18 0 1 11 13 29 8
Total	26	10	82

ITT issued eight Stop Work Orders as a result of deficiencies identified regarding the piping activities.

JCI Audits

JCI was the subcontractor responsible for the installation of instrument tubing, supports and instruments. JCI performed the following audits:

YEAR	AUDITS	CORP. AUDITS	AUDIT FINDINGS
1983 1984	1	2 6 3	36 46 14
TOTAL	3	 11	96

JCI issued six Stop Work Orders to halt specific activities until necessary corrective actions were implemented.

RCI Audits

RCI was the subcontractor responsible for the design and installation of the CRD system and installation of reactor internals and recirculating water system piping. RCI performed the following audits:

YEAR	SITE AUDITS	ENGR. AUDITS	AUDIT FINDINGS
1981	0	1	2
1982	2	1	12
1983	3	1	3
1984	4	1	9
1985	_2	_1	6
TOTAL	11	5	32

Seven Stop Work Orders have been issued by RCI.

QC Inspections

QC inspections have been performed by SWEC, ITT, JCI and RCI. The inspections were performed to inspection plans or checklists to verify conformance of hardware or acceptability of software. The SWEC inspections are summarized below:

-							~
	m /m	10	10	1.2	100	0	1
- E I	11.	10	2	U.	F .	e	6
			-	-		-	

YE	AR	STRUCT	<u>REC</u>	ELEC	MECH	PGCC	RACEWAY HANGERS	ASME S/B	INSTR	PROCUREMEN
19 19 19 19 19 19 19 19 19	75 76 77 78 79 80 81 82 83 83 84 85	321 3391 2937 5728 8213 2500 6188 11041 10581 5694 3293	0 912 2739 2535 2770 1052 1864 2801 4067 4462 4017	0 87 860 985 1840 194 2324 5984 3883 7123 14577	0 120 862 1191 1618 786 903 1471 2602 4495 3636	2635 3792 4180	7584 9904 8760	180 3038 5097	<u>315</u>	151 754 1379 1589 965 1102 1691 2000 1906 1005
TO	TAL	59887	27219	37857	17684	10607	26248	8315	315	12542

Total Procurement QA Inspection Reports thru 1985 = 12,542 Total Field QC Inspection Reports thru 1985 = 188,167

The subcontractor QC organizations have generated the following Inspection Reports (IRs) through 1985:

ITT - 74,106 IRs JCI - 17,938 IRs RCI - 2,985 IRs

NONDESTRUCTIVE EXAMINATIONS (NDE)

Nondestructive examinations have been performed to verify through surface and volumetric examination that components and welds are in compliance with design requirements. SWEC has generated the following NDE reports:

YEAR	RADIO- GRAPHY	ULTRA- SONIC	MAG PARTICLE	LIQUID PENETRANT	BUBBLE TEST	WELDER QUALS.
1976 1977 1978						9 72 19
1979 1980 1981	197	127	161	72		191
1982	15	30	2925	317	52	231
1984 1985	_132	44	1161 1372	3698 4876	126 196	1529 524
TOTAL	344	289	6756	9823	396	3309

* 6301 inches

x 1676 inches

Érz osure 2

Initial Acceptance Rate, Volumetric Examination 83% Initial Acceptance Rate, Surface Examination / 97.5%

ITT has generated the following inspection reports:

YEAR	LIQUID PENETRANT/MAG. PARTICLE	RADIOGRAPHY
1982 1983 1984 1985	1729(1) 2867 7590 <u>11819</u>	774 633 1163 <u>1832</u>
TOTAL	24005	4402

Initial Acceptance Rate, Volumetric Examination 72% Initial Acceptance Rate, Surface Examination 95%

NOTE 1: LP/MT exam totals for 1982 for first nine months only.

NOTE 2: SWEC QA/NDT, Boston conducted a complete review of 4,189 ITT Grinnell radiograph packages prior to 11/25/84. A total of 775 weld radiograph packages required some form of corrective action, which has been accomplished.