

NIAGARA MOHAWK POWER CORPORATION

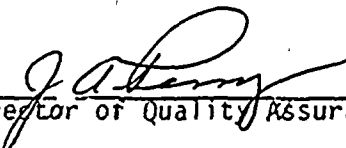
PSAR  
QUALITY ASSURANCE  
PROGRAM

FOR

NINE MILE POINT  
UNIT 2

JUNE 11, 1984

Approved: \_\_\_\_\_

  
Director of Quality Assurance

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## NMP-2 PSAR

### APPENDIX D

#### QUALITY ASSURANCE PROGRAM

##### D.1 INTRODUCTION AND SUMMARY

###### D.1.1 General

The ultimate responsibility for the implementation and execution of a Quality Assurance Program applicable to the design, fabrication, construction and testing of the structures, systems and components of Nine Mile Point Unit 2 (NMP-2) rests with Niagara Mohawk Power Corporation (NMPC).

Execution of appropriate portions of project quality assurance will be assigned to Stone & Webster Engineering Corporation (SWEC) (Section D.3) and the General Electric Nuclear Energy Business Group (GE-NEBG) (Section D.4) as designers and suppliers of the Nuclear Steam Supply System (NSSS) and the initial load of nuclear fuel.

Independent programs in quality assurance, including quality control, have been developed by SWEC and GE-NEBG; these will be audited by NMPC.

###### D.1.2 Program Purposes and Objectives

The Nine Mile Point Unit 2 Quality Assurance Program conforms to the provisions of the Code of Federal Regulations, Part 10CFR50, Appendix B, which covers Quality Assurance Criteria for Nuclear Power Plants.

The purpose of the quality assurance program herein described is to provide control of quality-related activities associated with the design, fabrication, construction and testing of QA Category I structures, systems and components of the nuclear power plant listed in Tables C.10a and C.10b of Appendix C to the PSAR. The program encompasses the activities of designing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting and testing for the safety-related functions of those structures, systems and components.

The information required for the Quality Assurance Program to address the safe operation of the facility is described in the Final Safety Analysis Report.

###### D.1.3 Program Control and Implementation

NMPC has the ultimate responsibility for control of the QA program and implementation is accomplished through auditing. Specific responsibilities for Quality Control activities have been delegated to SWEC for architect-constructor-engineer functions and to GE-NEBG for the NSSS and initial fuel load. The NMPC QA Manual-Design and Construction Phase describes the NMPC controlling policies and procedures. Figure D.1-1 shows the NMPC organizational interface. Figure D.1-2 shows the NMPC-G.E.-SWEC organizational interface.



D.1.3 Program Control and Implementation (Continued)

The details for carrying out SWEC's and GE-NEBG's delegated responsibilities are described in their Quality Assurance Manuals, procedures and instructions. These documents assure compliance with the applicable portions of the NRC's 10CFR50 Appendix B criteria.

Direct control of SWEC and GE-NEBG quality assurance functions is performed by audits conducted by the NMPC QA personnel. The audits provide NMPC with the visibility to determine performance of SWEC and GE-NEBG and to judge compliance with the applicable portions of the Appendix B criteria and for conformity with manuals, procedures and instructions established for the project.

NMPC conducts quality assurance reviews of safety-related specifications and purchase orders and selected safety-related drawings and sketches.



## D.2 QUALITY ASSURANCE PROGRAM

### D.2.1 Organization

The QA Department is a corporate department under the direction of the Director Quality Assurance who reports on quality matters to the President. Further definition of the administrative and functional organizations is included in the procedures developed to implement specific parts of this program. The QA Department regularly reviews the status and adequacy of the QA program, including a quality compliance review of all contractors and a self-appraisal.

#### Director Quality Assurance

The Director Quality Assurance reports directly to the President and is responsible for the overall control and implementation of the QA program. Because the Director Quality Assurance is organizationally independent from the various functional groups, he has the freedom to deal independently with matters concerning quality activities performed by those groups.

To ensure that the Director Quality Assurance may deal with quality problems effectively, he has authority to take direct action concerning matters affecting quality. Direct action includes the initiation of an order to stop work or consultation with NMPC senior executives concerning unresolved quality problems.

The Director Quality Assurance affects overall QA policy through his approval of the content of this program.

#### Manager Quality Assurance - Project

The Manager QA - Project and his staff establish and evaluate how all activities with respect to quality are being carried out with regard to Nine Mile Point Unit 2. The Manager QA - Project informs the NMPC Director Quality Assurance and the Project Director and, when appropriate, the Executive Director of Nuclear and the President as to findings. Additional specific duties of the Manager QA - Project are as follows:

1. Managing and directing the Quality Assurance Project organization.
2. Interpreting quality requirements as they relate to project construction.
3. Appropriately acting on deficient conditions to assure timely corrective action.
4. Review the status of audit and surveillance reports on organizations performing Quality Assurance/Quality Control activities and inform Project Management of their disposition.
5. Resolution of all matters relating to project quality assurance.





### D.2.1 Organization (Continued)

The Manager QA - Project affects overall QA policy through his approval of the NMPC QA project procedures and has the authority to take direct action regarding quality related matters concerning the Unit 2 project. Direct action includes making a recommendation for stop work and stopping the further processing with specific work activities that are adverse to quality.

#### Manager Quality Assurance - Services

The Manager QA - Services provides a support function for the NMP-2 Quality Assurance organization. His responsibilities include:

1. Conducting corporate QA audits and providing a trend analysis program.
2. Recommend development of or revision to QA Department procedures and policy to the Director QA for his approval.
3. Coordination of QA Department training.
4. Advising the Director Quality Assurance and the Manager QA - Project of serious quality assurance concerns regarding identified quality problems.

#### Manager QA-Nuclear

The Manager QA-Nuclear provides a support function for the preoperational and startup testing, operation, maintenance and modification and repair for NMP2. His responsibilities are defined in the Unit 2 FSAR.

#### Quality Assurance Supervisor/Unit Managers

Quality Assurance Supervisors/Unit Managers have the responsibility for supervision of the members of the Quality Assurance staff assigned to evaluate and coordinate necessary Quality Assurance functions. Additional responsibilities of QA Supervisors/Unit Managers are as follows:

1. Supervising, directing and coordinating the Quality Assurance staff and consultants within the framework of established policies and Quality Assurance Department procedures.
2. Bringing unresolved quality-related problems to the attention of the Manager QA - Project.
3. Coordinating and evaluating necessary audit and surveillance functions and maintaining a tracking and trending system for Quality Assurance identified deficiencies.
4. Assuring resolution of project quality-related problems.
5. Preparing and implementing NMPC Project Quality Assurance procedures and instructions.
6. Initiating stop further processing of specific work activities which are adverse to quality and recommending "stop work."



D.2.1 Organization (Continued)

Quality Assurance Staff

The NMP-2 Quality Assurance staff consists of appropriate Quality discipline personnel reporting to the appropriate Quality Assurance Supervisor. They are assigned as required to ensure that quality functions within their discipline are implemented.

Offsite Quality Assurance personnel report to the appropriate Quality Assurance Supervisor. They assist in performing his quality functions and ensuring that corporate quality policies are implemented.

Examples of specific duties of the NMPC Quality Assurance staff are as follows:

1. Conduct audits and surveillance of the various NMPC departments, architect-engineers, contractors, and subcontractors, including Quality Control groups within these organizations.
2. Review safety-related procurement documents.
3. Aid in the preparation of the NMPC Quality Assurance program including the administration for preparation of procedures and instructions for Nine Mile Point Unit 2 Project.
4. Review procedures affecting quality activities performed by NMPC, the Project architect-engineer, and the NSSS and fuel contractor.

The education and experience requirements of quality assurance personnel are contained in Table D.2-1.

QA-related activities are performed by other individuals and groups in accordance with the requirements of the NMPC QA program manuals and Appendix B to 10CFR50. The NMPC organizations that perform these activities for Unit 2 include:

Nuclear Engineering and Licensing  
 Nuclear Construction  
 Purchasing  
 Site Superintendent Maintenance Nuclear and Staff  
 Technical Superintendent Nuclear and Staff  
 Superintendent Chemistry and Radiation Management  
 Superintendent Training Nuclear  
 Station Superintendent and Staff

Nuclear Engineering and Licensing

The Vice President Nuclear Engineering and Licensing has overall responsibility for licensing the NMPC nuclear projects and providing certain engineering support for the nuclear projects.



### D.2.1 Organization (Continued)

#### Nuclear Construction

The Project Director has the overall responsibility for project management of Unit 2. The project management efforts include management of construction, design, preliminary testing and support for turnover of plant equipment and systems to Nuclear Generation for preoperational and startup testing (fuel load). These activities are governed by the Project Manual and procedures for Unit 2. The Project Director has stop work authority.

#### Purchasing

The Vice President Purchasing reports directly to a Senior Vice President and is responsible for formulating, establishing and enforcing compliance with procurement requirements. The Vice President Purchasing and his staff are responsible for ensuring that all applicable procurement documents and changes are reviewed and accepted by the QA Department.

#### Nuclear Generation

The Vice President Nuclear Generation has overall responsibility for the safe and reliable operation of Units 1 and 2. The organization responsible for these activities is under the direct responsibility of the General Superintendent Nuclear Generation. The General Superintendent is responsible for implementing NMPC QA policies in accordance with the QA program as described in Chapter 17 of the FSAR.

### D.2.2 Program

Total responsibility for the QA program is retained by NMPC. The QA Department is responsible to the President for establishment and administration of the QA program. This program includes control measures, such as audit, surveillance and review and/or approval, to assure QA compliance for the design, procurement, fabrication, storage, construction, test, operation and maintenance of the facility or any modifications.

The Quality Assurance Program for Nine Mile Point Unit 2 is implemented and executed by NMPC. The program provides direction for the Quality Assurance efforts for all contractors, subcontractors and engineering consultants performing work or providing services for components, systems or structures for Unit 2.

The Quality Assurance Program conforms to the provisions of the Code of Federal Regulations, Part 10CFR50, Appendix B.

NMPC requires SWEC, GE-NEBG and outside consultants (whenever applicable) to maintain and implement separate but subsidiary Quality Assurance Programs responsive to and designed to satisfy the Quality Assurance Criteria of Appendix B.

The structures, systems and components subject to this program are identified in Tables C.10a and C.10b, Appendix C of the PSAR as Category I items.



### D.2.2 Program (Continued)

The overall Quality Assurance Program for Unit 2 provides control over activities affecting the quality of the identified structures, systems and components to an extent consistent with their importance to safety, and the program is carried out in accordance with documented policies, procedures or instructions.

The QA program as described herein is in effect for work now in progress involving safety-related equipment. Design review meetings are, or have been, held with representatives involved in producing the Unit design. These meetings ensure that applicable regulatory requirements, codes, standards and design bases are correctly translated into specifications, drawings, procedures and instructions. Included also in deliberations during the design review meetings are resolutions regarding QA/QC adequacy, design interfaces and Regulatory Guides.

The QA activities which have been initiated include assessments of the adequacy of the programs of the NSSS supplier, the architect-engineer and the reactor pressure-vessel supplier. Quality assurance audits are conducted on the NSSS vendor and on the architect-engineer, with particular emphasis on the design activities. These activities include such items as design control, procurement document control, the preparation of instructions, procedures and drawings, document control, control of purchased material, equipment and services, QA records, audits, etc.

Stone & Webster Engineering Corporation (SWEC) is the architect-engineer and is assigned the responsibility of acting as agents for NMPC in carrying out the day-to-day quality assurance activities as prescribed by NMPC, for other than the nuclear steam supply system equipment and services furnished by GE-NEBG. The Quality Assurance Program established by SWEC for application to NMP-2 is described in summary in the Stone & Webster Quality Assurance Program Manual. In addition, SWEC performs appropriate audits of the design, fabrication and testing of the nuclear steam supply system and components.

General Electric Company, Nuclear Energy Business Group (GE-NEBG), as suppliers of the Nuclear Steam Supply System (NSSS) and the initial load of nuclear fuel, is assigned the responsibility for planning and executing the day-to-day quality assurance activities relative to its scope of supply.

The Quality Assurance Program established by GE-NEBG for its scope of supply for NMP-2 is described in the "Nuclear Energy Business Operations Boiling Water Reactor Quality Assurance Program Description," NEDO-11209-04A.

### D.2.3 Design Control

The NMPC Quality Assurance Program provides assurance that applicable regulatory requirements and design bases for those safety-related structures, systems and components are correctly translated into specifications, drawings, procedures and instructions. Measures exist for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related function of the structures, systems and components.





### D.2.3 Design Control (Continued)

In the process of auditing, NMPC Quality Assurance personnel will review design drawings and field changes. Procedures regarding, and departments participating in, design review are audited by NMPC Quality Assurance personnel on a planned and scheduled basis. NMPC Quality Assurance policies also require that changes made to design drawings and specifications must be reviewed in the same manner as the original drawings and specifications.

The essential elements required to implement design control are specified in the Niagara Mohawk Power Corporation Quality Assurance Manual - Design and Construction Phase. Written procedures are established for the identification and control of design interface and for coordination between SWEC and GE-NEBG design organizations.

### D.2.4 Procurement Document Control

The assurance that applicable regulatory requirements, design bases, and other requirements are suitably included or referenced in the documents for procurement of material, equipment, and services is obtained through review by the Project Director or his staff. Review of plans, specifications and purchase orders is described in the NMPC Quality Assurance Manual - Design and Construction Phase.

The primary effort is directed toward assuring that the review of drawings and specifications is thoroughly executed before the placement of an order. In this manner, a solid base is established for procurement. NMPC engineers review and evaluate all bids received by SWEC and determine the successful bidder.

The above procedures are in addition to a similar review carried out by SWEC prior to submittal to NMPC for approval.

### D.2.5 Instructions, Procedures and Drawings

Activities affecting quality are prescribed by documented instructions, procedures and drawings of a type appropriate to the circumstances and are accomplished in accordance with these instructions, procedures and drawings.

### D.2.6 Document Control

Niagara Mohawk Power Corporation has and requires SWEC and GE-NEBG to have written document control procedures in accordance with Appendix B criteria as part of their respective Quality Assurance programs.



#### D.2.7 Control of Purchased Material, Equipment and Services

The primary method of control of purchased items is through the use of an approved list of vendors. This list is revised, based on vendors' performance and on new applicants.

In order for a vendor to qualify for the approved list of vendors, a financial review and quality assurance program evaluation is performed. When applicable, past performance is reviewed.

NMPC will participate in selected quality assurance audits and witness tests at major equipment suppliers and their subsuppliers.

#### D.2.8 Identification and Control of Materials, Parts and Components

Identification and control of material, parts and components are delegated and carried out by SWEC and GE-NEBG in accordance with detailed procedures within their respective Quality Assurance Programs. Methods and systems of identification are subject to review and audit by Unit 2 Quality Assurance staff.

#### D.2.9 Control of Special Processes

The control of special processes is delegated to SWEC, GE-NEBG and the equipment vendors. NMPC gains assurance of these controls by selected audits of various vendors. Special attention is directed to welding, heat treating and nondestructive testing to ensure compliance with the applicable codes and standards.

#### D.2.10 Inspection

The inspection function is delegated to SWEC, GE-NEBG and their vendors, subject to audits by NMPC. However, during the preoperational phase, inspection may be conducted by NMPC or one of its contractors. The results of these audits determine the adequacy of the inspection effort.

#### D.2.11 Test Control

Selected vendors' shops are audited for quality control by NMPC, SWEC and GE-NEBG quality assurance personnel. Certain shop tests on major components, such as hydrostatic tests, pump capacity tests, control systems checkouts, core and coil inspections, final assembly inspections, etc., will be witnessed by NMPC, SWEC and GE quality assurance personnel and engineers.

The Administrative and Program controls during the preliminary testing phase (check-out and initial operations of equipment) are delineated in the SWEC Project Test Program Directives (PTPDs). The Administrative and Program controls during the pre-operational testing phase are delineated in the NMPC Start-up Administrative Procedures.

The NMPC Quality Assurance Department monitors performance of these testing activities to verify conformance with these controls.



#### D.2.12 Control of Measuring and Test Equipment

NMPC requires that procedures provide for periodic calibration of measuring and testing devices. The calibration system provides for the prevention of inaccuracy by detection of deficiencies and timely positive action for their correction. This is monitored by planned and periodic audits by the QA organization. NMPC Quality Assurance shall arrange for the review of NMPC, SWEC and GE-NEBG procedures and shall audit their activities to ensure that control of measuring and test equipment is an implemented part of their Quality Assurance program. The NMPC Quality Assurance staff may also accompany SWEC and GE-NEBG on vendor audits to determine the adequacy of the vendor's measuring and test equipment control system.

When a contractor does not have a program or does not receive approval of his program, the SWEC Field Quality Control Division shall provide, with NMPC concurrence, the necessary controls for the contractor's work.

In the event a contractor fails to perform its Quality Control functions as stated in his approved program, NMPC will be notified and will direct SWEC QA to perform detailed inspection and other corrective actions as required.

#### D.2.13 Handling, Storage and Shipping

Control measures in accordance with applicable portions of 10CFR50, Appendix B, have been delegated to SWEC and GE-NEBG. Instructions or procedures developed by SWEC and GE-NEBG will be subject to review and audit by NMPC.

#### D.2.14 Inspection, Test and Operating Status

NMPC, SWEC and GE-NEBG are required to maintain a system that provides assurance that the inspection and test status of materials and components under their respective control is known at all times. Following site installation, the operational status of systems and components will be indicated by tagging or other appropriate means to prevent inadvertent utilization.

#### D.2.15 Nonconforming Material, Parts or Components

Measures are established within the respective QA programs to assure that conditions adverse to quality are properly identified and corrected. Review and audit for compliance will be conducted by NMPC.

#### D.2.16 Corrective Action

Measures are established within the respective QA programs to assure that conditions adverse to product quality, such as deviations, nonconformances, defective items, etc., are identified and appropriate corrective and preventive action is taken by means of audit of corrective action systems. Results of these audits will be reported to the proper level of NMPC management systems.



### D.2.17 Quality Assurance Records

The QA program establishes requirements for generation, collection and maintenance of quality assurance records which furnish objective evidence of the quality of items and the completion of activities affecting quality. A permanent records retention system is established to provide readily retrieved quality history for each item as required by regulations, codes, standards, specifications and procurement documents.

Niagara Mohawk Power Corporation has overall responsibility for Quality Assurance records and designates the QA record types required for the permanent plant file. Responsibility has been delegated to SWEC and GE-NEBG for generation, collection, storage, review and approval and transmittal to NMPC of records covering design, manufacturing, construction and installation and preliminary testing. NMPC Records Management receives and processes records into the permanent plant file and maintains the file as required throughout the lifetime of the facility. NMPC QA monitors the records program by audit and surveillance.

### D.2.18 Audits

Audits planned by NMPC Quality Assurance during the design and construction phase consists of audits of SWEC at both the design office and the construction site, audits of GE-NEBG audits of the NMPC Project Office and vendor audits.

NMPC QA audits are performed as a method of determining the effectiveness of the SWEC and the GE-NEBG Quality Assurance Programs. This is accomplished by reviewing selected elements of the Nine Mile Point Unit 2 approved Quality Assurance Program, SWEC QA program and GE-NEBG QA program.

Audits are normally conducted using audit plans and checklists prepared by Quality Assurance personnel. The audit plans and checklists are developed using the parameters established by various documents, i.e., Quality Assurance Manuals, procedures, specifications, etc. The general policy in regard to vendor, SWEC and GE-NEBG audits by NMPC is to verify that vendors of safety-related components conform to all applicable portions of Appendix B to 10CFR50 and the Quality Assurance Program. In order to do this, it is necessary to ensure that vendor audits delegated to SWEC and GE-NEBG are adequate to ensure quality, to evaluate the vendors' management systems, records, Quality Assurance/Quality Control manuals, processes, hardware conformance and activities against these criteria. The frequency of audits depends on the function being audited or on prior audit experiences. Most audits will be conducted on a planned and scheduled basis. When conditions warrant, unscheduled audits may be conducted with a minimum notice and minimum written preplanning.





D.2.18 Audits (Continued)

The results of each audit are reported in writing to the NMPC Director Quality Assurance, Manager QA-Projects, Manager QA-Services, Project Director and appropriate levels of management within the organization audited.

The audit report shall list all discrepancies found and the persons or organizations assigned corrective actions. These responsible persons or organizations shall submit to the appropriate Quality Assurance Supervisor a report of the corrective action taken, or shall specify a reasonable time period when this action can be accomplished.



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Qualifications and Experience Levels of QA Personnel

<u>Title</u>	<u>*Minimum Required Degree</u>	<u>Minimum Years Experience</u>	<u>Required Background</u>
Mgrs. of QA	BS	15	At least 15 years in charge of responsible assignments including several functions in the design, construction or operation of a nuclear power facility.
QA Supervisors Nuclear	BS	8	At least eight years of QA related work or equivalent experience in the design, construction or operation of a nuclear facility.

\*Or Equivalent Qualifications

Table D.2-1



D.3 STONE & WEBSTER ENGINEERING CORPORATION QUALITY ASSURANCE PROGRAM

Execution of portions of project quality assurance performed by SWEC shall be in accordance with the latest revision of the Quality Assurance Program Manual, Nine Mile Point Unit 2 (SWEC).

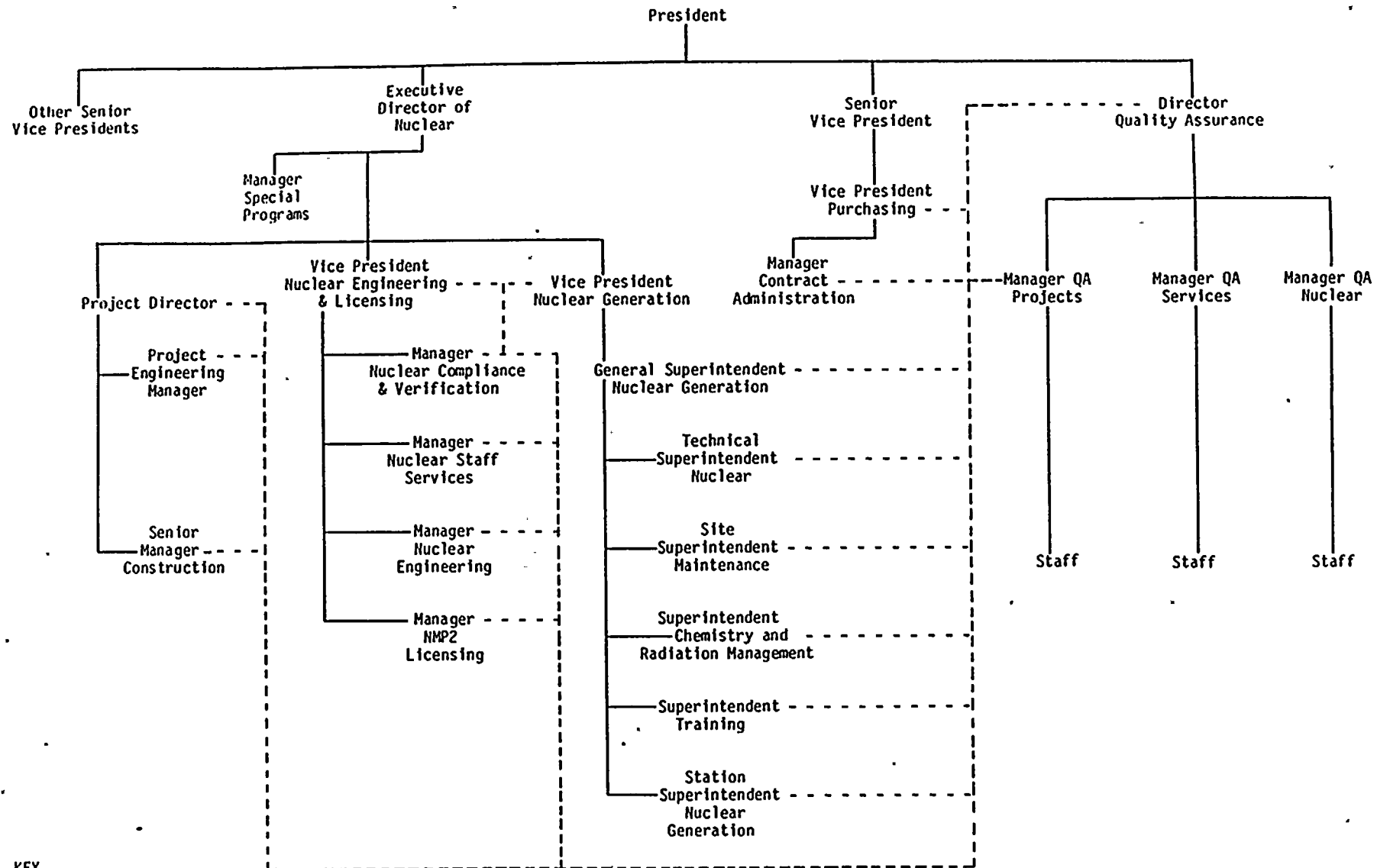


D.4 GENERAL ELECTRIC QUALITY ASSURANCE PROGRAM

As of the date of this submittal, execution of portions of project quality assurance performed by GE shall be in accordance with the latest revision of "Nuclear Energy Business Operations Boiling Water Reactor Quality Assurance Program Description," NEDO-11209-04A.





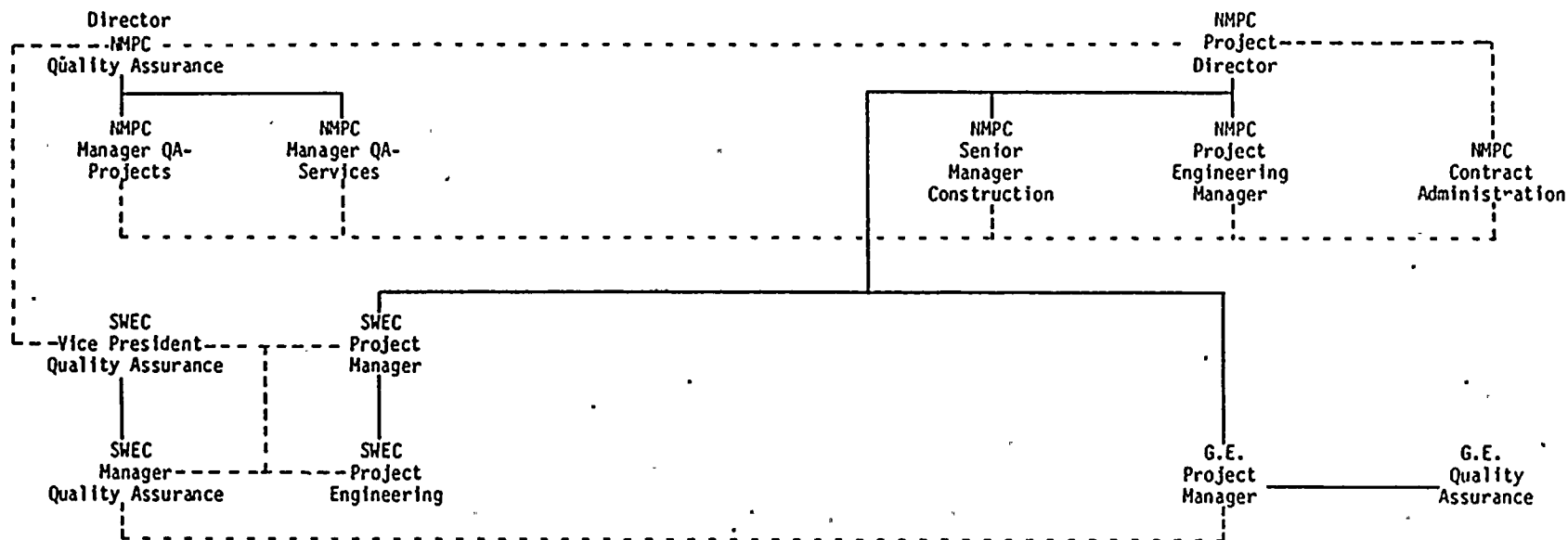


**KEY**

----- Communication  
 \_\_\_\_\_ Administration and/or Required Communication Link

**NMPC Organization**  
**Fig. D.1-1**





**KEY**

————— Administrative or Communication  
 - - - - - Communication

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 Figure D1.-2  
 NMPC-SWEC-GE  
 Organizational Interface

