

NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY
THE HARTFORD ELECTRIC LIGHT COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

QUALITY ASSURANCE PROGRAM TOPICAL REPORT

7810300159

ABSTRACT
NORTHEAST UTILITIES QUALITY ASSURANCE PROGRAM
TOPICAL REPORT

Northeast Utilities (NU) has developed and is implementing a comprehensive Quality Assurance program to assure conformance with established regulatory requirements, set forth by the Nuclear Regulatory Commission (NRC), and accepted industry standards. The participants in the NU Quality Assurance Program assure that the design, procurement, construction, testing, operation, maintenance, repair and modification of nuclear power plants are performed in a safe and effective manner.

The NU Quality Assurance Program (QAP) Topical Report complies with the requirements set forth in Appendix B, of 10 CFR Part 50, along with applicable sections of the Safety Analysis Report (SAR) for each license application, and is responsive to the United States NRC Regulatory Guide 1.70, Rev. 2, dated September, 1975, which describes the information required to be presented in the Quality Assurance Section of the SAR's for nuclear power plants.

The NU QAP is committed to utilize the guidance obtained from the Regulatory documents and their endorsed Standards as referenced in the WASH 1309, WASH 1284, and WASH 1283, Rev. 1. Appendix D of the Topical Report identifies the applicable documents.

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TOPICAL REPORT

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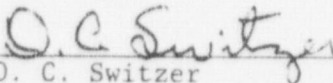
POLICY STATEMENT
NORTHEAST UTILITIES QUALITY ASSURANCE PROGRAM
TOPICAL REPORT

The policies, requirements and tasks contained in this Northeast Utilities Quality Assurance Program description have been developed to fulfill a recognized need for assurance that requisite quality is achieved in design, procurement, construction and operation of our nuclear facilities.

Northeast Utilities procedures which implement this program are described in various manuals which are referenced herein.

The program has been established to comply with the requirements of Title 10, Code of Federal Regulations, Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants." It is also responsive to selected NRC Regulatory Guides as well as ANSI N45.2.

The development and overall responsibility for this Quality Assurance Program lies with the NUSCO Executive Vice President of Engineering and Operations. Corporate authority is delegated to the Manager, Quality Assurance for the preparation and administration of the Quality Assurance Program, individual group Vice Presidents are responsible for the implementation of their portion of the Northeast Utilities Quality Assurance Program. Revisions, additions to, and audits of this program are the responsibility of the Manager, Quality Assurance. Any revisions or additions shall be approved by affected Departments prior to the incorporation of such changes into the program.



D. C. Switzer
Vice Chairman
Northeast Utilities Service Company

INTRODUCTION

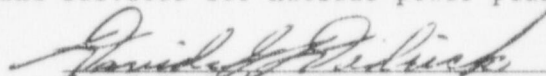
This Northeast Utilities (NU), Quality Assurance Program Topical Report contains the quality assurance requirements which are relative to the safety of the nuclear power plant. The topical report consists of the following three parts:

1. Introduction, which delineates the purpose of the topical program, and summarizes its scope and applicability.
2. QAP which summarizes the quality assurance approach, through eighteen criteria, to activities related to Category I material, parts, components, systems and services.
3. The appendices, provide supporting statements and tabulations.

This topical report has been prepared to document that a meaningful quality assurance program has been established and implemented to ensure that adequate quality requirements are being complied with to safeguard NU employees, contracted personnel and the general public, from the conceptual phase through the operations phase of nuclear power plant life.

The NU QAP establishes controls which are applicable to systems, structures, components, material, parts and services identified as safety related and listed for each nuclear power plant and supplemented, if applicable, for plant betterment projects. The controls which implement the actions identified in the QAP topical report are departmental procedures and instructions which delineate actions and steps necessary to accomplish safety related quality requirements. Procedures and instructions are written by the company and/or departments which have the responsibility for implementing actions assigned to them as delineated by the NU QAP. Quality related procedures and revisions thereto are reviewed by and concurred with by the Manager, Quality Assurance/ designee, in accordance with QAP 2.0 and QAP 5.0.

The NU QAP is responsive to applicable codes, Nuclear Regulatory Commission regulatory requirements, accepted industrial standards and revisions thereto. Provisions are established to update the NU QAP topical report in accordance with revisions to codes, standards and regulatory requirements, and to inform cognizant personnel to implement appropriate action to assure the highest standard of quality is achieved for safety related systems, structures, components and services for nuclear power plants.



David G. Diedrick
Manager, Quality Assurance

1.0 ORGANIZATION

1.1 INTRODUCTION

Northeast Utilities (NU) is a holding company which owns all of the common stock in several companies as illustrated by Figure 1.1.

The Connecticut Light and Power Company (CL&P), The Hartford Electric Light Company (HELCO) and Western Massachusetts Electric Company (WMECO) are the sole owners of Millstone Units Number One and Two with 53%, 28% and 19% ownership respectively. They are the principal owners in Millstone Unit Number Three with 65% ownership and, by contract have the authority to make all of the decisions affecting the design, procurement, construction and operation of that unit. This decision making authority will be the same for future units, i.e., Montague Units Number One and Two.

The NU Companies jointly own 44% of The Connecticut Yankee Atomic Power Company (CYAPCO). By contract, NU and Northeast Utilities Service Company (NUSCO) have been delegated operational control of CYAPCO. NUSCO provides technical support for the operation of that plant. This is also illustrated in Figure 1.1.

Northeast Nuclear Energy Company (NNECO) and CYAPCO are the operating companies established to operate their respective facilities. NNECO is delegated the responsibility for operating the Millstone and Montague Units by the owners. NNECO in turn has contracted for the services of NUSCO for the design and construction management of all of the units at Millstone and Montague and may solicit technical support during plant operations. NNECO and CYAPCO comprise the Nuclear Plant Operating Companies (NUPOC) as illustrated in Figure 1.1.

NUSCO, part of which is organized as shown in Figure 1.2, provides services such as engineering, quality assurance, accounting, planning and procurement for the NU system operating companies where these services can be more efficiently and economically performed on a system-wide basis.

The NUPOC and NUSCO interrelationship shown in Figure 1.3, for quality related activities, indicates how conflicts are resolved. As indicated, the Vice Chairman - NUSCO is also the President of NUPOC.

1.2 GENERAL

- 1.2.1 The Vice Chairman of NU is also the Vice Chairman of NUSCO and directs specified nuclear related activities of NUSCO. He has the ultimate responsibility for the establishment and execution of the NU Quality Assurance Program (QAP). Authority for the establishment and execution of the Program is delegated to the NUSCO Executive Vice President - Engineering and Operations.

The NUSCO Executive Vice President (NUPOC Vice President) - Engineering and Operations is responsible for engineering, construction, operation, maintenance, modification, and quality assurance within NU. See Figure 1.3. The NUSCO Vice President Nuclear Engineering and Operations, reporting to the NUSCO Executive Vice President Engineering and Operations, and the Vice President of Purchasing and Stores reporting to the NUSCO Vice Chairman, are responsible for ensuring that the requirements of the NU QAP are carried out within their respective groups.

- 1.2.2 The NUSCO Vice President Nuclear Engineering and Operations (NUPOC Vice President) reporting to the NUSCO Executive Vice President Engineering and Operations assesses the scope, status, implementation and effectiveness of the NU QAP by conducting, with the assistance of a team of individuals, annual reviews to assure that the Program is adequate and complies with 10 CFR 50, Appendix B and other regulatory requirements.

The team is made up of individuals knowledgeable in management, auditing, quality assurance and the NU QAP. They are appointed by and report to the NUSCO Vice President Nuclear Engineering and Operations.

The management quality assurance review is:

- a. Preplanned toward the objective of determining the adequacy of the NU QAP and its compliance with Appendix B to 10 CFR Part 50;
- b. a systematic evaluation;
- c. capable of identifying, communicating and tracking any required corrective action.

1.3 PARTICIPATING GROUPS

- 1.3.1 The major groups participating in the NU QAP are the NUSCO Nuclear Engineering and Operations and NUSCO Purchasing.
- 1.3.2 Overall responsibility for the NU QAP, including direction of the program, implementation of the policies, plans, requirements, procedures, audits and verification to assure compliance with regulatory requirements including 10 CFR 50, Appendix B, is assigned to the Director Reliability Engineering and Quality Assurance. The Manager, Quality Assurance reporting to the Director Reliability Engineering and Quality Assurance, is directly responsible for verifying implementation of the requirements of the NU QAP.

- 1.3.3 Overall responsibility for the implementation of the NU QAP Topical Report at the NUPOC nuclear plant is assigned to a NUPOC Superintendent. Each NUPOC Quality Assurance Supervisor, reporting to the appropriate Superintendent, is responsible for verifying implementation of the requirements of the NU QAP.

1.4 RESPONSIBILITIES

- 1.4.1 The head of each ~~department~~ or organization performing quality related activities is responsible for:
- a. Administering those activities within his organization which are quality related as defined by the NU QAP Topical Report;
 - b. Establishing and clearly defining the duties and responsibilities of personnel within his organization who execute quality related activities;
 - c. Planning, selecting and training personnel to meet the requirements of the NU QAP;
 - d. Performing and coordinating quality matters within his department and interfacing with the Quality Assurance Department on quality related matters.

The responsibility, authority, and organizational relationship for performing quality related activities within each organization is established and delineated in the NU organization charts and written job or functional descriptions.

1.4.2 Nuclear Engineering and Operations Group

The Vice President Nuclear Engineering and Operations Group is responsible for providing and directing projects, technical and support personnel to meet NUSCO responsibilities during engineering, construction and assigned functions during preoperational and startup testing and modifications of nuclear power plants.

The Nuclear Engineering and Operations Group is divided into five departments: a) Nuclear Operations; b) Nuclear and Environmental Engineering; c) Nuclear Projects; d) Generation Engineering; e) Reliability and Quality Assurance (See Figure 1.2).

- 1.4.2.1 The Director Reliability Engineering and Quality Assurance is responsible to direct and/or coordinate the support for Project Managers and others and the establishment and verification of implementation of the requirements of the NU QAP. He assures that audit data are analyzed

and the reports, which indicate quality trends and effectiveness of the QA Program, are reported to management for review and assessment.

The Manager, Quality Assurance reporting to the Director Reliability Engineering and Quality Assurance, is directly responsible for verifying implementation of the requirements of the NU QAP Topical Report. He provides management with objective evidence concerning quality, independent of the individual or group directly responsible for performing the specific activity. He has the authority and organizational freedom to assure all necessary quality affecting activities are performed and is independent of undue influences and responsibilities for schedules and costs. He has the responsibility and authority delineated in writing, to stop unsatisfactory work and control further processing, delivery, or installation of nonconforming materials. He maintains an overview of NUPOC quality assurance activities through a planned and systematic program of audits and surveillances. He maintains a quality assurance staff which covers QAP aspects of construction, procurement, design, preoperational testing and operations.

- 1.4.2.2 The Director Nuclear Projects is responsible to direct and/or coordinate the processes and assure the necessary resources for the licensing, engineering, procurement, construction, quality assurance, startup of new nuclear generating facilities and provide construction management services for generation facility betterment work. The Nuclear Projects Department consists of a Nuclear Project Manager and a Nuclear Project Engineer for each nuclear project planned or under construction, construction site management and cost and schedule control.
- 1.4.2.3 The Director Generation Engineering Department is responsible for providing support to projects directed by the Nuclear Projects Department and other NUSCO/NUPOC departments and to provide Project Engineers for backfit/betterment projects. His department provides systems design expertise and the expertise for specification and procurement of equipment and materials. The Generation Engineering Department consists of the following activities; mechanical engineering, electrical engineering, civil engineering and engineering design.

1.4.2.4 The Director Nuclear and Environmental Engineering Department is responsible for licensing and safeguards, reactor engineering, technical support, nuclear systems' analyses, environmental programs and all engineering associated with nuclear fuel and those components which constitute or significantly effect the reactor core, for both new nuclear projects and operating nuclear power plants. The Nuclear and Environmental Engineering Department consists of the following activities; environmental programs, reactor analysis, licensing and safeguards and nuclear fuel management.

1.4.2.5 The NUSCO System Superintendent of Nuclear Operations is responsible for modification, refueling, maintenance and operation of in-service nuclear power plants and for controlling and directing the preoperational and startup test program of new units. Assumption of preoperational testing responsibility by the Nuclear Operations Department commences with system turnover by Nuclear Projects. The Nuclear Operations Department consists of the NUSCO Nuclear Operations Engineering staff and the NUPOC organizations.

The NUPOC Superintendents are responsible for the operation, maintenance, modification and refueling of in-service nuclear power plants, and for controlling and directing the preoperational and startup test program of new units in accordance with an approved startup manual per QAP 5.0. Assumption of preoperational testing responsibilities commences with system turnover. They are also responsible for providing qualified personnel to perform these activities in accordance with approved drawings, specifications and procedures. They provide nuclear plant operations input to the Nuclear Engineering Departments for the design of new facilities and plant betterment projects.

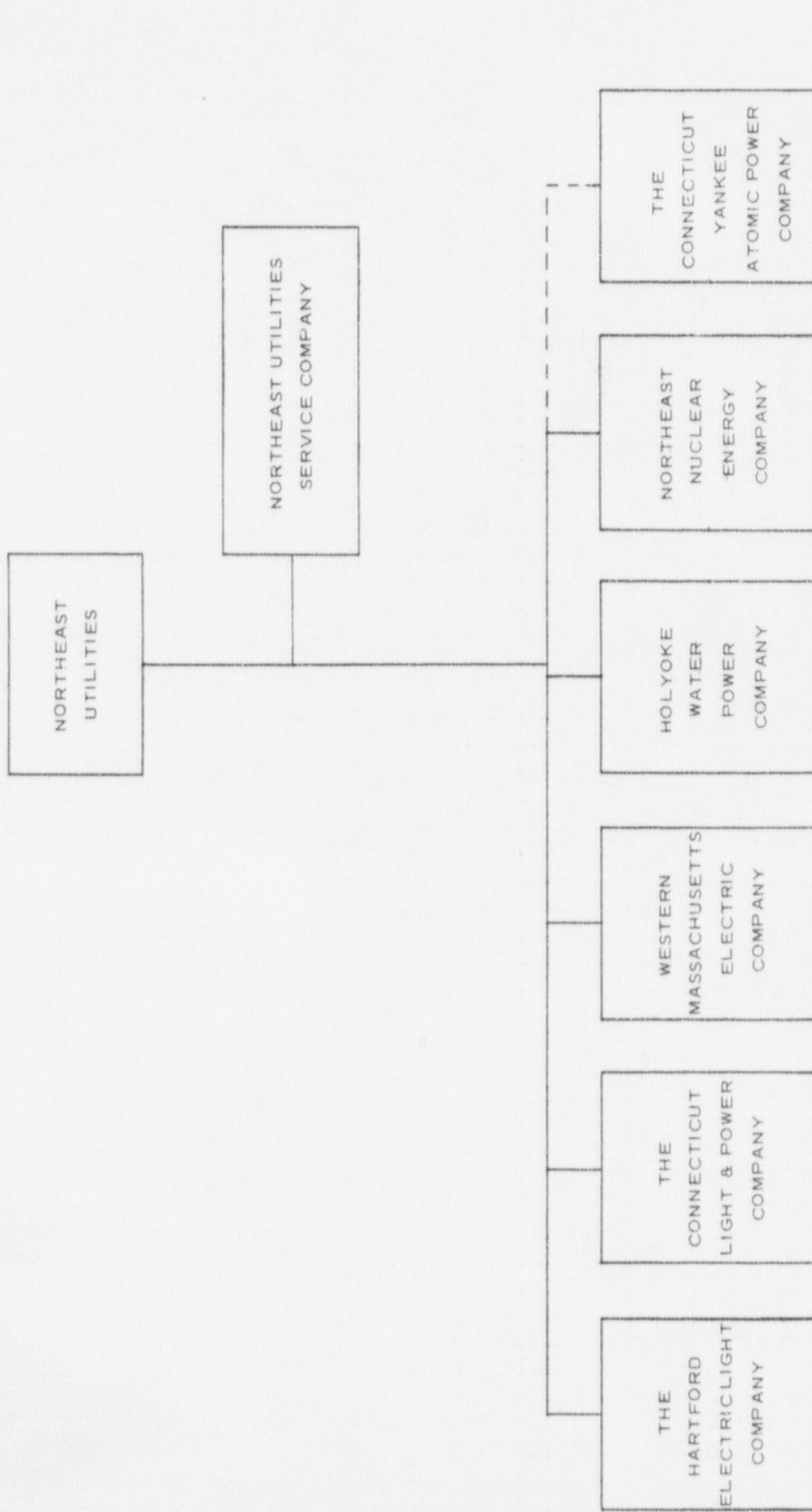
The NUPOC Quality Assurance Supervisor reporting to a NUPOC Superintendent, is responsible for verifying implementation of the NU Quality Assurance Program requirements at the in-service nuclear power plants and at assigned pre-service plants, for all those quality affected activities commencing with system turnover. He also provides station management and the Manager, Quality Assurance with objective information concerning quality, independent of the individual or group directly responsible for performing the specific activity.

He has the authority and organizational freedom, is sufficiently removed from undue cost and schedule influences and responsibilities to perform his quality assurance functions effectively, including:

- a. Stop unsatisfactory work and control further processing, delivery of nonconforming materials as delineated in writing;
- b. Identifying quality problems;
- c. Initiating, recommending or providing solutions, and;
- d. Verifying implementation of solutions.

1.4.3 Purchasing

The Purchasing Managers are responsible to the Vice President Purchasing and Stores for the procurement of materials and services from qualified suppliers, in accordance with predetermined commercial, technical, quality requirements; issue NUSCO Purchase Orders/Contracts and changes thereto; and maintains traceability of purchasing records from NUSCO/NUPOC, initiation of purchase requisitions through to payment for the purchased item. The Vice President Purchasing and Stores controls quality related purchasing procedures.



NORTHEAST UTILITIES ORGANIZATION

— DIRECT CONTROL

- - - OPERATIONAL CONTROL

FIGURE 1.1

NORTHEAST UTILITIES

ORGANIZATIONAL RELATIONSHIP BETWEEN NUSCO PERSONNEL HAVING QUALITY RELATED FUNCTIONS

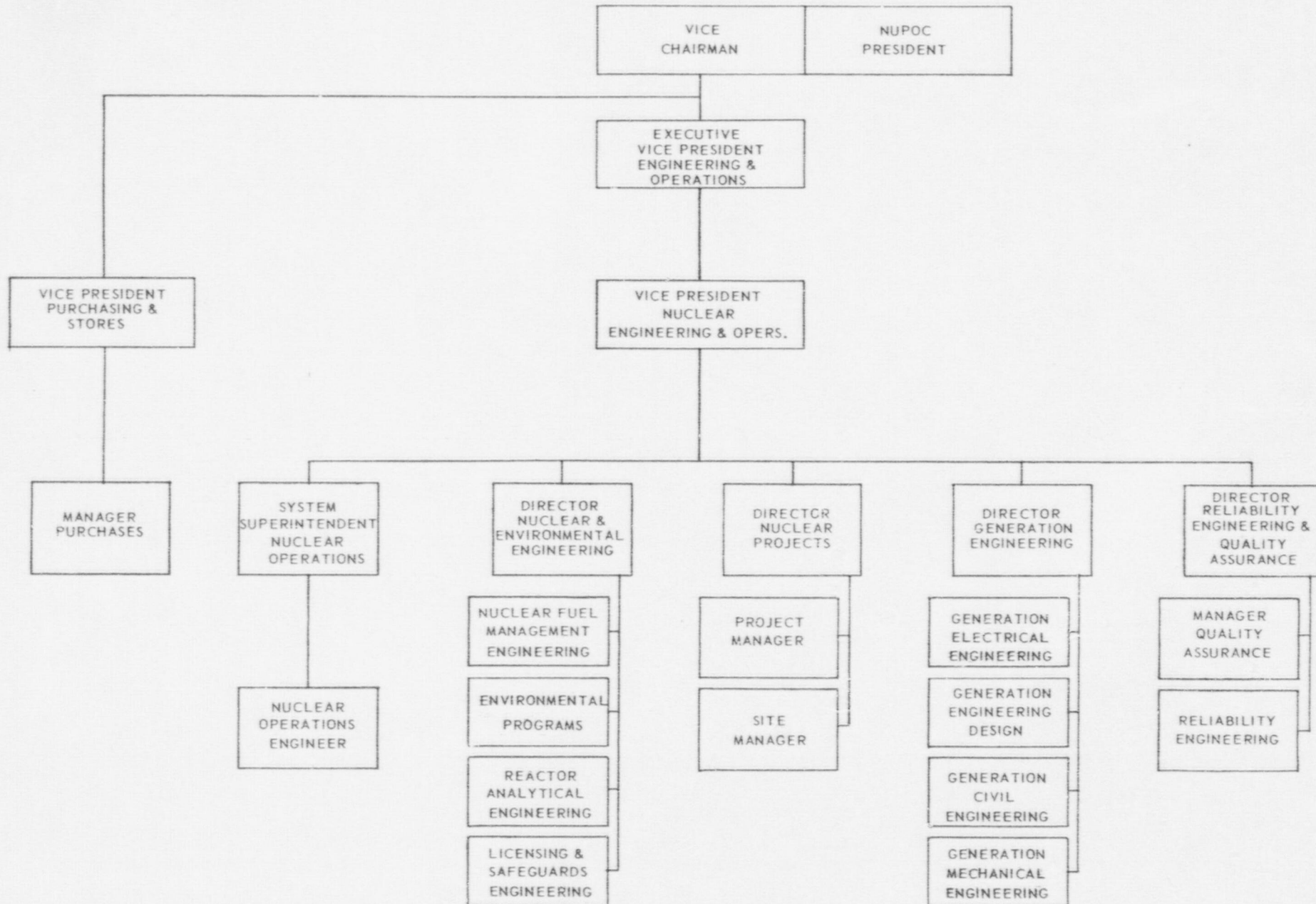


FIGURE 1.2

2.0 QUALITY ASSURANCE PROGRAM

2.1 GENERAL REQUIREMENTS

Northeast Utilities (NU) has established a Quality Assurance Program (QAP) which complies with the criteria of 10 CFR 50, Appendix B, and follows the guidance referred to in Appendix D of this report. The quality assurance requirements set forth herein and the attached Policy Statement, supplemented by the Quality Assurance Procedures, provide the primary basis of the Program and the NU Policy with regard to quality assurance. This Program is established for each plant site in a manner intended to accomplish the required level of quality and is carried out throughout the life of nuclear power plants. This includes quality related activities initiated prior to submittal of the Preliminary Safety Analysis Report (PSAR), such as design and procurement, preparation of the PSAR, and safety related site preparation activities. It also includes quality related activities during the operation, maintenance and modification of the in-service nuclear power plants.

The requirements of the NU QAP apply, as a minimum, to nuclear safety related systems, structures and components as functionally identified in Appendix A, "Category I Systems, Structures and Components", and other items or services which are specifically identified by NU in each license application submitted to the NRC.

The requirements of the Program are implemented by Northeast Utilities Service Company (NUSCO), Nuclear Plant Operating Companies (NUPOC), the engineer-constructor, (NUSCO) contractors, suppliers and engineering service organizations performing activities affecting the quality of safety related systems, structures and components of nuclear power plants.

Procedures define the required indoctrination and training of personnel performing activities affecting quality, as necessary, to assure that suitable proficiency is achieved and maintained.

Training sessions are documented, the content described, who attended, when they attended and the results of the training sessions.

A periodic program review of the status and adequacy of the NU QAP is accomplished by Quality Assurance Department audits and by the independent audit team described in QAP 1.0, Section 1.2.2. Organizations outside NU participating in the Program are required to review the status and adequacy of that part of the NU QAP which they are executing. The Quality Assurance Department reviews the quality assurance program of engineer-constructors, NUSCO contractors, suppliers and engineering service organizations.

2.2 IMPLEMENTATION

2.2.1 Goals and Objectives

As stated in the Policy Statement of NU, the goals of the NU QAP are to maintain quality levels in an effective and efficient manner and to assure a high degree of functional integrity and reliability of nuclear safety related systems, structures and components. To meet this goal, the following objectives of the NU QAP have been defined:

- a. Define through documented procedures, the quality activities that apply to the design, fabrication, procurement, construction, testing, operation, refueling, maintenance, repair and modification of nuclear power plants;
- b. Establish, assign and document the responsibilities for the conduct of those activities affecting quality of the safety related systems, structures and components;
- c. Establish confidence that (a) the design, fabrication, construction and operation of nuclear power generation facilities are performed in a manner consistent with NU Policies and (b) quality related activities are performed by responsible personnel through a system of audits of those organizations with quality related responsibilities;
- d. Appraise management of quality related unresolved problems and trends which could have a significant effect on nuclear power plant safety and;
- e. Prevent schedule delays and high cost due to poor quality.

2.2.2 Program Documentation

This topical report on the NU QAP defines the NU nuclear policies, goals and objectives, and is used as guidance for the development of the various implementing departmental procedures. Revisions to the NU QAP Topical Report will be made as needed to reflect current requirements and descriptions of activities. These revisions will be made in accordance with a Quality Assurance Department Procedure. If a regulatory commitment reflects a deviation from the NU QAP Topical Report, an amendment shall be submitted to the Nuclear Regulatory Commission (NRC) thirty (30) calendar days prior to implementation.

Quality Procedures are developed by the department with major responsibilities for a quality related activity.

These procedures are reviewed by all departments which assume responsibility for some portion of that procedures, are approved by the major implementing departments and are reviewed by and concurred with the Manager, Quality Assurance for compliance to the NU QAP. As the NU QAP develops and responds to new or revised requirements and guidance, procedures are developed or revised.

Each NUSCO Department Head/Nuclear Plant Operating Companies (NUPOC) Superintendent is responsible for implementation of the NU QAP which includes individual departmental procedure requirements applicable only to his respective activities. In addition, he is responsible for the preparation, approval and distribution of those instructions, operating procedures, testing procedures or other instructions where further guidance is necessary.

2.2.3 Systems, Structures and Components

The requirements of the NU QAP shall apply, as a minimum, to nuclear safety related systems, structures and components, as addressed in the Safety Analysis Reports (SAR). Safety related systems, structures and components are functionally identified in Appendix A of the NU QAP Topical Report and also specifically identified in Section 3 of each License Application submitted to the NRC.

The degree of control over activities affecting the quality of safety related systems, structures and components is consistent with their importance to safety. Such controls include use of appropriate equipment, establishment of suitable environmental conditions and assurance that all prerequisites for a given activity have been satisfied. The Program provides for controls over special processes and skills necessary to attain the required quality, and the need for verification of quality by inspection and test.

2.2.4 Participating Organizations

The NU organizations with responsibilities for activities affecting quality of nuclear safety related systems, structures and components are identified in QAP 1.0, which also briefly describes their assigned responsibilities.

The Quality Assurance Department is responsible for: a) the development, coordination, and control of the NU QAP including coordination of Quality Assurance Department Procedure review and approval; b) control and issuance of the NU QAP Topical Report as a controlled document (as described in QAP 6.0) and; c) review and concurrence with

quality related procedures written by other department and revisions thereto. Procedure reviews will be performed in accordance with QAP 5.0.

NU shall require that their engineer constructor, Nuclear Steam Supply System Supplier (NSSS) suppliers, and contractors shall invoke upon their subcontractors, via procurement documents, requirements for a quality assurance program to meet the applicable criteria of Appendix B to 10 CFR, Part 50, including the applicable elements of the Regulatory Guides and their endorsed Standards identified in Appendix D of the Topical Report. However, NU retains overall responsibility for the Program. The specific quality related activities performed by these organizations are specified in the procurement documents. The Quality Assurance Department reviews and approves these organization's quality assurance programs prior to initiation of contracted activities, and audits subsequent activities for compliance to their procedures.

The object of the review is to verify that the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations have an adequate quality assurance program to meet the applicable requirements of the NU QAP; or that an acceptable alternative to NU QAP requirements is described and documented.

In addition to the initial review, the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations quality assurance programs shall be periodically audited by the Quality Assurance Department to assure continued implementation of quality requirements.

After system construction by the engineer constructor, a program is initiated with a system turnover to NUPOC. A formal test program is prepared to provide assurance that all systems and equipment function in accordance with design specifications.

The formal test program is described in a startup test manual which describes the administrative organization and procedure which will be followed, during the phaseout of design and construction, preoperational testing and plant turnover. It demonstrates control of quality related activities including management and technical interfaces among the architect-engineer, constructor, NSSS Supplier and NUPOC.

During operation, contractors may be delegated the execution of quality assurance functions by contract. These contracts are reviewed and approved in accordance with NU QAP requirements.

2.2.5

Indoctrination and Training

A program is established and maintained for quality assurance indoctrination and training which provides confidence that the required level of personnel competence and skill is achieved and maintained in the performance of quality related activities. Quality procedures delineate the requirements for an indoctrination program to assure that personnel responsible for performing quality activities are instructed in the purpose, scope and implementation of quality related procedures and instructions and that compliance to these documents is mandatory. The Manager, Quality Assurance is responsible for the indoctrination of nonsupervisory personnel within his department who perform quality related activities.

This program also requires the head of each department (including the Quality Assurance Department) to be responsible for a training plan which assures that personnel performing quality related activities are trained in the principles and techniques of the activity being performed. The proficiency of personnel is maintained in the skills necessary to perform quality related activities through retraining, requalification or re-examination, as appropriate.

2.2.6

Management Participation

NUSCO Department Heads/NUPOC Superintendents are responsible for implementing the NU QAP Topical Report within their Departments/Plants. The Manager, Quality Assurance will assist in development, coordination and review of the Program.

A management review of the Program is conducted on an annual basis, by an independent audit group, to assess the scope, status, implementation, effectiveness and to assure compliance to NRC licensing commitments. The Management Review Committee is appointed by the NUSCO Vice President of Nuclear Engineering and Operations. He ensures that deficiencies are tracked and resolved, and advises upper management of the results of the audits.

The following actions are instituted by the Review Committee to assure that the NU QAP meets its published responsibilities:

- a. The Review Committee will review documents comprising changes to the NU Quality Assurance Program to assure compliance to the NU QAP Topical Report;
- b. The Review Committee utilizes results of audits conducted by the NRC or other departments to determine

whether or not any adverse trends exist, and ascertain if further attention is required by management;

- c. The Review Committee's findings of deficiencies and recommendations for program improvement are forwarded to the NUSCO Vice President Nuclear Engineering and Operations, who will ensure appropriate corrective action is taken.

The quality assurance programs of the engineer-
constructor, NUSCO contractors, suppliers and engineering
service organizations that perform quality related activities
are reviewed by the Quality Assurance Department to
assure that contractors management regularly reviews the
status and adequacy of their part of the NU QAP.

3.0 DESIGN CONTROL

3.1 GENERAL REQUIREMENTS

The Nuclear Engineering and Operations Group or the appropriate Nuclear Plant Operating Companies (NUPOC) are responsible for controlling design work and administering design control activities (including design interface) and design modifications for nuclear safety related systems, structures and components and systems defined in the "Category I Systems, Structures and Components List" (Appendix A).

The Northeast Utilities (NU) Quality Assurance Program (QAP) for design is established to assure that the applicable design requirements, such as design bases, regulatory requirements, codes, technical standards and quality standards are identified in design documents and their selection reviewed, approved and controlled in accordance with established procedures. Such controls include review for suitability of application of materials, equipment, parts and processes that are essential to the safety related functions of the systems, structures and components. Changes to and deviations from specified requirements are identified, documented and controlled.

Northeast Utilities Service Company (NUSCO) has the ultimate responsibility for design control program implementation for plants presently under construction and for proposed plants. NUPOC has the responsibility for design control program implementation for operating plants unless they elect to appoint NUSCO to perform a modification. NUSCO AND NUPOC may delegate to other organizations the work of establishing and executing the design control program or any part thereof, but retains the ultimate responsibility, for the program.

The interface controls, both internal and external, for organizations performing design work for safety related systems, structures and components are identified and implemented in accordance with documented procedures. This identification includes those organizations providing criteria, designs, specifications and technical direction.

Measures are applied to verify the adequacy of design. The extent of design verification is specified and documented by the responsible organization. The verification process is performed by individuals or groups other than those who performed the original design, but who may be from the same organization. Where changes to previously verified designs have been made, design verifications are required for the change, including evaluation of the effects of those changes on the overall design. Design verification may be accomplished by testing. Tests to demonstrate adequacy under adverse design conditions shall comply with the requirements of QAP 11.0, "Test Control". Design errors and deficiencies which adversely affect safety related systems, structures and components in the design process are docu-

mented, and appropriate corrective action is taken. These design errors and deficiencies are documented in accordance with design change procedures or as defined in QAP 15.0.

3.2 IMPLEMENTATION

The Nuclear Engineering and Operations Group or NUPOC is responsible for the design, design review, engineering approval of design changes, design evaluation and design control of nuclear power plants. The function may be delegated to other organizations to perform the design activity, or any part thereof, but the responsibility for overall design remains with the Nuclear Engineering and Operations Group or NUPOC. In all cases, final engineering decisions and ultimate design control of systems, structures and components related to nuclear power plants is the responsibility of NUSCO Nuclear Engineering and Operations Group/NUPOC.

The Quality Assurance Department performs audits/ surveillances/- inspections to verify that the engineer-constructor, NUSCO contractors, suppliers, engineering service organizations and NU Departments are effectively complying with their QAP requirements for design control.

3.2.1 Design Process

Design control measures are applied to design analyses, such as, reactor physics, stress, thermal, hydraulic, nuclear radiation, accident and seismic analyses; compatibility of materials; accessibility for in-service inspection, maintenance, and repair; and delineation of acceptance criteria for inspections and tests. Measures established to control design documents are described in QAP 6.0.

Program procedures and instructions define the method for implementing design control measures. These measures require that applicable design requirements, such as, design bases, regulatory requirements, codes and standards, are translated into specifications, drawings, procedures or instructions. Instructions further require that appropriate quality standards are specified and included in design documents. All materials, equipment, parts and processes, including standard "off the shelf" commercial or previously approved items essential to the safety related functions, are selected and reviewed for suitability of application. The basis for selection may include industry standards, material and prototype hardware testing programs, and design reviews.

3.2.2 Design Change Control

Procedures and instructions governing design change control during construction, modifications to operating plants, control of discrepant or deficient design conditions, and reported unsatisfactory performance, provide

for the identification of the need for design changes and a documented method to control these changes. Design and specification changes are subject to design control measures commensurate with those applied during the original design.

Prior to receipt of an operating license, an independent review and approval of design changes is performed by the organization that conducted the original design reviews, unless NUSCO designates another qualified organization to perform this function.

Subsequent to receipt of an operating license, proposed safety related design change/modifications are submitted to the in-service units management for processing and review. This review includes the Plant Operation Review Committee (PORC)/Site Operations Review Committee (SORC). PORC/SORC is advisory to the appropriate NUPOC Superintendents on matters relating to nuclear safety. Its composition, responsibilities, and authority are defined in Section 6 of each in-service unit Technical Specifications. NUPOC QA personnel can be represented at the PORC/SORC Committees if assigned by the appropriate NUPOC unit Superintendents. If the change involves a Category I, system, structure or component, the change will be reviewed by qualified engineering personnel for technical adequacy. First review of the design change requests is performed by the Nuclear Review Board/Environmental Review Board on unreviewed safety/environmental question. These independent reviews are performed to assure that:

- a. the adequacy of the proposed change is determined;
- b. unreviewed safety questions are properly identified and handled per 10 CFR 50.59;
- c. nuclear safety/environmental requirements have been considered.

Errors and deficiencies in design, including the design process, that could adversely affect safety-related structures, systems, and components are documented and corrective action is taken to preclude repetition.

3.2.3 Design Interface Control

During design, construction or modifications by NUPOC of nuclear power plants, the Nuclear Engineering and Operations Group is responsible for review, coordination and documentation of design interfaces. Engineering procedures provide the method for identification of design interfaces, design interface changes, and modifications affecting drawings and documents.

During plant design and construction phases, control of interfaces may be delegated to the engineer-constructor and/or the Nuclear Steam Supply System (NSSS) supplier.

During the operations phase, procedures and instructions identify design interfaces which are controlled by the appropriate NUPOC Superintendent. Resolution of design interface questions are documented.

3.2.4 Design Verification

Original designs and design modifications are reviewed for adequacy and the sign-off performed by a person other than the originator of the design. Design reviews are documented in accordance with procedures or instructions. Simplified calculations or computer models/codes may be utilized as alternate means of design verification. When design verification is performed by testing, the tests are performed using approved procedures, which specify the authority and responsibility of design verification personnel. Ultimate responsibility for design adequacy and evaluation is retained by NUSCO/NUPOC, as appropriate.

Particular emphasis is placed on assuring that designs are in conformance with applicable codes, and on selecting the proper design verification or checking method. Procedures and instructions provide the requirements and necessary controls for design verification. These controls include a review to assure that design characteristics can be controlled, and verification that there is adequate accessibility for inspection or test, and that inspection and test acceptance criteria are incorporated. During the operations phase, documentation of reviews is provided.

During the design and construction phases, the NUSCO project engineer maintains the ultimate responsibility for the design documents generated by the engineer-constructor, NSSS supplier and other NUSCO departments. The evaluation of selected documents by projects engineers may be accomplished with assistance from other NUSCO departments concerned with the equipment/subject covered by the document being evaluated.

The project engineer is responsible for the resolution of NUSCO comments on specifications and drawings issued by the engineer-constructor, NSSS supplier, and other NUSCO contractors.

4.0 PROCUREMENT DOCUMENT CONTROL

4.1 GENERAL REQUIREMENTS

The procurement of materials, equipment, parts and/or services required during the design, construction, operation and maintenance of Category I systems, structures and components in nuclear power plants is performed in a controlled manner which assures compliance with applicable regulatory requirements, procedures, quality assurance standards and regulations affecting procurement documents. Changes to procurement documents are subject to the same degree of control as utilized in the preparation of the original documents.

4.2 IMPLEMENTATION

4.2.1 Program

A Nuclear Project Manager and a Nuclear Project Engineer is selected and a Project Team is formed under the Director, Nuclear Projects for each new nuclear power plant project. The Northeast Utilities Service Company (NUSCO) Nuclear Project Engineer by procedure coordinates the preparation, review and approval and records of NUSCO procurement documents for Category I material, equipment, parts or services. The review and approval cycle of procurement documents initiated by NUSCO includes: the appropriate section of Generation Engineering for technical adequacy; the Manager, Quality Assurance for inclusion of quality assurance requirements, as and the appropriate Project Manager.

A project engineer is selected for each modification to a nuclear power plant. The project engineer coordinates the preparation, review and approval of procurement documents for Category I material, equipment, parts or services, for technical adequacy and inclusion of quality assurance requirements.

During the operations phase of nuclear power plants, Nuclear Plant Operating Companies (NUPOC) Purchase Requisitions are reviewed for technical adequacy and verification of the "QA Category I" designation. The appropriate NUPOC Superintendent reviews and approves Category I NUPOC Purchase Requisitions and forwards them to quality assurance personnel for inclusion of quality assurance requirements.

During design, construction, preoperational testing and operation of nuclear power plants, and modifications thereto, the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations utilized by NUSCO/NUPOC are responsible to implement measures for control of procurement documents associated with Cate-

gory I material, equipment, parts and services to ensure applicable requirements including quality assurance requirements are specified. The NUSCO Quality Assurance Department performs on and off-site audits/surveillances/inspections to ensure organizations utilized by NUSCO are effectively complying with their requirements for the control of procurement documents.

Changes to procurement documents, whether initiated by NUSCO/NUPOC or their representative, are subjected to the same degree of control as that utilized in the preparation of the original document. Procurement documents for the purchase of spare or replacement parts for safety related systems, structures and components are subject to controls equivalent to original code and standard requirements or to subsequent code and standard revisions.

QA review of procurement documents determine that:

- a. The quality requirements are correctly stated, inspectable and controllable;
- b. There are adequate acceptance and rejection criteria;
- c. The procurement document has been prepared, reviewed, and approved in accordance with the NU QA program requirements.

4.2.2

Procurement Document Provisions

Procurement documents are prepared, reviewed and approved in accordance with approved procedures of the issuing organization or department and are documented prior to release and available for verification. These procedures require that procurement documents consist of the following, as necessary:

- a. The scope of work to be performed;
- b. Technical requirements (specified or referenced) including the applicable components and materials identification requirements, drawings, specifications, procedures, instructions, codes and regulations, and provide for identification of applicable test, inspection and acceptance requirements, or special process instructions;
- c. Quality Assurance Program requirements to be imposed on contractors which include the applicable requirements of 10 CFR 50, Appendix B, and the NRC regulatory position contained in the Regulatory Guides and their endorsed ANSI Standards listed in Appendix C of this Topical Report;

- d. Right of access which provides, as appropriate, for access to contractor facilities and records for inspection or audit by NUSCO or its designated representative, and to access for events such as notification and hold points;
- e. The documentation required to be prepared, maintained, and/or submitted to NUSCO/NUPOC or its representative for review, approval or historical record. The time of submittal of this documentation and the retention and disposition of Quality Assurance records which are not submitted to NUSCO/NUPOC is prescribed.

4.2.3 Selection of Procurement Sources

If the engineer-constructor, NUSCO contractor or supplier is not delegated the function of procurement source selection, the NUSCO Purchasing Department verifies that the procurement document has been reviewed and approved, and that the supplier has been approved for Category I procurement prior to issuing the purchase order for Category I material, equipment, parts and services. Supplier approval is not required for the procurement of nonengineered items which are:

- a. Relatively simple and standard in design, manufacture, and test (i.e., off the shelf item, the catalog number is in effect, a specification which controls the manufacture of the item) and;
- b. Adaptable to standard or automated inspections and/or tests of the end product to verify quality characteristics after delivery and;
- c. Of such a nature that product acceptance inspections/test performed upon receipt of items do not require operations which could adversely affect the integrity, function, or cleanness of the item.

Procurement documents may be issued to organizations with quality assurance programs that are unapproved by NUSCO Quality Assurance Department with the approval of the NUPOC Superintendents, or the cognizant Director or Superintendent within the Nuclear Engineering and Operations Group who ensures procurement documents to unapproved organizations contain detailed supplementary quality assurance requirements to meet NUSCO requirements. Procurement documents are reviewed by NUSCO Quality Assurance Department to ensure appropriate quality assurance requirements are specified. These requirements included in the procurement document as necessary, include audits and inspections at the suppliers facilities with scheduled witness/hold points and acceptance criteria

during fabrication and process of the procurement item.
Acceptance inspection and tests determined by NU shall be
performed after receipt at NU but prior to operation.

5.0 PROCEDURES, INSTRUCTIONS, AND DRAWINGS

5.1 GENERAL REQUIREMENTS

The Northeast Utilities (NU) Quality Assurance Program (QAP) provides measures for the preparation, review, approval, control and distribution of procedures, instructions and drawings of activities affecting quality of Category I systems, structures and components during design, construction, preoperational testing and operation of nuclear power plants. These documents include appropriate quantitative and qualitative criteria which specify the activity to be performed, the methods of construction and testing to be employed, material, equipment or parts to be used, a sequence of operation and the required documentation.

5.2 IMPLEMENTATION

Quality related procedures provide direction for personnel performing safety related functions. The Northeast Utilities Service Company (NUSCO) Manager, Quality Assurance/designee, reviews and concurs with quality related procedures originated by other departments. Comments concerning compliance with the NU QAP Topical Report and regulatory requirements are resolved. The Quality Assurance Department receives controlled copies of quality related procedures issued by other departments. During the design, construction and procurement phases, the engineer-constructor, NUSCO contractors, suppliers, and engineering service organizations may be delegated responsibility for preparing maintaining, issuing and verifying the implementation of appropriate program documents which are selectively reviewed/approved by the appropriate Nuclear Plant Operating Companies (NUPOC) Superintendent or NUSCO Site Manager/NUSCO Nuclear Project Engineer, as appropriate. In this case, the Quality Assurance Department performs on-site and off-site audits/surveillances/inspections of the quality assurance programs to ensure the engineer-constructor, NUSCO contractor, suppliers and engineering service organizations are effectively complying with their requirements for procedures and instructions. Contractor programs are required to clearly delineate the actions to be accomplished in the preparation, review and control of procedures, instructions and drawings and the methods for complying with 10 CFR 50, Appendix B.

5.2.2 Procedures and Instructions

Procedures and instructions for activities affecting quality are prepared, reviewed, and approved in accordance with written procedures and instructions.

During the design and construction phase, the NUSCO Site Manager/NUSCO Nuclear Project Engineer ensures that NUSCO contractors, suppliers and engineering service organizations implement quality assurance programs which contain written instructions for preparation, review and approval of procedures and instructions affecting quality. In

addition, Contractor's site quality related, construction procedures and quality control inspection procedures are reviewed for concurrence by the Quality Assurance Department to assure compliance with the Program.

The NUPOC organization is responsible, during the preoperational test and in-service phase, for the preparation, review and approval of plant quality related procedures. These procedures include preoperational and startup test procedures which are prepared, reviewed and approved in accordance with an approved Startup Manual, and overall site administrative procedures which implement the requirements of the NU QAP. Each NUPOC organization is also responsible for the preparation, review and approval procedures covering safety related activities in accordance with individual license requirements. The applicable NUSCO/NUPOC Quality Assurance Organizations reviews and concurs with inspection plans, test, calibrations and special process procedures, specifications, and changes thereto.

5.2.3 Drawings

The design control and verification measures described in QAP 3.0, are applicable for the review and approval of drawings. The Nuclear Engineering and Operations Group, during design and construction phase, or the appropriate NUPOC Superintendent, during the preoperational test and in-service phase of the nuclear power plants, has the ultimate responsibility for review and approval of new drawings or modifications to existing drawings. The originating organization may delegate to other organizations or departments the work of design and review activities, or any part thereof, but retains ultimate responsibility for this work.

5.2.4 Acceptance Criteria

Cognizant Department Heads review and approve departmental procedures, instructions and drawings to ensure the inclusion of adequate quantitative and qualitative criteria, as appropriate, for determining satisfactory work performance and quality compliance. These criteria apply to activities such as design, operations, test control, inspection and plant modifications.

6.0 DOCUMENT CONTROL

6.1 GENERAL REQUIREMENTS

The Northeast Utilities (NU) Quality Assurance Program (QAP) provides measures to assure controlled distribution of documents pertinent to Quality Assurance for the design, construction, preoperational testing, operation and major modification of nuclear power plant safety related systems, structures and components in accordance with NUSCO/NUPOC Quality Assurance Procedures and 10 CFR 50, Appendix B.

Documents such as procedures, instructions, drawings, specifications and reports are prepared, reviewed for appropriate qualitative and quantitative criteria, and approved by authorized personnel in the affected organization. Approved controlled documents are distributed to affected locations in accordance with controlled distribution lists. Modifications to controlled documents are reviewed and approved by the same organization which performed the original review and approval, unless otherwise specified in the implementing procedures. Measures are provided for controlling documents to preclude the possibility of the use of outdated documents.

6.2 IMPLEMENTATION

6.2.1 Responsibility

NU Department Procedures and Instructions delineate the measures for controlling documents including direction for the review for adequacy, approval by authorized personnel, distribution of controlled documents and verification that changes are promptly incorporated and implemented. These control measures apply to documents affecting the quality of nuclear safety related systems, structures and components during design, construction, preoperational testing, operation and major modifications thereto such as:

- a. Design Specifications;
- b. Design, Manufacturing, Construction and Installation Drawings;
- c. Quality Assurance Program Manuals, Procedures and Instructions;
- d. Manufacturing, Inspection and Testing Instructions;
- e. Test Procedures;
- f. Preliminary Safety Analysis Report;

- g. Facility Description and Safety Analysis;
- h. Final Safety Analysis Report;
- i. Procurement documents;
- j. Design Change requests;
- k. Topical Report;
- l. Nonconformance Reports;

The requirements for control of procurement documents are contained in QAP 4.0. During all phases of plant life, it is the responsibility of each organization issuing controlled documents to employ document control procedures. The issuing organization is additionally responsible for distribution of the documents to appropriate locations. There shall be provisions to assure that approved changes are included in instructions, procedures, drawings and other documents prior to implementation of the changes.

During the design and construction phase, the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations are responsible for implementing measures for review, approval, control and distribution of controlled documents, to ensure they are effectively complying with the requirements for document control. The Quality Assurance Department performs periodic on-site and off-site audits/surveillances/ inspections of the engineer-constructor, NUSCO contractors, suppliers and engineering services organizations to verify compliance with their approved quality assurance programs.

6.2.2 Distribution of Controlled Documents

NU Department Procedures, specify in what manner controlled documents and revisions thereof, are distributed to appropriate locations, prior to commencing the work.

6.2.3 Drawing Control

During the preoperational test and the in-service phases of nuclear power plants, the NU Nuclear Records Organization is responsible to implement a program, as per approved procedures, for the retention and retrieval of drawings and records submitted by the cognizant NUSCO nuclear project/Nuclear Plant Operating Companies (NUPOC) personnel. The NU Nuclear Records Organization maintains a drawing status file for in-service units which includes drawings newly issued or revised with latest revision and current status.

The engineer-constructor, NUSCO contractors, suppliers and engineering service organizations utilized by NUSCO/NUPOC during the design, construction and major modification to nuclear power plants may be delegated the function of drawing control and must furnish periodic status reports listing the revisions of applicable drawings which they issue.

The Quality Assurance Department performs on-site and off-site audits/surveillances/inspections of contracted firms to verify they are effectively complying with their programs for document control of drawings.

If the engineer-constructor, NUSCO contractor or supplier is not delegated the function of drawing control, the NUSCO Nuclear Project Engineer is responsible for the distribution of drawings to appropriate NUSCO/NUPOC personnel in accordance with controlled distribution lists.

6.2.4 Instruction and Procedure Control

During the design and construction phase, the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations are responsible for control of quality related procedures and instructions issued by them. The Quality Assurance Department performs on-site and off-site audits/surveillances/ inspections of the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations quality assurance programs to ensure they are effectively complying with their program for control of procedures and instructions.

During all phases of plant life, the originating NU department is responsible for establishing adequate control over quality related procedures and instructions issued by them. The responsible organization also issues status reports or revised indices listing the latest revision of applicable controlled documents issued by them.

7.0 CONTROL OF PURCHASED MATERIAL, EQUIPMENT AND SERVICES

7.1 PURPOSE

Measures for the control of procured material, equipment, parts and services by or for Northeast Utilities (NU) related to the safety of nuclear power plants are established and imposed by the Quality Assurance Program (QAP) during design, construction, preoperational testing, operation, maintenance and major modification, to ensure conformance to procurement documents. These measures include provisions for source evaluation and selection, submission of objective evidence by the contractor or sub-contractor, inspection at the supplier source and examination of items upon delivery. Control of quality by contractors and sub-contractors is assessed for effectiveness at intervals consistent with the importance, complexity and quantity of the product or service.

7.2 IMPLEMENTATION

The word supplier is used in this section to designate what is otherwise described as the engineer-constructor, NUSCO contractor, supplier and engineering service organization.

The evaluation and selection of suppliers is performed in accordance with procedures, which specify that procurement source evaluation and selection measures exercised in determining, supplier capability and responsibilities of qualified personnel involved in the evaluation and selection process.

7.2.1 NU Quality Assurance Department utilizes one or more of the following methods in evaluating the qualifications of a potential supplier:

- a. Coordinated review of a potential supplier utilizing one or more departments (i.e., Engineering, Construction, Operations and/or Purchasing);
- b. A/E supplier evaluations;
- c. Coordinating Agency for Supplier Evaluation

Evaluations ensure that NU suppliers employ a quality assurance program that conforms to applicable portions of the NU QAP Topical Report. Documented evidence of the evaluation and acceptance of the supplier's quality assurance program is retained in the Quality Assurance Department Files. The determination of supplier approval is based on such factors as prior performance, historical quality performance data, source surveys or audits and evaluation of the supplier's quality assurance program.

Suppliers Certificates of Conformance are periodically evaluated by audits independent inspections, tests, to assure they are valid.

7.2.2 Source Inspection

The NUSCO Quality Assurance Department is responsible for the performance of source inspections at suppliers facilities to ensure that the requirements of NUSCO Purchase Order/Contract have been met.

Surveillances of suppliers are performed in accordance with written procedures which provide for:

- a. The method of surveillance and the extent of documentation required and those responsible for implementing those instructions;
- b. Surveillances of those items where verifications of procurement requirements cannot be determined upon receipt.

7.2.3 Receipt Inspection

If the supplier is not delegated the function of receipt inspection for procured items, it is performed under the direction of the NUSCO Nuclear Project Engineer/NUPOC Quality Assurance Supervisor in accordance with quality procedures which delineate requirements and responsibilities necessary to perform inspection functions. Contractual obligation fulfillment and quality assurance requirements are verified during receipt inspections.

Receiving inspection of supplier-furnished material, equipment, and services is performed to assure that material, components, equipment and acceptance records are inspected and judged acceptable in accordance with predetermined inspection instructions prior to installation or use. Receipt inspections include, as appropriate:

- a. Measures for verifying that the shipment is complete, properly identified, undamaged and corresponds with the receiving documentation;
- b. Measures for inspection of the item and review of supporting documentation (e.g., mill test reports, NDE reports) as required by the purchase documents;
- c. Measures for inspection and acceptance of items to inspection instructions;
- d. Measures for identifying and controlling acceptable items including identification of inspection status prior to release from the receiving inspection area;
- e. Measures for identifying, segregating and handling nonconforming items;

- f. Measures to ascertain that inspection records or certificates of conformance are available prior to release to construction/plant for installation.

7.2.4 Supplier Furnished Records

Records required to be furnished by the supplier are specified in the procurement document. Certifications or documentation verifying conformance, provided by the supplier, identify that all the specific procurement requirements have been met (either by reference to the purchase order or by delineation).

The supplier must furnish the following records as a minimum:

- a. Documentation that identifies the purchased material or equipment and the specific procurement requirements, (e.g., codes, standards and specifications) met by the items;
- b. Documentation that identifies any procurement requirements which have not been met, together with a description of those nonconformances dispositioned "accept as is" or "repair".

The responsible NU QA personnel shall review and accept these documents which pertain to the requirements in the procurement document, in accordance with NU QA Program, and its applicable procedures.

8.0 IDENTIFICATION AND CONTROL OF MATERIALS, PARTS AND COMPONENTS

8.1 GENERAL REQUIREMENTS

During the operations phase, NUSCO/NUPOC organizations assure that the identification of inspections, tests, and operating status of structures, systems, and components is known by affected organizations.

The Northeast Utilities (NU) Quality Assurance Program (QAP) provides measures for the identification and control of Category I material, parts and components, including partially fabricated assemblies, during design, construction, preoperational testing, operation, maintenance and major modifications thereto. To ensure that each item can be traced to associated documentation, the identification of the item is maintained by heat number, lot number, part number, serial number, or other appropriate methods, and is physically marked on the item and/or on records traceable to the item. Documentation associated with material, equipment, and components verify that these items have been designed, fabricated, manufactured, tested, and inspected in accordance with specified requirements. The object of these controls is to prevent the use of incorrect or defective material, parts and components, in accordance with 10 CFR 50, Appendix B.

8.2 IMPLEMENTATION

NUSCO/NUPOC Procedures establish the responsibilities and requirements for the identification and control of materials, parts and components. The procedures assure that identification and control is maintained throughout fabrication, receipt, handling, storage and installation of items. Provisions include:

- a. Requirements for traceability to appropriate documentation such as: procurement documents, manufacturing documents, drawings, specifications, certifications, inspection and test records, and nonconformance reports.
- b. Controls to assure that the correct identification of an item is verified and documented prior to release for fabrication, assembly, shipping or installation.
- c. Requirements which assure that the method or location of markings do not affect the function or quality of an item.
- d. Establishment of identification requirements in specifications, drawings, procurement documents, procedures or instructions.

During the design, construction, preoperational testing, operation, maintenance or modifications to nuclear power plants, Northeast Utilities Service Company (NUSCO)/Nuclear Plant Operating Companies (NUPOC) may delegate any portion of the implementation of the

identification and control program to the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations, as appropriate. If delegated, contracts require that the contractor establish an identification and control program which meets the NU QAP requirements. In this case the Quality Assurance Department/NUPOC Quality Assurance perform on-site and off-site audits/surveillances/inspections of the engineer-constructor, NUSCO contractors, suppliers, engineering service organizations and quality assurance program to ensure they are effectively complying with their requirements for identification and control of material, equipment and components.

During the preoperational testing and the in-service phase of nuclear power plants, receipt inspections are performed to verify that material, equipment and components are properly identified in accordance with procurement requirements. The NUPOC Quality Assurance Supervisor is responsible for assigning and applying permanent identification to the items in accordance with approved procedures. If the application of a serial number is not practical, other means of identification are implemented to assure proper identification and traceability.

In the event that the equipment, material or components are nonconforming or the identification becomes lost or illegible, the items are considered nonconforming and identified in accordance with QAP 15.0, until such time as identity can be re-established.

9.0 CONTROL OF SPECIAL PROCESSES

9.1 GENERAL REQUIREMENTS

The Northeast Utilities (NU) Quality Assurance Program (QAP) provides measures to assure control of special processes associated with Category I systems, structures and components by the use of qualified, approved procedures, equipment and personnel during design, construction, preoperational testing, operation, maintenance and major modifications to nuclear power plants.

Special processes are performed under controlled conditions in accordance with special requirements and may include, but are not limited to: welding, cleaning, heat treating, and nondestructive examination and/or testing.

9.2 IMPLEMENTATION

During design and construction of nuclear power plants the Northeast Utilities Service Company (NUSCO) Nuclear Project Engineer is responsible for ensuring that special process data and documentation is reviewed, and that NUSCO contractors and/or engineering service organization's special process procedures utilized at nuclear power plants are qualified and approved, and that personnel and equipment utilizing special processes are properly qualified. The Nuclear Plant Operating Companies (NUPOC) special process procedures utilized during preoperational testing, operation, maintenance, modification and refueling of the in-service nuclear power plant are prepared, reviewed and approved in accordance with procedures as specified in QAP 5.0.

During the design, construction, preoperational testing and operation phase of nuclear power plants the responsibility for control of special processes, when applicable, is delegated to the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations utilizing special process procedures which are approved. Personnel and equipment involved in special process procedures are qualified prior to the start of work. NUSCO Quality Assurance Department/NUPOC Quality Assurance personnel perform on-site and off-site audits/surveillances/ inspections to ensure the engineer-constructor, NUSCO contractors, suppliers, and engineering service organizations are effectively complying with their quality assurance program requirements for control of special processes.

9.2.1 Procedure Qualification and Control

NU Departmental Procedures specify that written process control documents are utilized and qualified, as required, in accordance with applicable specifications, codes or standards.

9.2.2 Personnel Qualification and Certification

Codes, standards and NUSCO/NUPOC specify personnel qualification/certification requirements. Personnel responsible for the performance and verification of special processes are trained, tested, and certified as required by applicable specifications, codes and standards. Requirements for the period of certification, retesting, and recertification of personnel are also specified. Contractors qualify personnel and maintain records of qualified personnel in accordance with applicable codes, standards, specifications, and contract or procurement document requirements.

During construction, the NUSCO Nuclear Project Engineer is responsible for the review of records of qualified personnel, equipment and procedures associated with special processes. During preoperational testing and operation of nuclear power plants, the NUPOC Quality Assurance Supervisor is responsible for the review of these records.

9.2.3 Special Process Records

Records provide objective evidence that special processes were performed in compliance with approved procedures, by qualified personnel, and that when required by procedures, specifications, and codes, such performance was verified. Results of nondestructive examinations are recorded in accordance with applicable specifications, codes and standards. These records are retained by the vendor or supplied to NUSCO/NUPOC as required by contract or purchase orders. If records are to be retained by the vendor, the contract or purchase order specifies the retention period and instructions for final disposition of records.

During construction, the NUSCO Nuclear Project Engineer is responsible for the review of documents for acceptance, and for assuring that documents for special processes utilized during construction are reviewed and accepted. During preoperational testing and operation, the NUPOC Quality Assurance Supervisor is responsible for the review for completeness of data and documentation associated with the performance of special processes.

Special process documentation such as: special process procedures, qualifying data, and personnel and equipment qualification records associated with the performance of special processes at nuclear power plants, are kept current and maintained in appropriate NUSCO/NUPOC files, with final disposition to the NU Nuclear Records Organization.

10.0 INSPECTION

10.1 GENERAL REQUIREMENTS

Inspection of activities to verify the quality of Category I systems, structures and components, which are performed by or for Northeast Utilities (NU), are executed in accordance with the Quality Assurance Program (QAP) and appropriate procedures, instructions and drawings by qualified personnel independent from the individual or group performing the activity being inspected. If inspection is impossible or disadvantageous, indirect controls by monitoring processing methods, equipment and personnel are provided. Inspection notification and hold points are identified, as required, in the applicable documents.

10.2 IMPLEMENTATION

10.2.1 Inspection Responsibilities

During the construction phase, the Quality Assurance Department performs audits/surveillances/inspections to verify that the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations are effectively complying with their quality assurance program requirements for inspection. The Quality Assurance Department also observes the performance of selected inspections on-site and at NUSCO contractors, suppliers and engineering service organizations facilities, associated with or specified as "hold" or "notification" points in procurement documents. In all cases audit/surveillance/inspection activities are performed as specified in written quality assurance procedures.

During the preoperational testing and the operations phase, qualified personnel representing NUSCO/NUPOC Quality Assurance shall review procedures for maintenance and modifications in order to determine the need for:

- a. Inspections (e.g., receipt inspections, installation, system turnover, and product acceptance);
- b. Identification of inspection personnel;
- c. Documentation of inspection results.

The NUSCO Quality Assurance Department/Nuclear Plant Operating Companies (NUPOC) Quality Assurance Supervisor performs audits/surveillances/inspections to verify that NUSCO contractors, suppliers and engineering service organizations are effectively complying with their quality assurance program requirements for inspection and for

performing/witnessing inspections at "hold" or "notification" points identified in NUSCO procurement documents. All audit/ surveillance/inspection activities are performed under requirements specified in written quality assurance procedures.

10.2.2 Inspection Plans and Schedules

Documented inspection plans may be either a separate document or an integral part of work instruction documents. The plans are based on design specifications, procurement documents, drawings, other specifications, or previous experience, as appropriate. Inspections are scheduled to assure that sufficient time and resources are available, and to assure inspections are not inadvertently omitted or bypassed.

10.2.3 Inspection Personnel and Inspection Document Access

- a. Inspections are performed by individuals other than those who performed or directly supervised the activity being inspected. Inspection personnel are qualified and/or certified in accordance with appropriate codes, standards, and/or NU training programs;
- b. Access to drawings, procedures, specifications or other documented criteria necessary for the performance of inspections is provided prior to performing the inspection activity.

10.2.4 Inspection Procedures

- a. Required inspections, surveillance, or monitoring activities are performed and documented according to written, approved procedures and/or checklists. Inspection procedures or checklists contain the following:
 - (1) Identification of characteristics to be inspected;
 - (2) Identification of the individual or groups responsible for performing the inspection;
 - (3) Acceptance criteria;
 - (4) A description of the method of inspection;
 - (5) A record of the results of the inspection;
 - (6) Record of inspector or data recorder.

- b. Written approved procedures specify surveillance or monitoring of processing methods, or testing and operation of equipment when inspection is impossible, inaccessible or not applicable.
- c. Modification, repair, replacement or rework items are inspected in accordance with original inspection requirements or approved alternatives.
- d. During the preoperational testing and the operations phase, inspection procedures are reviewed by Quality Assurance personnel to determine the need for an independent inspection and the degree and method, if such an inspection is required, and to assure the identification of inspection personnel and the documentation of inspection results, for procedure review requirements, see QAP 5.0.

10.2.5 Mandatory Hold and Notification Points

Mandatory hold points are utilized when an inspection/operation must be performed or witnessed and signed-off by the responsible personnel before work can proceed. Notification points are used to identify the operations or completed processes that NUSCO/NUPOC or its representatives may elect to witness and/or inspect during the manufacturing, construction, installation process. Mandatory hold and notification points, as required, are identified in procurement documents and procedures. These documents are subject to the review and concurrence of the NUSCO Quality Assurance Department/ NUPOC Quality Assurance for adequacy of inspection, notification and/or mandatory hold controls.

11.0 TEST CONTROL

11.1 GENERAL REQUIREMENTS

A documented test control program is established by the Quality Assurance Program (QAP) for Category I systems, structures and components to ensure that they will perform satisfactorily in service and that test results are documented in accordance with 10 CFR 50, Appendix B and other pertinent regulatory and/or technical requirements.

The test control program identifies the systems, structures and components to be tested, method of conducting tests, evaluation of tests and documentation of tests by qualified personnel to assure requirements have been satisfied.

The test control program is systematic and includes proof test prior to installation, construction tests, preoperational tests, start-up tests and retest following repairs, replacement or modification.

11.2 IMPLEMENTATION

11.2.1 Test Program

Test requirements to determine or to verify the capability of an item to meet specified requirements in accordance with engineering/design documents, Safety Analysis Report (SAR) documents, procedures or procurement documents, as appropriate, are accomplished by subjecting the item to a set of physical, chemical, environmental or operating conditions. Retest following repairs, replacement or modification is performed in accordance with the original design requirements or acceptable alternatives and is performed when original test results are invalidated.

Northeast Utilities (NU) Departmental Procedures are written and approved to delineate the methods and responsibilities for controlling, accomplishing and documenting testing during the construction, preoperational testing, maintenance, operation and modification of nuclear power plants.

During design, construction, preoperational testing, operation, maintenance and modification to nuclear power plants the engineer-constructor, Northeast Utilities Service Company (NUSCO)/Nuclear Plant Operating Companies (NUPOC) contractors, suppliers and engineering service organizations, as appropriate, are responsible for imple-

menting measures for the control of tests to ensure that Category I material, equipment and parts will perform satisfactorily. The Quality Assurance Department performs on-site and off-site audits/surveillances/inspections of selected proof tests when "notification" points have been identified in Purchase Order/Contracts of the engineer-
constructor, NUSCO/NUPOC contractors, suppliers and engineering service organizations to verify they are complying with their quality assurance program requirements for test control. Documentation associated with these observations are maintained by the Quality Assurance Department.

During the preoperational testing phase of nuclear power plants, preoperational and startup testing is conducted by qualified personnel in accordance with procedures prepared, reviewed and approved in conformance to a NUPOC startup manual.

During the in-service phase of nuclear power plants proof tests, product acceptance tests, retest, and periodic surveillance tests are conducted by qualified personnel in accordance with approved procedures. Personnel performing tests ensure that calibrated equipment and instrumentation utilized are within the calibration interval specified. Documentation including test procedures and approved data sheets are maintained in appropriate files.

11.2.2 Test Procedure Preparation and Test Performance

Testing is accomplished in accordance with approved test procedures which incorporate or reference the requirements and acceptance criteria in the applicable design and procurement documents. The test procedure or test program documents include the following as a minimum:

- a. Instructions for the testing method used;
- b. Required test equipment and instrumentation;
- c. Test requirements, such as acceptance and rejection criteria;
- d. Hold, notification, inspection and data collection points;
- e. Test prerequisites such as: calibrated instrumentation; trained, qualified, and licensed or certified personnel; preparation, condition and completeness of item to be tested; suitable and controlled environmental conditions;

- f. Methods for documenting or recording test data and results;
- g. Provisions for data collection and storage.

11.2.3 Evaluation of Test Results

The documented test results are evaluated against the predetermined acceptance criteria by an individual or group having appropriate qualifications. The acceptance status of the test is documented. Deficiencies noted during the evaluation are documented and dispositioned in accordance with approved procedures.

The evaluation of test results may also be delegated to other organizations. The evaluating organization is required to assure the use of qualified personnel, evaluate the data against predetermined criteria and document the results of the evaluation and acceptance status of the test. The Quality Assurance Department performs audits/surveillances/inspections to verify that these organizations are effectively complying with their quality assurance program requirements for test control.

12.0 CONTROL OF MEASURING AND TEST EQUIPMENT

12.1 GENERAL REQUIREMENTS

The Northeast Utilities (NU) Quality Assurance Program (QAP) provides measures for the control of measuring and testing equipment (M&TE) used as the basis for acceptance in activities affecting quality during inspection, testing and measurement of Category I material, equipment and parts. Periodic calibration and adjustment of measuring and test equipment is performed and controlled to assure accuracy is maintained within limits necessary to verify that design requirements have been met. Documentation is retained such that all items of M&TE are traceable to their calibration records.

12.2 IMPLEMENTATION

- 12.2.1 During the preoperational testing and the in-service phase of nuclear power plants, approved procedures delineate the methods and responsibilities for the control, maintenance and calibration of M&TE.

All documentation associated with M&TE is maintained in appropriate files, with eventual incorporation into the NU Nuclear Records Organization.

The engineer-constructor, NUSCO contractors, suppliers and engineering service organizations utilized by NUSCO/NUPOC during the design, construction, operation, maintenance and modification of nuclear power plants, as appropriate, are responsible for implementing measures for the control of M&TE to ensure they are properly calibrated, adjusted and maintained at specified intervals in order to maintain accuracy within required limits. The NUSCO Quality Assurance Department/ NUPOC Quality Assurance Supervisor performs on-site and off-site audits/surveillances/inspections of the quality assurance programs of the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations to verify they are effectively complying with their requirements for control of M&TE.

12.2.2 Calibration Standards

Measuring and test instruments are calibrated at specified intervals based on the required accuracy, purpose, degree of usage, stability characteristics, and other conditions affecting the measurement. Measuring and test instruments shall be labeled or tagged to indicate the next calibration date. Measuring and test equipment is calibrated at specified intervals based on the required accuracy, purpose, degree of usage, stability characteristics, and other conditions affecting the measurement.

Calibration of this equipment should be against standards that have an accuracy of at least four times the required accuracy of the equipment being calibrated or, when this is not possible, have an accuracy that assures the equipment being calibrated will be within required tolerance and that the basis of acceptance is documented and authorized by responsible management. In addition, the calibrating standards shall have greater accuracy than secondary standards being calibrated. Calibrating standards with the same accuracy may be used if they can be shown to be adequate for the requirements and the basis of acceptance is documented and authorized by responsible management. Implementing procedures describe the measures utilized in order to maintain the proficiency of the measuring and test equipment.

12.2.3 "Out of Tolerance" Control

M&TE and reference standards, when found out of tolerance are so identified and removed from service. A review is conducted to determine the validity of previous inspection or test results gained through use of the instrument, and of the acceptability of items previously measured or tested.

13.0 HANDLING, STORAGE AND SHIPPING

13.1 GENERAL REQUIREMENTS

Measures are established by the Northeast Utilities Quality Assurance Program using approved procedures, instructions and procurement documents to ensure proper handling, storage, shipping, cleaning and preservation of Category I material, equipment and parts. These measures are imposed during the design, procurement, construction, preoperational testing and operation of nuclear power plants and major modifications thereto, in order to preclude damage, loss or deterioration of material, equipment and parts.

13.2 IMPLEMENTATION

13.2.1 General

Procedures, instructions and procurement documents define the requirements and responsibilities for the handling, storage, shipment, cleaning and preservation of Category I material, equipment and parts, and required implementation of established design and specification requirements.

During design and construction the responsibilities associated with handling, storage, shipment, cleaning and preservation of Category I material, equipment and parts may be delegated to the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations. These organizations are monitored through audits/surveillances/inspections by the Quality Assurance Department to verify compliance with their quality assurance program requirements for handling, shipping, cleaning and preservation.

Handling, storage, cleaning and preservation requirements of material, equipment and parts is conducted in accordance with written procedures and procurement documents during the preoperational testing and the in-service phase nuclear power plants. The Nuclear Plant Operating Companies may utilize NUSCO contractors, suppliers, and engineering service organizations during the operation, maintenance and modification of the in-service nuclear power plant. These organizations are responsible for implementing measures for handling, storage, shipping, cleaning and preserving Category I material, equipment and parts to preclude damage, loss or deterioration. The Quality Assurance Department performs audits/surveillances/inspections to verify that NUPOC, and NUSCO contractors, suppliers and engineering service organizations are effectively implementing and complying with their approved procedures and instructions for handling, storage, shipping, cleaning and preservation of Category I material, equipment and parts.

13.2.2 Establishment of Special Handling, Storage, Shipping,
Cleaning and Preservation Requirements

Special or additional handling, storage, shipping, cleaning and preservation requirements are to be identified and implemented as specified in procurement documents and approved procedures. These established requirements are consistent with the regulatory positions of the NRC Regulatory Guides and their endorsed ANSI Standards, listed in Appendix D of the Topical Report, or specifications and/or suppliers technical manual, and will be consistent with accepted industry standards.

14.0 INSPECTION, TEST AND OPERATING STATUS

14.1 GENERAL REQUIREMENTS

The Northeast Utilities (NU) Quality Assurance Program (QAP) provides measures for indication, by the use of marking such as stamps, tags, labels or other suitable means, the status of tests and inspections of Category I material, equipment and parts throughout design, construction, preoperational testing, operation, maintenance and modification of nuclear power plants, to preclude the inadvertent bypassing of inspection and test requirements. These measures provide for the identification of items which have satisfactorily passed required inspections and tests. Measures are also established for indicating the operating status of systems, structures and components to prevent inadvertent operation.

14.2 IMPLEMENTATION

14.2.1 General

The engineer-constructor, NUSCO/NUPOC contractors, suppliers and engineering service organizations utilized by NUSCO/NUPOC during design, construction, preoperational testing, operation, maintenance and modification of nuclear power plants, as appropriate, are responsible for implementing approved measures for the identification of inspection and test status of Category I materials, equipment and parts to preclude the bypassing of requirements. The NUSCO Quality Assurance Department/NUPOC Quality Assurance Supervisor performs on-site and off-site audits/surveillances/inspections of the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations to verify that they are effectively complying with their requirements for identification of inspection and test status, in compliance with approved procedures and instructions. Elements of this system require that suppliers and contractors have a controlled manufacturing and test operation, in order to preclude the inadvertent bypassing of process inspections or tests, and to provide a positive identification of component status throughout all phases of manufacturing, testing, and inspecting by means of tagging, routing cards, stamping, manufacturing or test reports, labeling or other appropriate methods.

Where NUSCO/NUPOC performs receipt inspections at nuclear power plants, the NUSCO Nuclear Project Engineer (during plant construction) or the NUPOC Quality Assurance Supervisor (during preoperational testing phase and at in-service plants), ensures that traceability is maintained of acceptable material, equipment and parts, to indicate conformance to NUSCO Purchase Order/Contract requirements. Nonconforming material, equipment and parts are identified in accordance with QAP 15.0.

During tests and inspections of operating nuclear power plants a status tagging system is implemented, as per approved procedures and instructions, to prevent inadvertent operations of Category I systems, structures and components.

14.2.2 Status Identification and Control

Procedures and instructions describe control of the application and removal of markings such as stamps, tags, labels and other suitable means to indicate the status of safety related systems, structures and components to prevent inadvertent operation, and to preclude omission of inspections, tests or other critical operations. These procedures and instructions delineate the requirements, methods and responsibilities for indicating the status of the affected items. The complete status of all items under the calibration system is recorded and maintained.

Records associated with status identification are maintained in accordance with approved procedures.

15.0 NONCONFORMING MATERIALS, PARTS OR COMPONENTS

15.1 General Requirements

The NU Quality Assurance Program requires that documentation and control of nonconforming material, parts or components utilized in Category I systems, structures and components during design, construction, preoperational testing, operation and maintenance of nuclear power plants and major modifications thereto, be performed in accordance with approved procedures in order to prevent inadvertent use or installation. These procedures include appropriate requirements for identification, documentation, segregation and disposition of nonconforming items, and notification to affected organizations. In accordance with procedures, nonconforming material, parts or components are reviewed and accepted, rejected, repaired or reworked.

15.2 Implementation

15.2.1 Program

Approved procedures define the responsibilities and establish measures for identification, documentation, segregation, review and disposition of nonconforming materials, parts or components, and notification to affected organizations. Each Northeast Utilities department is responsible for the identification, control and disposition of nonconformances within the scope of their departmental responsibilities.

The NUSCO Quality Assurance Department/NUPOC Quality Assurance Supervisor performs on-site and off-site audits/surveillances/inspections of the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations to verify these organizations are effectively complying with their quality assurance program requirements for documentation and control of nonconforming material, parts or components.

15.2.2 Documenting and Controlling Nonconformances

Nonconformances of Category I systems, structures and components are documented and reported as requiring corrective action. Approved procedures delineate controls required for further processing, installation and operation of nonconforming items. These controls include:

- a. Physical identification of the material, part or component as nonconforming;
- b. Segregation of nonconforming items until properly dispositioned. Where physical separation is not practical, suitable tags, markings and documentation are used to assure control.

15.2.3 Documentation

Documentation of nonconforming items requires identification of the items, description of the nonconformance, disposition of the nonconformance, inspection requirements and signature approval of the disposition. A trend analysis of nonconformances is performed, as necessary and results are reported to appropriate level of management.

An engineering evaluation is performed, if necessary, prior to the resolution of nonconformances relating to Category I systems, structures and components.

15.2.4 Evaluation and Disposition

Evaluations are performed to determine the disposition of nonconforming items. The evaluation determines whether an item is to be accepted as-is, returned to supplier, repaired, reworked, scrapped or salvaged. These evaluations assure that the final condition does not adversely affect safety, operation or maintenance of the item, or of the component or system in which it is installed. Applicable information is accumulated and records are maintained.

The engineer-constructor, NUSCO contractors or NUPOC personnel are required to report to the NUSCO Site Manager/ NUSCO Nuclear Project Engineer or the appropriate NUPOC Superintendent, as applicable, to obtain release of nonconformance item prior to its installation. These release items are identified by a Nonconformance Tagging System which defines the description of the nonconformance and its nonconformance status. Nonconformance items dispositioned "accept as is" or "repair" are forwarded with the hardware to the NUSCO Nuclear Project Engineer, NUSCO Site Manager or the appropriate NUPOC Superintendent, as applicable, for review and approval, and then made part of the materials receipt records.

The need to release nonconforming material, parts or components shall be based on such considerations as:

- a. Impact on plant safety;
- b. Safety of personnel;
- c. Suitability of material or items in the "as-is" condition, i.e., probability of eventual satisfactory resolution of the nonconformity without repair, rework or replacement;
- d. Accessibility of material or items after release;

- e. Cost of removal and repair or replacement should material or items eventually have to be removed, repaired, or replaced;
- f. Effect on the orderly progress of work.

Items reworked or repaired in accordance with procedures are verified by reinspecting the item as originally inspected or by a documented method which is equivalent to the original inspection method.

16.0 CORRECTIVE ACTION

16.1 GENERAL REQUIREMENTS

The Northeast Utilities (NU) Quality Assurance Program (QAP) provides documented measures for corrective action to ensure that nonconforming Category I systems, structures and components are identified and promptly corrected. These measures shall include, as appropriate, procedures for identification, documentation, segregation, disposition, notification to affected organizations and follow-up to prevent recurrence. Nonconforming items shall be reviewed and accepted, rejected, repaired or reworked in accordance with approved procedures.

16.2 IMPLEMENTATION

16.2.1 Corrective Action and Follow-Up

Evaluation of conditions adverse to quality such as, nonconformances, failures, malfunctions, deficiencies, deviations, and defective material and equipment is conducted to determine the need for corrective action in accordance with established procedures.

During design, construction, preoperational testing and operation of nuclear power plants, the engineer-constructor, NUSCO contractors, suppliers, engineering service organizations and their subtier contractors, utilized by NUSCO/NUPOC, and NU personnel are responsible for informing the NUSCO Vice President Nuclear Engineering and Operations, through their respective chains of command, of significant conditions which are adverse to quality, the cause of the condition and the corrective action taken. A reaudit to verify implementation of corrective action and close-out of corrective action documentation shall be accomplished by the original auditing organization. The Quality Assurance Department or NUPOC QA, as appropriate, identifies deficiencies by audits/surveillances/inspections of the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations quality assurance programs for corrective action, and Quality Assurance Department/NUPOC Quality Assurance Supervisor, as necessary, reaudits to verify that corrective action has been properly implemented.

The NUSCO Quality Assurance Department/NUPOC Quality Assurance Supervisor performs internal audits to identify deficiencies in departmental corrective action programs. The appropriate NUSCO Department Director/Manager or the appropriate NUPOC Superintendent, is responsible to implement timely corrective action. The NUSCO Quality Assurance Department/NUPOC Quality Assurance Supervisor may reaudit the affected department to verify corrective action has been implemented and documented.

If corrective action is inadequate or not timely, the follow-up organization requests corrective action from management as delineated in procedures. The NUSCO Executive Vice President of Engineering and Operations has the final authority in the event that agreement is not reached at lower levels.

Where corrective action is required of contractor personnel, NUSCO/NUPOC defines in procedures and contracts the corrective action interface between NUSCO/NUPOC and the contractor. NUSCO/NUPOC requires the engineer-
constructor, NUSCO contractor, suppliers and engineering service organizations, as appropriate, to have a documented corrective action program for safety related materials and services.

16.2.2 Recurrence Control

It is the responsibility of the organization which is responsible for the condition adverse to quality to ensure that corrective action not only corrects the immediate condition, but also prevents the adverse condition from recurring.

17.0 QUALITY ASSURANCE RECORDS

17.1 GENERAL REQUIREMENTS

The Northeast Utilities (NU) Quality Assurance Program (QAP) provides for the maintenance, identification, retention and retrieval of records to furnish evidence of activities affecting quality during design, construction, preoperational testing, operation, maintenance and major modification of nuclear power plants. The records include but are not limited to: operating logs and the results of reviews, inspections, tests, audits, monitoring of work performance and material analyses. The records also include closely related data such as qualifications of personnel, procedures and equipment. Inspection and test records contain as a minimum but are not limited to: identification of inspector or data recorder and the acceptability and the action taken in connection with any deficiencies, and Reportable Occurrences noted. Approved procedures establish requirements concerning record retention such as duration, location and assigned responsibility.

17.2 IMPLEMENTATION

NU Departmental Procedures and Instructions establish the responsibilities and requirements for the maintenance, identification, retention and retrievability of records pertaining to the quality of material, equipment, parts, processes or operations relating to Category I systems, structures and components which when founded on observations, measurements or tests can be fully verified, and documented by cognizant personnel.

During design, construction, preoperational testing, operation, maintenance and modification of nuclear power plants the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations, as appropriate, utilized by NUSCO/NUPOC are responsible to implement measures for identification, maintenance, retention, retrieval and turnover, to the NUSCO Nuclear Project Engineer/Cognizant NUPOC personnel, of documented and approved records which contain objective evidence of quality, as specified in NUSCO Purchase Order/Contracts. The NUSCO Quality Assurance Department/NUPOC Quality Assurance Supervisor performs on-site and off-site audits/surveillances/ inspections of the engineer-constructor, NUSCO contractors, suppliers and engineering service organizations, as appropriate, to verify they are effectively complying with their program for quality assurance records.

During the preoperational testing and in-service phase of nuclear power plants NUSCO/NUPOC quality records are identified, controlled and maintained in appropriate files and are identifiable to specific systems, structures and components within the nuclear power plant. When identification to a specific system, structure or component is not practical, records are filed by category; (e.g. specification, nonconformance reports, audits, etc).

17.3 RETENTION

NU Quality Assurance records are classified as life records or non-life records as delineated by the NU Nuclear Records Organization. Non-life records are those quality documents that are maintained for a specific period of time other than the life time of the in-service nuclear power plant or the particular component or part. Life records are those quality documents that are maintained for the lifetime of the in-service nuclear power plant or for the life of the particular component or part. Life records are those which would be of significant value in meeting one or more of the following criteria:

- a. Demonstrating capability for safe operation;
- b. Maintaining, reworking, repairing, replacing or modifying the item;
- c. Determining the cause of an accident or malfunction of an item;
- d. Providing required base line data for in-service inspection.

Records are reviewed and approved by the NUSCO Nuclear Project Engineer or other cognizant qualified personnel of NUSCO/NUPOC, engineer-constructor, etc., as appropriate, and are transmitted to the NU Nuclear Records Organization. The responsibility of the NU Nuclear Records Organization, upon receipt of records, is to maintain and provide controlled retrievability of records affecting the quality of nuclear power plants, in such a manner as to prevent destruction of records by fire, flood, theft, and environmental conditions, such as temperature or humidity, as delineated in procedures.

18.0 AUDITS

18.1 GENERAL REQUIREMENTS

The NU Quality Assurance Program requires that measures be provided to implement an effective audit program. These measures are applied during the design, construction, preoperational testing and operation of nuclear power plants and major modifications thereto, through the performance of audits. Audits are conducted in accordance with preestablished procedures and written checklists by qualified personnel not having direct responsibilities in the areas being audited to ensure compliance with the NU QAP Topical Report. The results of audit findings are documented and then reviewed with management having responsibility in the area audited.

18.2 IMPLEMENTATION

18.2.1 Program

Eight (8) types of audits relating to the QAP are performed:

- a. Northeast Utilities Service Company (NUSCO) Internal Audits;
- b. NUSCO Off-site Engineer-Constructor, Contractor, Supplier, and Engineering Service Organization Audits; (as per procurement documents)
- c. NUSCO Construction Site Audits; (annually or as applicable by the procurement documents)
- d. NUSCO Preoperational Testing Audits; (as per test schedule)
- e. NUSCO Plant Audits; (annual audits of the 18 criteria of Appendix B 10CFR Part 50)
- f. Nuclear Plant Operating Companies (NUPOC) In-Plant Preoperational Test Audits; (as per test schedule)
- g. NUPOC Internal In-Plant Audits; (annual audits of the 18 criteria of Appendix B, 10CFR, Part 50 and selected criteria semi-annually)
- h. NUPOC Contractor, Supplier and Engineering Service Organization Audits. (as per the procurement document)

In addition, provisions are established to require that audit be performed to those activities where the requirements of Appendix B to 10 CFR, Part 50, are being implemented and associated with:

- a. The determination of site features which affect plant safety (e.g., core sampling, site and foundation preparation, and meteorology);

- b. The preparation, review, approval and control of early procurements;
- c. Indoctrination and training programs;
- d. Interface control among the applicant and the principal contractors.

Measures are provided to perform audit of those safety-related activities performed during the operational phase. Those areas are listed below:

- a. Operation, maintenance, and modifications;
- b. The preoperation, review, approval and control of design, specifications, procurement documents, instructions, procedures and drawings;
- c. Receiving and plant inspections;
- d. Indoctrination and training programs;
- e. The implementation of operating and test procedures;
- f. Calibration of measuring and test equipment.

Audits are scheduled on the basis of the status and safety importance of the activities being performed. Schedules are originated and maintained by the NUSCO Quality Assurance Department or the NUPOC Quality Assurance Supervisor.

NUSCO/NUPOC audits are performed as specified in procedures by qualified personnel using a preestablished written audit plan prepared by the auditing organization. The audits evaluate work areas, activities, processes, items; and review documents and records to provide objective evidence of the effectiveness of implementation and conformance to the NU QAP.

NUSCO QA audits are performed of the NUPOC QA organization audit functions. This includes a review and assessment of the audit plan, audit report, corrective action, and follow-up as made available in NUPOC QA records. The results of NUPOC QA audits are also submitted for inclusion in the NUSCO QA quarterly report, and presented to NU management.

The engineer-constructor, NUSCO contractors, suppliers and engineering service organizations utilized during the design, construction, preoperational testing and operation of nuclear power plants and major modifications thereto, are responsible for developing and implementing a system of planned and periodic audits to verify compliance with

and the effectiveness of all aspects of their quality assurance programs including reporting and resolution of deficiencies. The NUSCO Quality Assurance Department/NUPOC Quality Assurance personnel performs on-site and off-site audits/surveillances/inspections to ensure these organizations are complying with their quality assurance requirements for audits, effectively.

Departments within the NUSCO and NUPOC organizations are responsible for implementing quality related functions in accordance with approved procedures and instructions. The Quality Assurance Department and the NUPOC Quality Assurance Supervisor, as applicable, perform internal audits to verify implementation of the requirements prescribed in the NU QAP Topical Report and implementing departmental procedures.

18.2.2 Review of Audit Findings

Audit results are documented, reviewed, and analyzed with management having responsibility in the area audited. The responsible management is required to take the necessary action to correct the deficiencies revealed by the audit.

18.2.3 Reporting of Audit Results

Audit results are reviewed and approved by the Manager, Quality Assurance or the appropriate NUPOC Superintendent, as applicable. These individuals are responsible, based on the audit documentation, for issuing the audit reports to the appropriate management of the area audited and for ensuring that timely corrective action is taken to rectify deficiencies. In addition, audit data and reports are accumulated quarterly and reported to management for the review and assessment of quality trends and the effectiveness of the quality assurance program.

18.2.4 Resolution of Audit Deficiencies

Appropriate action to resolve deficiencies identified during NUSCO/NUPOC Audits is to be taken by the cognizant engineer-constructor, NUSCO contractor, supplier, engineering service organization or internal NUSCO/NUPOC management before the scheduled resolution date. Follow-up audits are performed as necessary, to verify appropriate actions have been taken to resolve deficiencies. Unresolved items which exceed the scheduled resolution date and cannot be resolved by affected management are submitted for resolution to the NUSCO Vice President Nuclear Engineering and Operations.

18.2.5 Records/Reports of Audits

Audit records, reports and associated documentation pertinent to audits are maintained in the appropriate NUSCO/NUPOC files with disposition to the NU Nuclear Records Organization, as specified in procedures.

APPENDIX A

CATEGORY I SYSTEMS, STRUCTURES, AND COMPONENTS

The following systems, structures and components of a nuclear power plant, including their foundations and supports, are designated as Category I. The pertinent quality assurance requirements of Appendix B to 10 CFR Part 50, should be applied, as a minimum, to all quality related activities affecting the safety related function of these systems, structures and components as listed below and to other items and services specifically identified by NU in Section 3 of each license application submitted to the NRC.

- (a) The reactor coolant pressure boundary.
- (b) The reactor core and reactor vessel internals.
- (c) Systems or portions of systems that are required for (1) emergency core cooling; (2) post-accident containment heat removal or; (3) post-accident containment atmosphere cleanup (e.g., hydrogen removal system).
- (d) Systems or portions of systems that are required for (1) reactor shutdown; (2) residual heat removal or; (3) cooling the spent fuel storage pool.
- (e) Those portions of the steam systems of boiling water reactors extending from the outermost containment isolation valve up to but not including the turbine stop valve, and connected piping of 2-1/2 inches or larger nominal pipe size up to and including the first valve that is either normally closed or capable of automatic closure during all modes of normal reactor operation.
- (f) Those portions of the steam and feedwater systems of pressurized water reactors extending from and including the secondary side of steam generators up to and including the outermost containment isolation valves, and connected piping of 2-1/2 inches or larger nominal pipe size up to and including the first valve (including a safety or relief valve) that is either normally closed or capable of automatic closure during all modes of normal reactor operation.
- (g) Cooling water, component cooling and auxiliary feedwater systems or portions of these systems including the intake structures, that are required for (1) emergency core cooling; (2) post-accident containment heat removal; (3) post-accident containment atmosphere cleanup; (4) residual heat removal from the reactor or; (5) cooling the spent fuel storage pool.
- (h) Cooling water and seal water systems or portions of these systems that are required for functioning of reactor coolant system components important to safety, such as reactor coolant pumps.

- (i) Systems or portions of systems that are required to supply fuel for emergency equipment.
- (j) All electric and mechanical devices and circuitry between the process and the input terminals of the actuator systems involved in generating signals that initiate protective actuation of safeguard systems.
- (k) Systems or portions of systems that are required for (1) monitoring of systems important to safety and; (2) actuation of systems important to safety.
- (l) The spent fuel storage pool structure, including the fuel racks.
- (m) The reactivity control system (e.g., control rods, control rod drives, and boron injection system).
- (n) The control room, including its associated vital equipment, cooling systems for vital equipment, life support systems and any structures or equipment inside or outside of the control room whose failure could result in incapacitating injury to the occupants of the control room.
- (o) Primary and secondary reactor containment.
- (q) Other systems not covered by items (a) through (p) above which contain or may contain radioactive materials and whose postulated failure would result in conservatively calculated potential offsite doses (using meteorology as prescribed by Regulatory Guides 1.3 and 1.4) which are more than 0.5 rem to the whole body or its equivalent to any part of the body.
- (r) The Class IE electric systems, including the auxiliary systems for the onsite electric power supplies, that provide the emergency electric power needed for functioning of plant features included in items (a) through (p) above.
- (s) Those portions of systems, structures or components whose continued function is not required but whose failure could reduce the functioning of any plant feature included in items (a) through (q) above to an unacceptable safety level.

CONSUMABLES

The following specific consumables when utilized in safety related systems shall be included in those portions of our quality assurance program, as applicable.

- 1. Emergency generator diesel fuels
- 2. Hydraulic snubber fluids
- 3. Reagents
- 4. Resins

APPENDIX B

NORTHEAST UTILITIES QUALITY ASSURANCE PROGRAM TOPICAL REPORT

QUALIFICATION AND EXPERIENCE REQUIREMENTS
NUSCO MANAGER QUALITY ASSURANCE

Title: Manager, Quality Assurance

Shall satisfy one of the following sets of requirements:

- A) Graduate of a four year accredited engineering or science college or university, plus four years of industrial experience including three years in positions of leadership, such as lead engineer, project engineer, audit team leader, etc. At least two years of this experience should be associated with nuclear facilities. A masters degree in engineering or business management is considered equivalent to two years of experience.
- B) Completion of college level work leading to an associates degree in a related discipline plus eight years of industrial experience including three years in positions of leadership, such as project engineer, audit team leader, supervisor, etc. At least five years of this experience should be associated with nuclear facilities.
- C) High school graduate, plus twelve years of industrial experience, including three years in positions of leadership, such as project engineer, audit team leader, supervisor, etc. At least five years of this experience should be associated with nuclear facilities.

Note: The education and experience requirements should not be treated as absolute when similar training or an outstanding record will provide reasonable assurance that a person can perform the required tasks.

APPENDIX C

NORTHEAST UTILITIES QUALITY ASSURANCE PROGRAM TOPICAL REPORT

LIST OF QUALITY ASSURANCE PROCEDURES

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NUSCO NUCLEAR PRODUCTION PROCEDURES

APPENDIX B TO 10CFR PART 50	NUSCO NUCLEAR PRODUCTION
I. Organization	QA 1.01 Organization
II. Quality Assurance Program	QA 2.01 Quality Assurance Program
III. Design Control	QA 3.01 Plant Design Change Request Control
IV. Procurement Document Control	
V. Instructions, Procedures, & Drawings	QA 5.01 Preparation, Issuance & Control of Department Orders
	QA 5.02 Distribution and Accountability of Department Orders
VI. Document Control	QA 6.01 Design Document Control
	QA 6.02 Distribution of Design Documents
VII. Control of Purchased Material, Equipment & Services	
VIII. Identification & Control of Materials, Parts & Components	
IX. Control of Special Processes	
X. Inspection	
XI. Test Control	
XII. Control of Measuring & Test Equipment	
XIII. Handling, Storage & Shipping	
XIV. Inspection, Test & Operating Status	
XV. Nonconforming Materials, Parts, or Components	QA 15.01 Control of Nonconformance Reports Requiring NUSCO Engineering Approval
XVI. Corrective Action	
XVII. Quality Assurance Records	QA 17.01 Quality Assurance Records
XVIII. Audits	QA 18.06 Quality Assurance Audit Follow-up Program

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NUSCO NUCLEAR PROJECTS PROCEDURES

APPENDIX B TO 10CFR PART 50	NUSCO NUCLEAR PROJECT PROCEDURES
	<p>3.04 Processing, Documenting & Filing the Results of Design Reviews</p> <p>3.04a Processing, Documenting & Filing of Results of Construction Procedure Review</p> <p>3.06 Resolution of Design Deficiencies</p> <p>3.07 Preparation, Review & Disposition of Plant Design Change Requests</p> <p>3.08 Preparation, Issuance & Control of Assignments</p> <p>3.11 Preparation, Review, Approval and control of Design Documents Prepared by NUSCO</p> <p>3.12 Review & Disposition of Deviations from Specifications</p> <p>3.13 Review and Disposition of NUPOC Design Modification Form</p>
IV. Procurement Document Control	<p>4.01 Preparation, Review & Approval of NUSCO Bid Specification</p> <p>4.02 Review of Proposals Submitted by the Engineer-Constructor, Contractors & Engineering Service Organizations</p> <p>4.03 Review of Proposals Submitted by Suppliers (Vendors)</p> <p>4.04 Preparation of NUSCO Purchase Requisitions and Review of NUSCO Purchase Orders</p> <p>4.05 Approval of Engineer-Contractor Purchase Orders</p>
V. Instructions, Procedures, & Drawings	<p>5.01 Review of Selected Work Instructions & Procedures of the Engineer-Contractors & Engineering Service Organizations</p>

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NUSCO NUCLEAR PROJECTS PROCEDURES

APPENDIX B TO 10CFR PART 50	NUSCO NUCLEAR PROJECT PROCEDURES
<p>XVI. Correction Action</p> <p>XVII. Quality Assurance Records</p> <p>XVIII. Audits</p>	<p>15.03 Documenting & Reporting Significant Deficiencies</p> <p>15.04 Installation of Nonconformance Material Equipment & Parts</p> <p>16.01 Corrective Action Program for Significant Deficiencies</p> <p>17.01 Retention & Control of Quality Records in the NUSCO Nuclear Project File - Berlin & Plant Site</p> <p>17.01A Control and Retention of Design Documents Files For NUSCO Nuclear Plant Betterment Projects</p> <p>18.01 Resolution of Audit Deficiencies</p>

MILLSTONE QA ADMINISTRATIVE CONTROL PROCEDURES (ACPS)

APPENDIX B TO 10CFR PART 50	MILLSTONE QA (ACPS)
I. Organization	ACP-QA 1.01 Administrative Control Procedure Program
	ACP-QA 1.02 Organization & Responsibilities
	ACP-QA 1.04 Plant Operations Review Committee
	ACP-QA 1.05 Site Operations Review Committee
II. Quality Assurance Program	ACP-QA 1.06 Quality Assurance/Quality Control Program
	ACP-QA 4.01 Plant Housekeeping
	ACP-QA 8.07 QA Training Program
	ACP-QA 8.16 Training, Certification & Identification of Qualified Inspection, Examination & Test Personnel
	ACP-QA 8.21 Indoctrination & Training of Audit Personnel
III. Design Control	ACP-QA 3.04 Design Change Control
IV. Procurement Document Control	ACP-QA 4.02 Procurement, Control & Identification of Material
V. Instruction, Procedure, & Drawings	ACP-QA 2.02 Performing Category I Work
	ACP-QA 3.01 ACP's & Station Forms
	ACP-QA 3.02 Station Procedures & Forms
	ACP-QA 3.05 Review & Approval of Vendor Procedures
	ACP-QA 3.06 Preservice Unit Instructions
VI. Document Control	ACP-QA 3.03 Document Control
VII. Control of Purchased Material, Equipment & Services	ACP-QA 4.01 Product Acceptance Inspection & Testing
VIII. Identification & Control of Materials, Parts & Components	ACP-QA 4.03 Classifying & upgrading Spare Parts
	ACP-QA 4.07 Control of Weld Material

MILLSTONE QA ADMINISTRATIVE CONTROL PROCEDURES (ACPS)

APPENDIX B TO 10CFR PART 50	MILLSTONE QA (ACPS)
IX. Control of Special Processes	ACP-QA 2.07 Control of Special Processes
X. Inspections	ACP-QA 2.02A Installation Inspections
	ACP-QA 2.04 Control of Work By Outside Construction of In-Service Systems
	ACP-QA 9.06 In-service Inspection Program
XI. Test Control	ACP-QA 2.02B Retests
	ACP-QA 9.02 Plant Surveillance Program
	ACP-QA 9.02A Unit 1 Surv. Master Test Cont. List
	ACP-QA 9.02B Unit 2 Surv. Master Test Cont. List
	ACP-QA 9.03 Inservice Plant Testing
XII. Control of Measuring & Test Equipment	ACP-QA 9.04 Control & Calibration of Test Instruments
XIII. Handling, Storage & Shipping	ACP-QA 4.04 Instructions for Packaging, Shipping, Receiving, Storage & Handling
	ACP-QA 6.04 Radioactive Material Shipping Requirements
XIV. Inspection, Test & Operating Status	ACP-QA 2.06 Station Tagging & Bypass/Jumper Control
XV. Nonconforming Materials, Parts, or Components	ACP-QA 5.01 Nonconforming Materials & Parts
XVI. Corrective Action	ACP-QA 10.01 Plant Incident Report
	ACP-QA 10.03 Reportable Occurrences and Non-routing Environmental Operating Reports
	ACP-QA 10.06 NRC Commitment Follow Program
XVII. Quality Assurance Records	ACP-QA 10.04 QA Records
XVIII. Audits	ACP-QA 9.01 Internal In-Plant Audit Program
	ACP-QA 9.05 Monitoring of QA Activities

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CONNECTICUT YANKEE QA PROCEDURES

APPENDIX B TO 10CFR PART 50	CONNECTICUT YANKEE QA PROCEDURES		
I. Organization	ADM	1.1-1	Connecticut Yankee Organization Responsibility & Authority
II. Quality Assurance Program	QA	1.2-2.1	Request for Category I Evaluation
	QA	1.2-2.2	QA Category I Boundary
	QA	1.2-2.3	Qualification of Inspection, Examination & Test Personnel
	QA	1.2-2.4	Housekeeping Requirements
III. Design Control	QA	1.2-3.1	Design Change Control
	QA	1.2-3.2	QA Requirements for the Design of Nuclear Power Plants
IV. Procurement Document Control	QA	1.2-4.1	Procurement Document Control
V. Instructions, Procedures & Drawings	QA	1.2-5.1	Maintenance Requests & Job Orders
	QA	1.2-5.2	Procedure Format
VI. Document Control	QA	1.2-6.1	Document Distribution & Accountability
	QA	1.2-6.2	Master Document Index
	QA	1.2-6.3	Drawing Changes
	QA	1.2-6.4	Temporary Procedures Changes
	QA	1.2-6.5	Procedure Review & Approval
	QA	1.2-6.6	FDSA Change Request
	QA	1.2-6.7	Technical Specification Change Request
VII. Control of Purchased Material, Equipment & Services	QA	1.2-6.8	Control of Forms
	QA	1.2-7.1	Material Receipt Inspection
	QA	1.2-7.2	Fuel Assembly Receipt Inspection

CONNECTICUT YANKEE QA PROCEDURES

APPENDIX B TO 10CFR PART 50	CONNECTICUT YANKEE QA PROCEDURES		
VIII. Identification & Control of Materials, Parts & Components	QA	1.2-8.1	Identification of Materials, Parts & Components
	QA	1.2-8.2	Materials Issue
	QA	1.2-8.3	Weld Material Control
IX. Control of Special Processes	QA	1.2-9.1	Control of Special Processes
	QA	1.2-9.2	Requirements for Cleaning of Fluid Systems & Associated Components
	QA	1.2-9.3	QA Requirements for Protective Coating Applied to Nuclear Facilities
X. Inspections	QA	1.2-10.1	Installation Inspections
	QA	1.2-10.2	Supplementary QA Requirements for Installation, Inspection & Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plant
XI. Test Control	QA	1.2-11.1	Operational Surveillance Tests
	QA	1.2-11.2	Review of Test Data
	QA	1.2-11.3	Retest Requirements
	QA	1.2-11.4	Product Acceptance Tests
XII. Control of Measuring & Test Equipment	QA	1.2-12.1	Control of Measuring as Test Equipment
XIII. Handling, Storage & Shipping	QA	1.2-13.1	Handling of Material & Equipment
	QA	1.2-13.2	Storage of Material & Equipment
	QA	1.2-13.3	Shipping of Material & Equipment
	QA	1.2-13.4	Packaging of Material & Equipment

CONNECTICUT YANKEE QA PROCEDURES

APPENDIX B TO 10CFR PART 50	CONNECTICUT YANKEE QA PROCEDURES
XIV. Inspection, Test & Operating Status	QA 1.2-14.1 Bypass & Jumper Control
	QA 1.2-14.2 Equipment Control (Locking & Tagging)
XV. Nonconforming Materials, Parts, or Components	QA 1.2-15.1 Nonconformance Report
	QA 1.2-15.2 Document Deficiency Notice
XVI. Corrective Action	QA 1.2-16.1 Plant Information Reports
	QA 1.2-16.2 Failure & Malfunction Reports
XVII. Quality Assurance Records	QA 1.2-17.1 Quality Assurance Records
XVIII. Audits	QA 1.2-18.1 Internal Audits

NUSCO NUCLEAR PLANT RECORDS MANUAL (NPRM)

APPENDIX B TO 10CFR PART 50	NPRM QA PROCEDURES
XVII. Quality Assurance Records	<ol style="list-style-type: none">1. Administration2. Various Operating & Maintenance Procedures3. Drawing Control4. Source Document Control5. Computer Programs & Associates Instructions for NPR6. Training Requirements

NU WELDING MANUAL

APPENDIX B TO 10CFR PART 50	WELDING MANUAL QA PROCEDURES
I. Organization	AP 700 Organization & Control of NUSCO Welding Manual
IX. Control of Special Processes	AP 701 Preparation, Qualification, Approval & Revision of NUSCO Welding Manual AP 703 Preparation, Review & Approval of Detailed Welding Procedures
XVII. Quality Assurance Records	AP 702 Control of Welder & Brazers Qualifications

NU PURCHASING BUSINESS PROCEDURES

APPENDIX B TO 10CFR PART 50	PURCHASING QA PROCEDURES
IV. Procurement Document Control	Applicable BP3.0 Purchasing Procedures

APPENDIX D

NORTHEAST UTILITIES QUALITY ASSURANCE PROGRAM TOPICAL REPORT

REGULATORY GUIDE AND ANSI STANDARD COMMITMENTS

Appendix B to 10 CFR, Part 50 - Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants.

10 CFR, Part 55 - Operator's Licenses and its Appendix A - Regualification Programs for Licensed Operators of Production and Utilization Facilities.

Paragraph 50.55a, Codes and Standards, of 10 CFR, Part 50, Licensing of Production and Utilization Facilities (ASME Boiler and Pressure Vessel Code, Section XI, 1971 - Rules for In-Service Inspection of Nuclear Reactor Coolant Systems).

Regulatory Guide 1.8 - 8/10/71 (formerly Safety Guide 8) - Personnel Selection and Training - Endorses ANSI N18.1 (6-70).

Regulatory Guide 1.28 (formerly Safety Guide 28), 6-7-72 - Quality Assurance Program Requirements (Design and Construction) Endorses ANSI N45.2 - 1971.

Regulatory Guide 1.30 (Safety Guide 30), 8-11-72 - Quality Assurance Requirements for the Installations, Inspection, and Testing of Instrumentation and Electrical Equipment - Endorses ANSI N45.2.4-1972.

Regulatory Guide 1.33 (formerly Safety Guide 33) 11-3-72 - Quality Assurance Program Requirements (Operating) - Endorses ANSI N45.2-1971 and ANS3.2.

Regulatory Guide 1.37 - Quality Assurance Requirements for Cleaning of Fluid Systems and Assorted Components of Water-Cooled Nuclear Power Plants, 3-16-73 -Endorses ANSI N45.2.1 - 1973.

Regulatory guide 1.38 - Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage and Handling of Items for Water-Cooled Nuclear Power Plants, 3-16-73 - Endorses ANSI N45.2.2 - 1972.

Regulatory Guide 1.39 - Housekeeping Requirements for Water - Cooled Nuclear Power Plants, 3-16-73 - Endorses ANSI N45.2.3 - 1973.

Regulatory Guide 1.58 - Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel, August 1973 - Endorses ANSI N45.2.6 - 1973.

Regulatory Guide 1.64 - Quality Assurance Requirements for the Design of Nuclear Power Plants, Oct. 1973 - Endorses ANSI N45.2.11 (Draft 3, Rev. 1) July 1973.

Draft Regulatory Guide 1.70XX - Additional Information Quality Assurance During Design and Construction (Draft 2, April 25, 1974).

Regulatory Guide 1.74 - Quality Assurance Terms and Definitions, Feb. 74 -Endorses ANSI N45.2.10 - 1973.

Draft Regulatory Guide - Preoperational and Initial Startup Test Programs for Water-Cooled Power Reactors.

ANSI N45.2.5 - Supplementary Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants (Draft 3, Rev. 1, Jan. 1974).

ANSI N45.2.8 - Supplementary Quality Assurance Requirements for Installation, Inspection and Testing of Equipment, and Piping for the Construction Phase of Nuclear Power Plants (Draft 3, Rev. 3, April, 1974).

ANSI N45.2.9 - Requirements for Collection, Storage and Maintenance of Quality Assurance Records (Draft 15, Rev. 0, April 3, 1974).

ANSI N45.2.12 - Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants (Draft 3, Rev. 4, February 22, 1974).

ANSI N45.2.13 - Supplementary Quality Assurance Requirements for Control of Procurement of Equipment, Materials and Services for Nuclear Power Plants (Draft 2, Rev. 4, April 1974).

APPENDIX E

NORTHEAST UTILITIES QUALITY ASSURANCE PROGRAM TOPICAL REPORT

GLOSSARY OF QUALITY ASSURANCE TERMS

Audit - a formal, documented activity performed in accordance with written checklists or procedures to verify by evaluation of objective evidence that a quality assurance program has been developed, documented, and implemented in accordance with applicable requirements.

Calibration - the process by which measuring and test equipment are checked against standards of known higher accuracy and adjusted as necessary to ensure their compliance with designated specifications.

Category I - designation given to systems, structures, and components of a Northeast Utilities nuclear power plant that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public.

Category I Systems, Structures, and Components - defined in Appendix A.

Cleaning - those actions performed to maintain an item in accordance with cleanliness requirements.

Contractor - organizations that provide services that may include engineering, procurement, construction, and installation of material, equipment, and parts. The Nuclear Steam Supply System Supplier (NSSS Supplier) is included in this category.

Corrective Action - action taken to correct conditions adverse to quality in order to preclude recurrence of the conditions.

Deficiencies - departures from specified requirements.

Departmental Measuring and Test Equipment List - a list of all departmental measuring and test equipment included in the NUPOC calibration program.

Design - technical and management processes which lead to and include the issuance of design output documents such as drawings, specifications, and other documents defining technical requirements of systems, structures, and components.

Design Changes - changes in drawings and specifications which define the design of Category I systems, structures, and components of nuclear power plants.

Design Documents - design documents referred to herein are the drawings and specifications that define the design of Category I systems, structures, and components; the Facility Description and Safety Analysis (FDSA)/Final Safety Analysis Report (FSAR); the License Document; Technical Specifications; and Environmental Technical Specifications.

Drawing Change Request - a document used to request approval of revisions to existing NUSCO drawings.

Engineer-Constructor - the principal organization contracted by NUSCO that performs the overall engineering, procurement, construction, and installation of Category I systems, structures, and components of a nuclear power plant.

Engineer-Constructor/NUSCO Contractor Installation Inspection - an inspection of Category I systems, structures and components performed by the Engineer-Constructor/NUSCO Contractor prior to system release/transfer to NUPOC for preoperational testing, as defined in the NUPOC Startup Manual.

Engineering Service Organization - organizations that provide services such as analysis, testing, and inspection.

Handling - the transfer of an item from one location to another within a contractor's, supplier's or engineering service organization's facility or at the nuclear power plant.

Identification - a means by which material, equipment and parts can be traced to their associated documentation through the use of heat numbers, lot numbers, part numbers, serial numbers, or other appropriate means.

Inspection - a phase of quality control which, by means of examination, observation, or measurement determines the conformance of material, equipment, parts, and processes to predetermined quality requirements.

Inspection Status - identification of material, equipment, and parts that have completed inspection, either acceptable or unacceptable.

Life Records - those quality documents that are maintained for the lifetime of the in-service nuclear power plant or for the life of the particular component or part. Life records are those which would be of significant value in meeting one or more of the following criteria:

- (1) demonstrating capability for safe operation.
- (2) maintaining, reworking, repairing, replacing or modifying the item.
- (3) determining the cause of an accident or malfunction of an item.
- (4) providing required base line data for in-service inspection.

Measuring and Test Equipment - those instruments, gauges, tools, and measuring devices used during inspection and testing to determine that measuring and test parameters comply with appropriate requirements in specifications and drawings.

Nonconforming Material, Equipment, and Parts - any material, equipment, or parts which do not conform to specified requirements.

Nonengineered Items - Material, equipment and parts which are:

- (1) Relatively simple and standard in design, manufacture and test.
- (2) Adaptable to standard or automated inspections and/or tests of the end product to verify quality characteristics after delivery.
- (3) Of such a nature that product acceptance inspections/tests performed upon receipt of the items do not require operations which could adversely affect the integrity, function, or cleanness of the item.

Non-Life Records - those quality documents that are maintained for a specific period of time other than the lifetime of the in-service nuclear power plant or the particular component or part.

Northeast Utilities (NU) - a public utility holding company which owns Northeast Utilities Service Company and The Northeast Nuclear Energy Company and thru its operating subsidiaries has a controlling interest in The Connecticut Yankee Atomic Power Company.

Northeast Utilities Service Company (NUSCO) - a wholly owned subsidiary of Northeast Utilities that provides engineering, procurement, construction, and quality assurance services for Northeast Utilities relating to design, construction, and preoperational testing of nuclear power plants and major modifications thereto.

Nuclear Plant Operating Companies (NUPOC) - which as a subsidiary of Northeast Utilities performs preoperational testing of Category I systems, structures and components of nuclear power plants and major modifications thereto subsequent to completion of their design and construction and is also responsible for the operation of in-service nuclear power plants. The companies which comprise NUPOC are The Connecticut Yankee Atomic Power Company and The Northeast Nuclear Energy Company.

NUPOC In-Plant Preoperational Testing Audits - audits performed by the NUPOC Quality Assurance Supervisor to verify implementation by NUPOC of the requirements of the Northeast Utilities Quality Assurance Program during preoperational testing.

NUPOC Internal In-Plant Audits - audits performed by the NUPOC Quality Assurance Supervisor of NUPOC quality related activities.

NUSCO Contractor, Supplier, and Engineering Service Organization Audits - audits performed by NUSCO Quality Assurance of NUSCO contractor, supplier, and engineering service organization quality related activities at their facilities.

NUSCO Contractor, Supplier, and Engineering Service Organization List - a list identifying the approval status of the quality assurance programs of contractors, suppliers, and engineering service organizations.

NUSCO Internal Audits - audits performed by NUSCO Quality Assurance of NUSCO quality related activities.

NUSCO Nuclear Project Engineer - the engineer designated to act as project engineer during design, construction and preoperational testing of a nuclear power plant or major modifications thereto. He may or may not be titled engineer.

NUSCO Off-Site Engineer-Constructor Contractor, Supplier, and Engineering Service Organization Audits - audits performed by NUSCO Quality Assurance of the quality assurance programs of the Engineer Constructor and NUSCO contractors, suppliers, and engineering service organizations at their facilities.

NUSCO Plant Audits - audits performed at the in-service nuclear power plant by NUSCO Operations Quality Assurance of NUPOC quality related activities.

NUSCO Preoperational Testing Audits - audits performed by NUSCO Operations Quality Assurance during preoperational testing to verify implementation by NUPOC of the requirements of the Northeast Utilities Quality Program.

NUSCO Quality Records Center - the location at NUSCO of the NUSCO Quality Assurance records files under the cognizance of the NUSCO Quality Assurance Department.

"Objective Evidence" - any statement of fact, information, or record, either quantitative or qualitative, pertaining to the item or service based on observation, measurements, or tests which can be verified.

Preoperational Testing - tests performed by NUPOC to ensure Category I systems, structures, and components will perform satisfactorily during operation of the in-service nuclear power plant.

Preservation - those actions performed to maintain an item in this original and usable condition.

Procedures and Instructions - documents that specify how an activity is to be performed. They may include methods to be employed; material, equipment, or parts to be used; and a sequence of operations.

Procurement Documents - letters of Intent, Contracts, Purchase Requisitions, and Purchase Orders which provide contractual basis for services such as engineering and procurement; supply of material, equipment, and parts; construction; installation; inspection; and testing.

Product Acceptance Inspection/Test - Inspection/test performed as part of receipt inspection at the nuclear power plant to verify the quality

characteristics of nonengineered items. Operations utilized during product acceptance inspections/tests are such that they do not adversely affect the integrity, function or cleanness of the item.

Proof Test - a test conducted prior to installation of Category I systems, structures and components to verify specification requirements have been met.

Purchased Material, Equipment, and Parts - items procured for use in Category I systems, structures, and components.

Purchased Service - services procured to assist in operation, maintenance, modification, and refueling of in-service nuclear power plants.

Quality Assurance Program (QAP) - consists of the QAP Topical Report, Quality Assurance Department Procedures and other Northeast Utilities Departmental/Divisional quality related procedures.

Quality Assurance Records - any record pertaining to the quality of material, equipment, parts, processes, or operations relating to Category I systems, structures and components which are founded on observations, measurements, or tests which can be fully checked or verified. Such statements may be recorded on a written or preprinted document or tag. The statements are authorized with a signature or stamp identifiable to the person making the statement of fact.

Repair - a disposition applied to nonconforming material, equipment, and parts that are unsuitable for their intended purpose which are modified by the use of additional operations and/or processes so that they are suitable for their intended purpose but do not meet all specified requirements.

Retest - a test conducted prior to operation following installation inspections of work associated with maintenance, modification, and refueling to verify that Category I systems, structures, and components will function satisfactorily when in operation.

Return to Supplier - a disposition applied to nonconforming material, equipment, and parts that are unsuitable for their intended purpose but which are feasible to repair or rework at a supplier's facility.

Rework - a disposition applied to nonconforming material, equipment, and parts that are unsuitable for their intended purpose due to incomplete operations or variations from original engineering requirements but which are modified through the use of additional operations or processes to meet all specified requirements.

Salvage - a disposition applied to nonconforming material, equipment, and parts that are unsuitable for their intended purpose and not feasible for rework or repair but which contain material, equipment, or parts which are reclaimable for future use.

Special Processes - an operation performed under controlled conditions in accordance with special requirements utilizing qualified procedures, equipment, and personnel. These special processes may include, but are not limited to: welding, brazing, soldering, cleaning, heat treating, and nondestructive testing.

Storage - Maintenance of an item in the environment specified in appropriate documents.

Supplier - organizations that provide material, equipment, and parts.

Surveillance - A documented record of the observation of work operations performed at the construction site. Surveillances are not performed to a preplanned checklist. However, the results are formally documented and reviewed and follow-up action, if necessary, is provided.

Test and Operating Status - identification of material, equipment, and parts that are ready for test or operation, or an existing stage of a test operation.

Testing - the determination or verification of the capability of an item to meet specified requirements by subjecting the item to a set of physical, chemical, environmental, or operating conditions.

Use As Is - a disposition applied to nonconforming material, equipment and parts which are suitable for their intended purpose but do not meet all specified requirements.

APPENDIX F

NORTHEAST UTILITIES QUALITY ASSURANCE PROGRAM TOPICAL REPORT

Program Exception

ANSI N45.2.9, states in part, "Structure, doors, frames, and hardware should be Class A fire-related with a recommended four-hour minimum rating." The records storage vault door and hardware at NNECO has a two-hour rating and the record storage vault door and hardware at CYAPCo has a three-hour rating.

Both NNECO and CYAPCO's vaults are used for storage of documentation that is unsuitable for filming or awaiting filming.

A records organization excites along with written procedures addressing the control of quality assurance records.

Question 49: Describe the audit frequency associated with Section 18.2.1.

Response: Section 18.2.1 has been modified to indicate the frequency of audits.

Question 50: Indicate whether provisions are established requiring that audits be performed in those areas where the requirements of Appendix B to 10 CFR Part 50 are being implemented. Areas which are often neglected include those activities associated with:

- a. The determination of site features which affect plant safety (e.g., core sampling, site and foundation preparation, and meteorology).
- b. The preparation, review, approval, and control of early procurements.
- c. Indoctrination and training programs.
- d. Interface control among the applicant and the principal contractors.

Response: Section 18.2.1 has been modified in response to this question.

Question 51: Describe those provisions which assure that audit data are analyzed and the reports, which indicate quality trends and the effectiveness of the QA program, are reported to management for review and assessment.

Response: Section 18.2.2 has been modified to assure that audit data are analyzed.

Sections 1.4.2.1 and 18.2.3 have been modified to assure that audit data are reported to management for review and assessment of quality trends, and the effectiveness of the quality assurance program.