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

FEB 3 1983

Mr. George W. Grier
Corporate Quality Assurance Manager
Duke Power Company
P.O. Box 33189
Charlotte, SC 28242

Dear Mr. Grier:

Subject: NRC Acceptance of Amended Duke Power Company QA Topical Report, "Quality Assurance Program," Duke-1 (Amendment 6)

Your letter of December 21, 1982 transmitted Amendment 6 to the Duke Power Company (DPC) topical report, Duke-1, "Quality Assurance Program." The December 21, 1982 transmittal superceded the previous Amendment 6 transmitted August 30, 1982. The DPC topical report, through Amendment 5, was previously reviewed and accepted by the NRC for referencing in license applications as indicated in our letter of July 14, 1981. Amendment 6 includes DPC organizational changes and updates the QA program description for plant operation to meet Section 17.2 of Revision 1 of the NRC Standard Review Plan (NUREG-75/087).

Based on our review and evaluation of Amendment 6, we find that the criteria in Appendix B to 10 CFR Part 50 are met. Your amended topical report is therefore acceptable, and you may implement it upon your issuance of the amendment. Should regulatory criteria or regulations change such that our conclusions about this topical report are invalidated, we will notify you. You will be given the opportunity to revise and resubmit it should you so desire.

Please replace our letter of July 14, 1981 and its enclosure with a copy of this letter and its enclosure in your topical report, renumber the report DUKE-1-A (Amendment 6), and transmit 11 copies of the amendment to the NRC. Your submittal should point out the changes by use of a black bar in the margin where a change has been made, and the revision number should be adjacent to the bar. Your transmittal letter should identify the nuclear units to which this revised topical applies.

Should you have any questions regarding our review or if we can provide assistance, please contact Jack Spraul on (301) 492-4530.

Sincerely,

Terry L. Harpster, Chief
Quality Assurance Branch
Division of Quality Assurance,
Safeguards, and Inspection Programs
Office of Inspection and Enforcement

Enclosure:
Topical Report Evaluation

TOPICAL REPORT EVALUATION

Report Number: DUKE-1-A
Report Title: Quality Assurance Program DUKE-1-A (Amendment 6)
Report Date: March 1974, Amended December 1982
Originating Organization: Duke Power Company
Reviewed By: Quality Assurance Branch

SUMMARY OF TOPICAL REPORT

Topical Report DUKE-1-A (Amendment 6) describes the quality assurance (QA) program which the Duke Power Company (DPC) applies to those design, procurement, construction, preoperational testing, and operations phase activities involving safety-related structures, systems, and components of DPC's nuclear power plants. DUKE-1-A (Amendment 6) commits DPC to comply with the requirements of Appendix B to 10 CFR Part 50 and to comply with the Regulatory Position of Regulatory Guides 1.8 (5/77), 1.28 (2/79), 1.30 (8/72), 1.33 (2/78), 1.37(3/73), 1.38 (5/77), 1.39 (9/77), 1.58 (9/80), 1.64 (6/76), 1.74 (2/74), 1.88 (10/76), 1.116 (5/77), 1.123 (7/77), 1.144 (9/80), and 1.146 (8/80).

DPC has provided for our evaluation a detailed organizational descr ption of those individuals and groups involved in carrying out activities required by the QA program and a delineation of duties, responsibilities, and authority of those organizational elements involved in the QA program. DUKE-1-A (Amendment 6) contains a description of the measures used to carry out the DPC QA program activities and describes how applicable requirements of Appendix B to 10 CFR Part 50 will be satisfied by the administration and implementation of these measures.

SUMMARY OF REGULATORY EVALUATION

We have evaluated the QA program and the organizations responsible for QA functions as described in DUKE-1-A (Amendment 6). We find that QA policy and direction originate at an acceptably high management level and are effectively communicated to other parts of the organization. Those performing QA functions have responsibility and authority commensurate with their duties in implementing the QA program. We also find that measures have been established, to be implemented by written procedures and instructions, which address each of the criteria of Appendix B to 10 CFR Part 50 in an acceptable manner.

Based on our review and evaluation of DUKE-1-A (Amendment 6), we conclude that:

1. The organizations and persons performing QA functions within DPC have the required independence and authority to effectively carry out the QA program without undue influence from those directly responsible for costs and schedules.

2. The DPC QA program contains the necessary requirements, procedures, and controls which, when properly implemented, comply with the requirements of Appendix B to 10 CFR Part 50 and applicable regulatory guides and ANSI standards contained in Sections 17.1 and 17.2 of the NRC Standard Review Plan.

REGULATORY POSITION

It is the staff's position that the DPC topical report, DUKE-1-A (Amendment 6), "Quality Assurance Program" is acceptable for use in the design, procurement, construction, preoperational testing, and operations phase activities of DPC's nuclear power plants. The topical report can be referenced in Sections 17.1 and 17.2 of Safety Analysis Reports.

G W Grier being duly sworn states that he is Corporate Quality Assurance Manager of Duke Power Company; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission this amendment to its Topical Report - DUKE - 1-A; and that all statements and matters set forth herein are true and correct to the best of his knowledge.

G W Grier

ATTEST:

Lewis F. Camp, Jr.
Secretary

Subscribed and sworn to me this 21st day of December, 1982.

Notary Public

My Commission Expires: My Commission Expires Sept. 24, 1985
Date

DUKE POWER COMPANY

TOPICAL REPORT

QUALITY ASSURANCE PROGRAM

DUKE-1-A

Amendment 6

ABSTRACT

This topical report describes the Duke Power Company quality assurance program for all phases of its nuclear power plants. The report is organized like and is generally used for Chapter 17 - Quality Assurance of Duke's Safety Analysis Reports.

The Duke quality assurance program conforms to applicable regulatory requirements such as 10CFR50, Appendix B and to approved industry standards such as ANSI N45.2-1971 and ANSI N18.7-1976 and corresponding daughter standards, or to equivalent alternatives. The Duke Power quality assurance program also conforms to the regulatory position of the NRC Regulatory Guides listed in Table 17.0-1 of this report with the exception of the clarifications, modifications, and alternatives stated therein. 4

Section 17.0 describes the purpose of this report, provides definitions, and shows conformance to regulations, standards, and guides.

Section 17.1 describes the organization and program for quality assurance during the design, initial procurement, and construction phases of nuclear power plant development. Included in this section are organization charts, a listing of quality assurance and technical functions, and point-by-point comparisons of the Engineering Quality Assurance Program and Construction Quality Assurance Program with the 18 criteria of 10CFR50, Appendix B.

Section 17.2 describes the quality assurance program and organization for station operation. Included are organization charts and a point-by-point comparison of the program with the 18 criteria of 10CFR50, Appendix B.

The descriptions in Section 17.1 and 17.2 follow the format of 10CFR50, Appendix B. The topical is intended to be a comprehensive up-to-date description of Duke's quality assurance program for nuclear power plants.

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2	February 14, 1975
3	November 22, 1976
4	June 29, 1978
5	July 14, 1981
6	February 3, 1983

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17 QUALITY ASSURANCE

17.0 INTRODUCTION

Duke Power Company maintains full responsibility for assuring that its nuclear power plants are designed, constructed, tested and operated in conformance with good engineering practices, applicable regulatory requirements and specified design bases and in a manner to protect the public health and safety. To this end Duke has established and implemented a quality assurance program which conforms to the criteria established in Appendix B to 10CFR, Part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants" published June 27, 1970 (35 F. R. 10499) and amended September 17, 1971 (36 F. R. 18301) and amended January 20, 1975 (40 F. R. 3210D).

This topical report is written in the format of a Safety Analysis Report (SAR) Chapter 17, "Quality Assurance", in accordance with Revision 2 of the NRC's Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants - LWR Edition" and subsequent NRC guidelines. The quality assurance program described herein is applicable to all Duke nuclear power plants as referenced by Chapter 17 of the plants' SAR's. The report is divided into two sections as follows: 17.1 Quality Assurance During Design and Construction, 17.2 Operational Quality Assurance.

Section 17.1 describes quality assurance up to, but not including, preoperational testing and Section 17.2 applies to events beginning with preoperational testing and continuing through all phases of startup and operation. Section 17.1 is intended to be applicable to PSAR's, and Section 17.2 is applicable to FSAR's.

This Topical Report describes the Quality Assurance Program for those systems, components, items, and services which have been determined to be safety related. In addition, Duke's Quality Assurance Program provides a method of applying a graded Quality Assurance Program to certain non-safety related systems, components, items, and services. This method involves defining a Quality Assurance "Condition" for each level of quality assurance required. These will be designated as "QA Condition _____". The following conditions have been defined. 6

QA Condition 1 covers those systems and their attendant components, items, and services which have been determined to be safety related. These systems are detailed in the Safety Analysis Report applicable to each nuclear station. The Topical Report applies in its entirety to systems, components, items, and services identified as QA Condition 1.

QA Condition 2 covers those systems and their attendant components, items, and structures important to the management and containment of liquid, gaseous, and solid radioactive waste.

QA Condition 3 covers those systems, components, items, and services which are important to fire protection as defined in the Hazards Analysis for each station. The Hazards Analysis is in response to Appendix A of NRC Branch Technical Position APCSB 9.5-1.

QA Condition 4 covers those seismically designed/restrained systems, components, and structures whose continued functions are not required during and after the seismic event. The general scope of these systems, components, and structures, identified as Seismic Category 11 (SC11) are defined in Regulatory Guide 1.29, Seismic Design Classification.

Subsequent changes to Duke's quality assurance program shall be incorporated in this topical report. The topical report is intended to be a comprehensive up-to-date description of Duke's quality assurance program for nuclear power plants.

Any programmatic changes to the Quality Assurance Program will be submitted for review and acceptance prior to implementation. Significant organizational changes will be submitted no later than thirty (30) days after announcement. 6

17.0.1 DEFINITIONS

The following definitions are applicable to terms used in this report. Terms used in this report which are not defined in this section are defined in ANSI N45.2.10, "Quality Assurance Terms and Definitions."

Approver - An individual who reviews an activity for concept and conformity with codes and standards; the approver is a person other than the originator or checker.

Audit - An activity to determine through investigation the adequacy of, and adherence to, established procedures, instructions, specifications, codes, and other applicable contractual and licensing requirements, and the effectiveness of implementation.

Checker - An individual, other than the originator or approver, who is qualified in the area being checked and who has the responsibility to check the activity and/or all revisions for completeness, clarity, and accuracy.

Designer - The individual who performed the design.

Deficiency - Any condition considered to be adverse to quality including inadequacies of personnel, procedures, systems, methods, or items.

Documents - Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results. Examples of documents are drawings, specifications, instructions and procedures significant to the design, construction, testing, maintenance and operation of nuclear safety related equipment and systems.

Hold Point - That point in the manufacturing, preparation, development, installation and construction, inspection, or testing process that requires witnessing or review by Duke Power surveillance personnel.

Item - Any level of unit assembly, including structure, system, subsystem, subassembly, component, part, or material.

Nonconforming Item Report - A report of a deficiency in characteristics, documentation or procedure which renders the quality of an item unacceptable or indeterminate.

Nuclear Station Modification - A planned change in plant design accomplished in accordance with the requirements and limitations of applicable codes, standards, specifications, licenses and predetermined safety restrictions.

Carryover

Project Sponsor Engineer - The engineer, appointed by the Vice-President, Design Engineering, to oversee and coordinate all Design Engineering activities associated with the designated project.

Quality Assurance - The planned and systematic actions necessary to provide adequate confidence that a material, component, system or facility will perform satisfactorily in service. (Note: See 17.0.1.1 below for further explanation.)

Quality Assurance Records - Those records which furnish documentary evidence of the quality of items and of activities affecting quality.

Quality Assurance Requirements - Those inspection, test, examination, certification and documentation requirements which are imposed to provide objective evidence of the conformance of an item or activity to established design, engineering, standards, and code requirements.

Quality Control - Those quality assurance actions which provide a means to control and measure the physical characteristics of an item, process or facility to established requirements.

Responsible Engineer - The engineer assigned responsibility for an item or service.

Revisions - Any addition, correction, deletion or change.

Services - The performance by a supplier of activities such as design, investigation, inspection, nondestructive examination, and installation.

Sponsor Division - The sponsor division is the Design Engineering Department Division primarily responsible for coordination of the project design.

Survey - A documented activity performed in accordance with written procedures or checklists to verify, by examination and evaluation of objective evidence, that the quality assurance program has been developed, documented, and implemented in accordance with specified requirements.

Line (or Production) Organization - Those individuals directly responsible for activities related to the design, construction or operation of a nuclear power plant unit.

Variation Notice - A notice to provide a process by which field variations from Design Engineering drawings and specifications are evaluated and permitted.

17.0.1.1 Explanation of "Quality Assurance"

Quality Assurance as used in this document means the separate quality verification effort by Quality Assurance Department personnel in activities critical to the safety and integrity of the facility over and above that which is normally performed by the operating and technical staffs. The Quality Assurance program as defined above is not as alternative to good technical work. Rather, it is a system of controls to verify that quality is achieved. The Quality Assurance program in no way relieves the line management of achieving or assuring quality in all areas of their operation. As defined, the Quality Assurance Department has been given the responsibility to develop and manage a Quality Assurance Program for the Company.

Carryover

17.0.2 QUALITY ASSURANCE STANDARDS AND GUIDES

The Duke quality assurance program conforms to Appendix B of 10CFR50, as discussed in Section 17.0. The quality assurance program also conforms to applicable NRC Regulatory Guides and approved ANSI Standards, or applicable alternatives. Table 17.0-1 addresses quality assurance program conformance to the provisions of the NRC Gray Book (WASH 1283, Revision 1) "Guidance on Quality Assurance Requirements During Design and Procurement Phase of Nuclear Power Plants", Green Book (WASH 1309) "Guidance on Quality Assurance Requirements During the Construction Phase of Nuclear Power Plants", and the Orange Book (WASH 1284) "Guidance on Quality Assurance Requirements During the Operations Phase of Nuclear Power Plants" are also indicated, by reference to Regulatory Guides and standards, in Table 17.0-1. 4

Quality Assurance Program conformance with the documents identified in Table 17.0-1 may, however, be modified contingent upon future NRC or ANSI action. For example, if a draft document is subsequently approved and issued or if an approved document is revised, provisions of the more recent issue of such a document may be complied with in lieu of those contained in the version listed in Table 17.0-1, provided the more recent issue has been endorsed by the NRC. Also, formal regulatory actions of the NRC (e.g., issuance or amendment of a station's Facility Operating License) are considered to supersede the contents of 17.0-1, as applicable.

TABLE 17.0-1
CONFORMANCE OF DUKE POWER PROGRAMS TO QUALITY
ASSURANCE STANDARDS, REQUIREMENTS AND GUIDES

Standard, Requirement or Guide	Conformance Status	Remarks	
Regulatory Guide 1.8 Rev (1-R) - Personnel Selection and Training	Alternative	RG 1.8 Incorporates ANSI N18.1. Duke program conforms to ANSI N18.1-1971 except Radiation Protection Manager qualifications are contained in the Technical Specifications.	6
Regulatory Guide 1.28 Rev (2) Quality Assurance Program Requirements (Design and Construction)	Conforms	-------	6
Regulatory Guide 1.30 Quality Assurance Requirements for the Installation, Inspection and Testing of Instrumentation and Electric Equipment	Conforms	RG 1.30 Incorporates ANSI N45.2.4-1972 for both construction and operation	
Regulatory Guide 1.33 Rev (2) - Quality Assurance Program Requirements (Operations)	Conforms	RG 1.33 Rev (2) Incorporates ANSI N18.7-1976/ANS-3.2	
Regulatory Guide 1.37 - Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants	Conforms	RG 1.37 Incorporates ANSI N45.2.1-1973 for both construction and operation	
Regulatory Guide 1.38 Rev (2) - Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage and Handling of Items for Water-Cooled Nuclear Power Plants	Alternative	RG 1.38 Rev (2) Incorporates ANSI N45.2.2-1972. Duke program conforms to ANSI N45.2.2, 1972 except container markings shall be marked on at least one side (A.3.9(1)) and shall be applied with waterproof ink or paint in characters of a legible size, and caps and plugs for pipe and fittings are required unless specified by Design Engineering specification.	6
Regulatory Guide 1.39 Rev (2) - Housekeeping Requirements for Water-Cooled Nuclear Power Plants	Conforms	RG 1.39 Rev (2) Incorporated ANSI N45.2.3-1973 for both construction and operation	

TABLE 17.0-1

Standard, Requirement or Guide	Conformance Status	Remarks
Regulatory Guide 1.58 Rev 1 - Qualification of Nuclear Power Plant Inspection, Examination and Testing Personnel	Alternative	RG 1.58 Incorporates ANSI N45.2.6-1978 for both construction and operation. Duke nondestructive examination personnel will meet the qualification requirements of both SNT-TC-1A-1975 and SNT-TC-1A-1980. Duke operational/functional testing personnel will meet the requirements of ANSI N18.1-1971 rather than ANSI N45.2.6 6
Regulatory Guide 1.64 Rev (2) - Quality Assurance Requirements for Design of Nuclear Power Plants	Adopted with Clarification	RG 1.65 Rev (2) Incorporates ANSI N45.2.11-1974. The use of the originator's immediate supervisor for design verification shall be restricted to special situations where the immediate supervisor is the only individual competent to perform the verification. Advance justification for such use shall be documented and signed by the supervisor's management, with copy submitted to the Quality Assurance Department.
Regulatory Guide 1.74 - Quality Assurance Terms and Definitions	Conforms	RG 1.74 Incorporates ANSI N45.2.10-1973. Some definitions used by Duke are worded differently than those in this standard; however, the general meanings are the same.
Regulatory Guide 1.88 Rev (2) - Collection, Storage, and Maintenance of Nuclear Power Plant Quality Assurance Records	Conforms	RG 1.88 Rev (2) Incorporates ANSI N45.2.9-1974
Regulatory Guide 1.94 Rev (1) - Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel during the construction phase of nuclear power plants	Alternative	RG 1.94 Rev (1) Incorporates ANSI N45.2.5-1974. Duke program for McGuire and Catawba conforms to ANSI N45.2.5-1974 except the length of bolts shall be flush with the outside face of the nut. The Duke program for Cherokee conforms to ANSI/ASME N45.2.5-1978. 6
Regulatory Guide 1.116 Rev (0-R) - Quality Assurance Requirements for Installation, Inspections, and Testing of Mechanical Equipment and Systems	Conforms	RG 1.116 Rev (0-R) Incorporates ANSI N45.2.8-1975
Regulatory Guide 1.123 Rev (1) - Quality Assurance Requirements for control of Procurement of Items and Services for Nuclear Plants	Conforms	RG 1.123 Rev (1) Incorporates ANSI N45.2.13-1976

TABLE 17.0-1

Standard, Requirement or Guide	Conformance Status	Remarks
Regulatory Guide 1.144 Rev (1) - Auditing of Quality Assurance Programs for Nuclear Power Plants	Alternative	RG 1.144 Incorporates ANSI N45.2-12, (1977). Duke Program conforms to ANSI N45.2-12, 1977 except audits of suppliers are conducted in accordance with methods described in ANSI N45.2-13 (1976) in that these audits are conducted in accordance with established methods.
Regulatory Guide 1.146 Rev (0) - Qualification of QA Program Audit Personnel for Nuclear Power Plants	Conforms	-------
10CFR50, Appendix B - Quality Assurance Criteria for Nuclear Power Plants	Conforms	-------
10CFR50.55a - Licensing of Production and Utilization Facilities (ASME Boiler and Pressure Vessel Code, Section XI - Rules for Inservice Inspection of Nuclear Reactor Coolant Systems)	Conforms	10CFR50.55a Specifies ASME Section XI code dates. The Duke program conforms to 10CFR50.55a with the specific editions and addenda of Section XI specified in the Duke Power Inservice Inspection Plan for each station. 6
10CFR50 - Operators Licenses	Conforms	-------
10CFR55, Appendix A - Requalification Programs for Licensed Operators of Production and Utilization Facilities	Conforms	-------
10CFR50.55(e) - Conditions of Construction Permits	Conforms	-------

17.1 QUALITY ASSURANCE DURING DESIGN AND CONSTRUCTION

17.1.1 ORGANIZATION

Duke Power Company includes three departments which perform nuclear safety related activities during design and construction requiring quality assurance. These are the Design Engineering Department, Construction Department, and Quality Assurance Department. The responsibilities of these departments are listed below:

Department	Responsibilities
Design Engineering	Design Procurement of Original Items
Construction	Construction Procurement of Field Materials
Quality Assurance	Quality Assurance of all Activities Field Quality Control

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The Duke Purchasing Department (Mill Power Supply Company) is responsible for purchase administration for the other departments. Purchasing performs no quality assurance activities. The corporate organization chart for these departments is shown in Figure 17.1-1.

17.1.1.1 Corporate Organization

The Executive Vice-President, Engineering and Construction, is the corporate executive responsible for quality assurance and is the highest level of management responsible for establishing Duke's quality assurance policies, goals, and objectives. Directives have been issued by the Chief Executive Officer requiring development of and compliance with procedures in all safety related matters.

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Duke management is committed to applicable quality assurance regulations, codes, and standards as identified in 17.0.2 of this report.

The following is the basic philosophy of the Duke Power Quality Assurance Program:

The individuals who constitute Duke Power Company have full personal and corporate responsibility to assure that nuclear power plants are designed, constructed, tested and operated in a manner to protect the public health and safety. The comprehensive program to assure this begins with initial design and continues throughout the life of the station. The Duke Power Quality Assurance Program must assure that the necessary quality requirements for safety-related structures, systems, components and materials are achieved.

This program applies to the nuclear safety related portions of the plant but may also be optionally applied, in whole or in part, to other selected items necessary for reliable operation.

The Quality Assurance Department Quality Assurance Program Manual establishes the basic policies of the comprehensive program. This manual provides policy statements corresponding to the eighteen criteria of 10CFR50, Appendix B.

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The policies described in the Quality Assurance Department Quality Assurance Program Manual are implemented through departmental program manuals and procedures, and are, therefore, transmitted to all levels of management.

The Corporate Quality Assurance Manager, who directs the Quality Assurance Department (described in 17.1.1.4), has the sole responsibility for the development, management and implementation of the Company's Quality Assurance Program. The Corporate Quality Assurance Manager reports directly to the Executive Vice-President, Engineering and Construction. 6

Duke corporate management is continually involved in activities affecting quality and quality assurance requirements. The Executive Vice-President, Engineering and Construction, reviews minutes of all project review meetings which are held regularly and include quality assurance matters on the agenda, holds regular staff meetings which include the Corporate Quality Assurance Manager, and directs and reviews Corporate Audits of all areas performing activities affecting quality. Reports of trend analyses of nonconformances and Corporate Audits are sent to the Executive Vice-President, Engineering and Construction. 6 6

17.1.1.2 Design Engineering Department

The Design Engineering Department is headed by the Vice-President, Design Engineering, and consists of six divisions: Civil-Environmental, Mechanical-Nuclear, Electrical, General Services, Safety Review, Analysis and Licensing Division, and Project Management Division. The organization is presented on Figures 17.1-2. The department is responsible for the engineering design, procurement, and manufacturing of original items for Duke's nuclear stations. Design Engineering also is responsible for technical and schedule liaison with the NSSS vendor. These responsibilities include preparation verification, and control of design calculations, design drawings, and procurement and design specifications. 6

17.1.1.3 Construction Department

The Construction Department has overall responsibility for the construction of the stations, under direction of the Vice-President, Construction. Construction is organized by projects, and a Project manager is responsible for all site construction activities for each projects. Dependent on the stage of construction, not all positions may be filled; however, normally reporting to the Project Manager are a Human Resources Manager, Materials Manager, Construction Manager, Planning and Control Manager, and Engineering Manager. The Construction Manager is responsible for all craft activities including meeting schedule and cost objectives. The Human Resources Manager is responsible for Employment, Employee Relations, Training, Safety, Security, and Payroll. The Materials Manager is responsible for accounting, warehousing of material, field purchasing, and maintenance of construction equipment. The Engineering Manager is responsible for field engineering including technical support to the crafts, facilities planning, and construction engineering office functions. The Planning and Control Manager is responsible for project scheduling, budget preparation, status reporting, and schedule variation analysis. (The quality assurance controls on inspections and nonconforming items reports are described in 17.1.10.2 and 17.1.15.2.) The Construction Department organization is shown in Figure 17.1-3. 6

17.1.1.4 Quality Assurance Department

The Quality Assurance Department is responsible for all quality assurance activities related to Duke's nuclear stations. Quality Assurance activities are listed in Table 17.1-3. The Department is directed by the Corporate Quality Assurance Manager who reports to the Executive Vice-President, Engineering and Construction. The Corporate Quality Assurance Manager is responsible for developing, managing, and implementing the Quality Assurance Program of the Company. The qualifications and responsibilities of the Corporate Quality Assurance Manager is presented in Appendix A. The Corporate Quality Assurance Manager is independent of influences and responsibilities for schedules and costs. The organization chart of the Quality Assurance Department is presented in Figure 17.1-4. Quality Assurance Department personnel are organizationally separate and independent from those persons responsible for performing engineering, construction, operational, and procurement activities. Quality Assurance personnel have the freedom and responsibility to identify quality problems, to initiate, recommend or provide solutions; and to verify and report directly to management the implementation of such solutions. These personnel have written authority and responsibility to stop work when the continuance of the work would produce results adverse to quality. 6

The Quality Assurance Department consists of six divisions. Each is directed by an individual who reports to the Corporate Quality Assurance Manager. The general responsibilities of each division head are described below.

The Project Quality Assurance Manager is responsible for all quality assurance/quality control activities during the construction of nuclear stations. Reporting to him is a Senior Quality Assurance Engineer, Inspection Superintendent, and Surveillance Supervisor who are responsible for quality assurance/quality control activities. These activities include placing and approving quality assurance requirements on project originated documents, surveillance, review and approval of quality control inspection procedures and records, and maintenance of quality assurance records. 6

The Quality Assurance Manager, Technical Services is responsible for all quality assurance activities in the design of nuclear stations. Reporting to him are supervisors responsible for the placing and approving of quality assurance requirements on procurement documents and design documents and surveillance of the design process and for the review and approval and control of vendor, design, and procurement quality assurance records. He is responsible for development and maintenance of the quality assurance manuals and quality control inspection procedures. He also provides the Quality Assurance Department with a variety of services such as review and interpretation of codes and standards, analysis of trends affecting quality.

The Quality Assurance Manager, Administrative Services is responsible for department administration, control of supplier QA records, the QA Training Program, issue of QA Procedures, and certification of Quality Control Inspectors, NDE testers, and examiners. 6

The Quality Assurance Manager, Vendors is responsible for the vendor quality assurance programs, development and approval of approved vendors lists, and surveillance of vendor quality assurance programs.

The Quality Assurance Manager, Operations is responsible for all quality assurance and quality control activities during preoperational testing and operation at nuclear stations. These activities include quality control inspections,

administration of the inservice inspection program, and day-to-day surveillance of activities affecting nuclear safety. Reporting to him is a Senior Quality Assurance Engineer resident at each operational nuclear station who is responsible for quality assurance and quality control activities. These activities include maintenance of quality assurance records, surveillance, placing and approving quality assurance requirements on station procedures and performing quality control inspections. | 6

The Senior Quality Assurance Supervisor, Audit Division is responsible for the Departmental Quality Assurance Audit Program.

17.1.1.5 Department Interfaces

Quality related activities are performed by the Design Engineering, Construction and Quality Assurance Departments; and departmental interfaces are identified in the quality assurance program manuals associated with these areas. All Quality Assurance and Quality Control personnel have the authority to stop work pending resolution of any quality problems. If a member of another department disagrees, he is instructed to take the matter to his management. The disagreement may either be resolved at this level or at any level up to and including the Executive Vice-President, Engineering and Construction. | 6

17.1.2 QUALITY ASSURANCE PROGRAM

The Duke Quality Assurance Program and its supporting manuals, procedures, and instructions are applicable to items and activities designated as nuclear safety related. The Program consists of an overall Corporate Quality Assurance Program including separate programs for the various areas of activity. The supporting programs are the Engineering Quality Assurance Program, Construction Quality Assurance Program, and Quality Assurance Department Quality Assurance Program which apply to the respective activities performed by personnel in the Design Engineering, Construction, and Quality Assurance Departments. The activities performed by these departments are described in 17.1.1. A list of typical activities performed by the Quality Assurance Department and other departments appears in Table 17.1.4. A listing of the procedures appears in Tables 17.1-1 through 17.1-3, with references to the applicable criteria of 10CFR50, Appendix B. The Duke Quality Assurance Program also includes an ASME Quality Assurance Program which incorporates portions of the Engineering and Construction Programs with additional requirements specified by ASME.

The QA Manager, Technical Services is responsible for developing and revising the programs and assuring they are in compliance with applicable regulations, codes and standards. The Corporate Quality Assurance Manager and the head of the applicable department approve the programs and any revisions thereto. The quality assurance programs are mandatory requirements for performing activities affecting quality and are set forth in quality assurance manuals which are distributed on a controlled basis to all organizations and individuals responsible for quality. Revisions to these manuals are also distributed on a controlled basis. Anyone within the Quality Assurance, Design Engineering or Construction Departments may propose changes to the program to his superior or directly to the QA Manager, Technical Services. If acceptable and compatible with applicable requirements and corporate policy, the changes are implemented. Quality Assurance programs are reviewed periodically to assure they are in compliance with applicable regulations, codes, and standards; new or revised regulations, codes, and standards are reviewed for appropriate incorporation into the quality assurance programs. 5 5

The quality assurance program applies to nuclear safety related activities initiated prior to submittal of the PSAR, such as design and procurement and site investigation and preparation, in the same manner as other activities after PSAR submittal. Generally, the only activities of this type are NSSS vendor and consultant service qualification and selection. The procurement activities are handled as described in 17.1.4.

The program provides for training of personnel performing quality assurance activities in accordance with approved procedures. Formal training sessions are established for quality assurance policies, requirements, procedures, and methods. Retraining is performed periodically.

Training of personnel in the Quality Assurance Department is performed by the Quality Assurance Manager, Administrative Services Division in accordance with an approved procedure. Quality Control Inspectors are trained in the specific area in which they will be inspecting. All new employees are required to attend an indoctrination class on quality assurance, authority, organization, policies, manuals, and procedures. 5

Additional formal training is conducted in specific topics such as NRC regulations and guides, quality assurance procedures, auditing, and applicable codes and standards. Retraining is performed as required. On-the-job training is continuously performed by the employee's supervisor in the specific procedures and requirements in his area. Training records are maintained for each person, and no one is assigned a job until he is properly trained.

New personnel in Design Engineering are required to attend orientation classes describing quality assurance criteria and guides, basic definitions, and the Engineering Quality Assurance Program procedures and requirements. Annual retraining is performed for technical personnel, and it includes a review of plans and procedures and changes to regulatory requirements.

Construction Department personnel receive training in the Construction Quality Assurance Program. The Quality Assurance Program requires formal training, on-the-job training, examination and certification. Construction engineering and craft personnel receive on-the-job training in procedures and requirements applicable to their areas.

Periodic audits are conducted in accordance with established procedures to measure the effectiveness of implementation of the programs. The system of audits is described in 17.1.18.

During the design and construction phases of Duke's nuclear plants, project review meetings are held regularly to assess the design and construction status and provide an interface among the Design Engineering, Construction, Nuclear Production and Quality Assurance Departments. Schedules are maintained throughout those phases, and as design and construction nears completion, provisions are made for final checkout and testing of systems, components and structures by Construction. Design Engineering, Construction and Nuclear Production participate in the planning and scheduling for transfer of completed portions of the plant from construction jobsite and project management at its home office. These representatives participate in and are advised of the schedules for system turnover. Prior to actual turnover, written procedures are developed for control of the transfer of all portions of the plant including associated documentation. The procedures include check lists, marked drawings, documentation lists, system status, and receipt control. 6 6

Nuclear safety-related systems, structures and components are identified in the PSAR and FSAR for the particular station.

The Duke Quality Assurance Program is described in detail in the following sections of this report. The descriptions follow the criteria presented in 10CFR50, Appendix B.

17.1.3 DESIGN CONTROL

Duke has assigned overall responsibility for design of nuclear stations to its Design Engineering Department and responsibility for quality assurance of design to its Quality Assurance Department. The relationships existing for interdepartmental design control, and procedures for control within the various departments and the NSSS supplier are discussed below.

The Engineering Quality Assurance Program contains procedures and instructions for implementation and assurance of design control during the various phases of design activities for nuclear safety related items. These procedures and instructions assure the design is performed in accordance with approved criteria, and that deviations and nonconformances are controlled.

Each safety-related design document, such as a calculation, specification, purchase requisition, or drawing, is prepared by a qualified individual in Design Engineering who specifies and includes the appropriate codes, standards, and SAR commitments within the design documents. He notes any deviations or changes from such standards within the design documentation package. Each design document is then checked by another individual qualified in the same discipline and is reviewed for concept and conformity with applicable codes and standards (as specified within the design documentation package). The document is approved by the chief engineer or his designee having overall responsibility for the design function. A review of each specification is made by the Quality Assurance Manager, Technical Services or his designee to assure incorporation of necessary quality assurance information. The entire review process is documented.

During the check and review, particular emphasis is placed on assuring conformance with applicable codes, standards and SAR design commitments. The individuals in Design Engineering and Quality Assurance assigned to perform the check and review of a nuclear safety related document have full and independent written authority to withhold approval of the document until every question concerning the work has been resolved. If required, the matter can be carried up to the Vice-President, Design Engineering by individuals in Design Engineering or to the Corporate Quality Assurance Manager by individuals in Quality Assurance for resolution. The checker verifies calculations by checking or by alternate computations. Analytical models, theories, examples, tables, codes, computer programs, etc., used as bases for design must be referenced in the design document and their application verified during check and review. Model tests, when required, to prove the adequacy of concept or design are reviewed and approved by the responsible engineer. The tests used for design verification must meet all the requirements of the designing activity. Computer programs are controlled in accordance with the Design Engineering Quality Assurance Manual whereby programs are certified to demonstrate their applicability and validity. 6

Prior to the release of any safety-related design document, it is reviewed by the chief engineer of the sponsor division (i.e. Civil-Environmental, Mechanical-Nuclear, Electrical) or his authorized representative. Additionally, the documents are reviewed by the chief engineers of the other division, or their authorized representatives, to assure coordination of disciplines. If the document clearly involves no coordination with the other divisions, this review may be waived by the sponsoring chief engineer, with documented concurrence by the other chief engineers.

Any changes to the original design and procurement documents, including field changes, must be reviewed, checked and approved commensurate with the original approval requirements as discussed above.

After drawings and specifications have been properly prepared, checked, and reviewed by the appropriate parties, the responsible engineer sends the document to the General Services Division which distributes copies of the document in accordance with the approved distribution code. When required, each recipient of a design document verifies his receipt of such document in writing to the General Services Division. The General Services Division after verification of distribution to the responsible engineer, maintains the required documentation in its files until such time as it is stored or turned over to the Quality Assurance Department for final storage.

When deficiencies are discovered in the construction phase which affect the design of safety-related structures, systems, and components, such deficiencies are noted on Nonconforming Item Reports sent by an engineer (originator) to the Vice-President, Design Engineering or his designee (recipient). The report is logged in and is then forwarded for appropriate review to the responsible engineer, who coordinates further review of the problem and revises all design documents affected by the report as necessary. Where required, the responsible engineer also forwards copies of the report to the chief engineers in other divisions, who coordinate any revisions to their documents affected by the report. The responsible engineer and an individual in Quality Assurance, Technical Services Division then signoff the engineering portion of the report. The responsible engineer returns one copy of the completed report to the recipient and sends copies to the appropriate engineering files. The recipient then forwards the approved report to the originator.

Design interfaces are maintained by communication among the principals such as Design Engineering, Construction, Purchasing, Nuclear Production, NSSS supplier and other vendors. Methods by which this is accomplished include the following: 6

(a) Safety-related design documents are reviewed by the chief engineer of the applicable Design Engineering division or his authorized representative. As appropriate, subsequent review or waiver of review by the other chief engineers is documented.

(b) Design review, project review and startup review meetings are scheduled to coordinate design, procurement, construction and preoperational testing of the station. These meetings provide a primary working interface among the principal departments.

(c) Reports of variations and nonconformances (applicable to Construction Department and Design Engineering) are transmitted and controlled by procedures in the department quality assurance program manuals and as outlined in this section. Quality Assurance approves resolution of all nonconformances. All variations from Design Engineering documents must be approved by Design Engineering. Design Engineering is required to evaluate the cause of the variation to determine if a design nonconformance exists. When a design nonconformance results it must be submitted to Quality Assurance for review and approval. Design Engineering is required to perform a trend analysis on all variation notices. These trends and implementation of the entire variation notice process receive audits and surveillance by Quality Assurance. 6

(d) The NSSS supplier's quality assurance programs are reviewed and approved by the Quality Assurance Department and must include procedures that provide for the control of designs used in the production of safety-related items.

(e) Formal lines of communication are established between Quality Assurance, Technical Services and the NSSS supplier shortly after award of the NSSS contract.

The lines of the communication are established and documented through the project organization of both Design Engineering and the NSSS supplier, and through the quality assurance organizations of Duke and the supplier.

(f) Items designed by the NSSS supplier, other vendors or consultants are reviewed by Design Engineering to assure compatibility with Duke designed systems and compliance with applicable regulatory requirements.

Standard commercial ("shelf hardware") items or previously approved items used in nuclear safety related designs are subjected to the same verification and checking process for suitability of application as other items.

17.1.4 PROCUREMENT DOCUMENT CONTROL

Duke's quality assurance program requires that applicable regulatory requirements, design bases and other requirements, which are necessary to assure adequate quality, be included or referenced in the procurement documents for safety related items and related spare and replacement parts. The control of procurement documents is described below.

17.1.4.1 Engineering

The technical aspects of procurement documents for original installations are prepared by Design Engineering and form bases for purchase order preparation. The Quality Assurance Department places and approves quality assurance requirements (documentation, NDE, tests and inspections, etc.) on these documents. Procedures outlined in 17.1.3 describe the preparation, verification, and control of purchase requisitions, specifications, and drawings. In addition to the procedure outlined in 17.1.3, each procurement specification when required follows the specification format in the Engineering Quality Assurance Program for such activities as fabrication, cleaning, erecting, packaging, handling, shipping, storing, and inspection. These include or reference applicable design bases, technical requirements (including regulatory requirements such as 10CFR50, Appendix B and ANSI N45.2 or applicable portions thereof), component and material identification, drawings, specifications, codes and standards (including their revision status) tests and inspection requirements, and special process instructions. Procurement specifications also identify the documentation to be prepared, maintained, and submitted by the vendor for Duke's review and approval of such drawings, procedures, inspection and test records and personnel qualification records. This documentation includes major repair records. Purchase requisitions contain instructions for record retention and disposition if such records are to be maintained by the vendor. The procurement specification also provides the right of access to vendor facilities and records for inspection and audit. Deviations from specifications are approved by Duke.

Procurement documents are checked for inclusion of necessary requirements, proper referencing of procurement specifications, and adequacy by a checker, qualified to conduct the review and are approved by the chief engineer of the originating division or his designee. All procurement documents are checked by the Quality Assurance Department for inclusion of quality assurance requirements as required by the quality assurance manuals. Approved copies are sent to Construction, Purchasing, and Nuclear Production, as applicable. Purchase requisitions for safety related items are so identified and contain the necessary quality assurance requirements. The reviews and approvals described above are documented and retained as records. Revisions to procurement documents are reviewed and approved in the same manner as the originals. 6

Vendors are evaluated to assure that adequate control of their procurement documents for subvendors is maintained. Conformance with the vendor's quality assurance program is monitored by Quality Assurance Department, Vendors Division personnel. The requirements for procurement document control by vendors are included in their quality assurance programs.

A current list of approved vendors is maintained by Quality Assurance and is a controlled document and is issued as required. 6

17.1.4.2 Purchasing

The Purchasing Department originates purchase orders in strict accordance with approved purchase requisition and revisions thereto. An independent check for correct transferral of data from the requisition to the purchase order is performed by QA Technical Services Division personnel. This includes determination that the supplier is on the approved suppliers list. | 6

17.1.4.3 Construction

Purchase requisitions are prepared by Construction for certain field procured items and services in a manner similar to that specified in 17.1.4.1. Purchase requisitions for safety related items are so identified and the quality assurance requirements are indicated and approved by Quality Assurance Projects Division personnel. | 6

17.1.5 INSTRUCTION, PROCEDURES, AND DRAWINGS

17.1.5.1 Engineering

Design Engineering has the responsibility during design, initial procurement and manufacture, for the preparation of related specifications, drawings, instructions and procedures for nuclear stations. To assure that design requirements imposed by codes, standards, regulations, and site considerations have been considered, Quality Assurance procedures provide for review, approval and documentation of activities which affect the quality of safety-related items. The QA Department Technical Services Division is responsible for the quality assurance aspects of these documents which contain quality assurance requirements. Procedures are set forth in the Engineering Quality Assurance Program and outlined in Table 17.1-1. All instructions and procedures for activities involving nuclear safety include appropriate quantitative (e.g., dimensions, tolerances, operating characteristics) and qualitative acceptance criteria which are determined by the responsible engineer.

17.1.5.2 Construction

The Construction Department has the responsibility for the construction of nuclear stations. The Construction Quality Assurance Program includes procedures which require that work performed on safety-related items be accomplished in accordance with the requirements imposed by specifications, drawings, codes, standards, regulations, quality assurance criteria and site circumstances.

The acceptance criteria which are established by Design Engineering are incorporated in the instructions, procedures and drawings used to perform the work. Documentation, including test results and inspection records, demonstrating that the work has been properly performed is maintained. Procedures also provide for review, audit, approval and documentation of activities affecting the quality of safety-related items to determine that all criteria have been met. The quality assurance procedures are outlined in Table 17.1-2.

17.1.5.3 Vendors

Vendors of safety-related items have the responsibility for compliance with purchase specifications and other requirements imposed by codes, standards, quality assurance criteria, and design or construction considerations. This is accomplished by the development and implementation of vendor quality assurance programs which provide for review or audit approval and documentation of all activities affecting quality of safety-related items to determine that important activities have been satisfactorily accomplished. Vendor quality assurance programs, instructions, procedures, and drawings issued to Duke are controlled by procedures outlined in the appropriate quality assurance program manuals.

17.1.6 DOCUMENT CONTROL

17.1.6.1 Engineering

The preparation and issuance of quality assurance manuals, instructions, procedures, specifications, procurement documents and drawings, including changes thereto are controlled by procedures in the Engineering and Construction Quality Assurance Manuals. The procedures assure that documents, including changes and revisions, are adequately checked, approved and released by authorized personnel and that documents are transmitted and received at appropriate locations including the location where the prescribed activity is to be performed. Documents originated by vendors are also controlled in the same manner. Document control procedures require that the using organization be promptly notified when document revisions are issued, that records be maintained of receipts from receiving organizations, and that superseded documents are destroyed or are only retained when they have been properly labeled. Inventories of current documents are maintained and controlled.

In addition, master document lists are prepared for each project, maintained and distributed by the General Services Division of Design Engineering. The master document lists are revised daily as required and issued monthly as a minimum. The list contains document identification number (drawing no., specification no., etc.), the latest revision number, the last transmittal date, and the responsible engineer.

17.1.6.2 Construction

Each construction project is responsible for the control of documents on site. Safety related activities are only performed after receipt of approved documents. Certified Document Controllers are appointed to maintain and control drawings, specifications, procedures, and manuals. The Document Controllers replace superseded or revised documents and distribute and control current documents to assure they are available at the proper location prior to commencement of work. A master file of drawings is maintained and a master index, updated regularly, is used to identify drawings, revisions, number of copies, and distribution. Inspections are performed regularly and documented to assure proper functioning of the control system.

17.1.7 CONTROL OF PURCHASED MATERIAL, EQUIPMENT AND SERVICES

Duke's quality assurance program requires the control of safety-related items or services purchased from a vendor, subvendor or consultant.

17.1.7.1 Engineering

Design Engineering is responsible for the technical qualification of vendors and control of the initial procurement of all safety-related items and services. Specifications are prepared, checked, and approved by Design Engineering and Quality Assurance personnel and forwarded to Purchasing, who prepares an inquiry and forwards it to approved vendors except procurement of consultant services is handled directly by Design Engineering, without involving Purchasing. Quality Assurance is responsible for qualification of vendor's quality assurance programs.

17.1.7.1.1 Vendor Qualification and Selection

Nuclear safety-related material, equipment and services may be procured only from qualified vendors. Vendor qualification is accomplished by a Quality Assurance Vendors Divisions evaluation of the vendor's quality assurance program. The responsible engineer initiates a request for an evaluation of a potential vendor. The request lists applicable codes, standards, regulations and items of services to be supplied. When required, an audit or survey is performed by the Vendors Division of Quality Assurance. The audit or survey is carried out in accordance with a comprehensive vendor audit checklist to determine the ability of the vendor's quality assurance program and manual(s) to meet applicable criteria of 10CFR50, Appendix B. The audit team prepares a formal audit report which states whether or not the vendor is qualified to supply the specific items or services. This includes a review of the vendor's quality assurance manuals. The audit report is reviewed and approved or disapproved by the Quality Assurance Manager, Vendors. An approved vendor may then be included on the Quality Assurance approved Vendor's List. This approval is a prerequisite for vendor acceptance by the responsible engineer. Technical and commercial qualifications are determined by the responsible engineer and the Purchasing Department. Vendor selection is based on bid evaluations by Design Engineering, Purchasing, and Quality Assurance. The evaluation includes conformance to specifications, Quality Assurance requirements, and technical and commercial qualifications of the vendor. 6

Vendors are reevaluated when one year has elapsed since the last evaluation, surveillance and/or procurement activity.

When an item or service for which a vendor is being qualified is: (a) relatively simple and standard in design, manufacture, and test, (b) adaptable to standard or automated inspections and/or tests, vendor qualification may be based on documentation of (a) the vendor's successful record of producing such items, (b) the performance history of such (or similar) items, or (c) an evaluation by the QA Vendors Division of the vendor's current quality program.

These standard commercial "standard stock" items or previously approved items used in nuclear safety related designs are subjected to the same verification and checking process for suitability of application as other items.

17.1.7.1.2 Purchase of Material

After vendor selection is made, Design Engineering prepares a purchase requisition. The QA Department Technical Services Division includes applicable quality assurance requirements. The purchase requisition is checked and approved as outlined in 17.1.4.1. The approved purchase requisition is forwarded to Purchasing who prepares a purchase order including quality assurance requirements for forwarding to the successful vendor in accordance with the controls outlined in 17.1.6.1.

17.1.7.1.3 Vendor Surveillance

Procedures outlined in the QA Department Quality Assurance Program have been established which implement the surveillance program for vendors. This assures that items and services procured for use in nuclear safety-related applications are in compliance with applicable procurement specifications. Vendor surveillance is performed by personnel in the Vendors Division of Quality Assurance.

These procedures provide for surveillance of those characteristics or proceses to be witnessed, inspected or verified. Surveillance activities assure that the vendor complies with all quality requirements outlined on the purchase specification and purchase requisition. The surveillance report becomes a part of the quality assurance file for the item or service. The surveillance representative has the authority and responsibility to stop work when the required quality standards are not met.

17.1.7.1.4 Documentation

Except for some "standard stock" items each shipment of items procured from a vendor must be accompanied by a certificate of conformance (or equivalent) which identifies the applicable procurement documents and item(s). The certificate specifies that the item meets the procurement requirements and lists the documentation transmitted, including repair records and a description of any deviations. 6

The QA Technical Services Division reviews and approves this documentary evidence of item conformance with procurement requirements.

17.1.7.2 Construction

The Construction Department initiates purchase requisitions for certain safety-related items and services such as weld filler material, aggregate, cement testing, etc., except as specified in 17.1.7.5. These purchase requisitions are submitted to the Quality Assurance Projects Division for review and approval and to Purchasing for procurement.

17.1.7.2.1 Vendor Qualification and Selection

Vendor qualification for construction is accomplished by a technical and quality assurance evaluation performed by the engineer responsible for the

procurement of the item and quality assurance personnel, respectively. All vendors for safety-related items must be qualified by the Quality Assurance Vendors Division according to procedures in the Quality Assurance Program Manual prior to their receiving a request to bid. Vendor selection and contract award is based on bid evaluation conducted by Construction and Purchasing. The evaluation of bids includes the consideration of technical and commercial qualifications of the vendor.

17.1.7.2.2 Vendor Surveillance

Surveillance of vendor compliance with contract, technical requirements and quality assurance requirements is accomplished by Construction and Quality Assurance, respectively, by the performance of qualification tests of material lots upon receipt and prior to use, or by evaluation of vendor certified tests.

17.1.7.2.3 Documentation Review

The Senior Quality Assurance Engineer or his designee reviews and approves documentary evidence of item conformance with procurement requirements prior to installation or use of the item. 6

17.1.7.2.4 Receiving and Storage

Quality Control performs receiving inspections in accordance with the written procedures in the Construction Quality Assurance Program Manual to verify item conformance with receiving requirements. During the receiving process, items are reviewed for proper identification and documentation including test results. Based on this receiving inspection, each nonconforming item is identified. Procedures have been developed for following the status of these items with a computer program which enables Quality Assurance personnel to easily ascertain the status of all items not suitable for installation or operation. Safety-related items are stored in accordance with the Construction Quality Assurance Program and the procurement documents or special instructions issued by Design Engineering. Reference 17.1.10.2 for further description of receiving inspection and 17.1.15.2 for nonconformance.

17.1.7.3 Purchasing

The Purchasing Department receives an approved purchase requisition and prepares a purchase order which includes purchase requisition requirements. An independent verification of the transfer of the requirements from purchase requisition to purchase order is accomplished by the Quality Assurance Technical Services Division. The purchase order is forwarded to the selected qualified vendor. Consultant services are handled in accordance with 17.1.7.5.

17.1.7.4 Vendors

Duke assures that vendor quality assurance programs provide for surveillance, evaluation and approval of subvendors supply items and services. This assurance is accomplished by reviewing vendor audits of subvendors as part of the pre-bid audit, by making vendor control of subvendor work a criterion for vendor approval or disapproval, and by making vendor surveillance of subvendor a requirement of the purchase requisition.

17.1.7.5 Consultant Services

Consultant services are utilized by Duke to provide technical assistance and are controlled by similar procedures and documents as are suppliers of nuclear safety-related materials and equipment except the using department may handle the purchase administration rather than the Purchasing Department. Documentation of such services is controlled by the Quality Assurance Department. Results of consultant services are reviewed by the responsible engineer and are incorporated and documented into the project design as required.

17.1.8 IDENTIFICATION AND CONTROL OF MATERIALS, PARTS AND COMPONENTS

17.1.8.1 Identification

Identification requirements for materials, parts and components important to nuclear safety are stated in Duke Design Engineering specifications, drawings and purchase documents. Specific identification requirements are as follows:

(a) As appropriate, items, assemblies, parts, subassemblies, and components are permanently identified by tagging, color coding, strip marking, imprinted tape or other means to permit identification with supporting documentation. Some components, such as pressure vessels are identifiable by nameplates as required by applicable codes, standards or Duke specifications. Materials, parts and components are traceable from such identification to a specific purchase order to manufacturers' records and to quality assurance records and documentation.

(b) When required by procurement documents, materials are identified by heat, batch or lot numbers which are traceable to the original material. Care is exercised to prevent the duplication of serial numbers. When several parts are assembled, a list of parts and corresponding numbers is included in the documentation.

(c) When required by specifications or codes and standards, identification of material or equipment with the corresponding mill test reports, certifications and other required documentation is maintained throughout the operating file of the material or equipment.

(d) Sufficient precautions will be taken to preclude identifying items with materials that will affect the function or quality of the item being identified.

17.1.8.2 Control

Control of material, parts and components is governed by approved vendor's procedures and procedures in the Duke departmental quality assurance manuals. Specific control requirements include:

(a) Nonconforming or rejected materials, parts, or components are identified to assure that they will not be inadvertently used.

(b) The verification of correct identification of material, parts, and components is required prior to release for assembling, shipping and installation.

(c) Upon receipt, procedures require that materials, parts or components undergo a receipt inspection to assure they are properly identified and that the supporting documentation is available as required by the procurement specifications.

(d) Each organization which performs an operation that results in a change in the materials, parts or components is required to make corresponding revisions and/or additions to the documentation record as applicable.

17.1.9 CONTROL OF SPECIAL PROCESSES

Duke quality assurance program manuals require that special processes, including but not limited to, cleaning, welding, pipe bending, heat treating, nondestructive testing and calibration are controlled and accomplished by qualified personnel using qualified procedures. All special processes must conform with applicable codes, standards, specifications, criteria and other special requirements. Results of special processes are documented to provide evidence of verification.

17.1.9.1 Engineering

The Engineering Quality Assurance Program requires that vendors are evaluated and approved for adequate control of special processes prior to contract award. Special processes utilized by the NSSS supplier and/or other vendors are monitored for adequacy by surveillance visits performed by Design Engineering and/or Quality Assurance personnel. Vendor surveillance is described in 17.1.7.1.

17.1.9.2 Construction

The Construction Quality Assurance Program contains or references documented procedures, process control sheets, checklists, etc., for the control of special processes. These written procedures include appropriate quantitative or qualitative acceptance criteria. Typical processes include:

(a) Cleaning.

(b) Pipe Bending.

(c) Heat Treating.

(d) Welding.

(e) Non-destructive Testing.

Procedures are in effect which qualify process procedures and personnel. Personnel performing non-destructive testing are certified in accordance with American Society for Non-destructive Testing, Recommended Practice (SNT-TC-1A). Welding personnel and welding procedures are certified in accordance with ASME Code, Section IX when applicable. Qualification records are identifiable and and retrievable for both personnel and procedures. Completed check lists and documentation are maintained at the construction site. Equipment is calibrated under the equipment calibration program.

17.1.9.3 Vendors

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Special processes employed by vendors may be conducted in accordance with approved written procedures and meet specified criteria. Vendor special processes are evaluated and monitored by Duke. This surveillance is discussed in 17.1.7.1 and 17.1.9.1.

17.1.10 INSPECTION

The Duke quality assurance program requires that examination, measurements or test of items in process are performed for each work operation where necessary to assure quality. Written procedures describe inspections and examinations and list or reference acceptance criteria, both qualitative and quantitative.

17.1.10.1 Engineering

Vendors are required to have an approved quality inspection program which verifies conformance with approved procedures, purchase documents and codes. The program must be approved by Quality Assurance personnel prior to contract award. Quality Assurance Vendors Division personnel perform periodic audits and surveillance of vendor inspection programs, including those at scheduled hold points, to assure continued quality assurance adequacy. Personnel performing this function are required to have adequate training and experience to perform necessary evaluations of inspection programs. Personnel involved with surveillance functions have sufficient authority to stop work, when necessary, until conditions adverse to quality have been corrected. Written reports provide documentary evidence of audit and surveillance activities.

17.1.10.2 Construction

The Inspection Program at the Construction Project is under the direction of the Project Quality Assurance Manager. The Construction engineering organization is separate from the craft organization performing the activity to be inspected. Inspections are performed by Quality Control personnel who are other than those who perform the activity. Inspection procedures and results of inspections are approved by the Senior Quality Assurance Engineer. Inspection procedures, instructions, and checklists contain the following information or require this information on inspection reports: 6 6

a) characteristics to be inspected

b) responsibility for the inspection

c) acceptance and rejection criteria and acceptability

d) method of inspection

e) signature or initials of inspector 6

f) record of results of the inspection

g) verification of inspection reports by quality assurance personnel

h) date

i) information related to nonconformance and corrective action taken

j) filing of records of inspection

k) instrumentation calibration information

All quality control inspectors are examined and certified in their particular areas. Current qualification and certification files are maintained for each inspector. Nondestructive examination inspectors are certified in accordance with American Society for Non-destructive Testing (SNT-TC-1A) recommended practice. Written procedures require the test and certification of inspectors in other categories such as Mechanical, Electrical, and Structural as described in the Quality Assurance Program. Certification procedures and certifications are approved by Quality Assurance. 6

Examinations, measurements and tests of items are performed for each work operation where necessary to assure quality. Examinations are conducted during receipt, installation and at completion of installation or repair of items in accordance with written procedures and check lists. Inspection of modifications, repairs or replacements is performed commensurate with the original requirements. Results of inspections are documented and, as a minimum, identify the inspector, the type of observation, the acceptability of the result and the action taken in connection with any deficiencies noted. Quality Assurance Engineers and Quality Control Inspectors have full authority and responsibility to stop work when conditions adverse to quality affecting nuclear safety are detected. If resumption of work would make later correction impossible, the work cannot proceed until the deficient condition is corrected.

The Construction Project Quality Assurance Staff specifies inspection hold points in and approves all construction and installation procedures and quality control inspection procedures prior to their use. Inspection procedures or instructions are available with necessary drawings and specifications for use prior to performing inspection operations. After inspection data is collected and reviewed by Quality Control Inspectors the reports are technically reviewed and approved by Quality Assurance before becoming valid. Thus, inspection procedures and results undergo a review independent of the Construction project.

Bypassing of required inspections and tests are rare; however, such bypassing is documented, resolved, and controlled with nonconforming item reports. When direct inspection is not possible, other equivalent methods are used to verify the adequacy of the activity.

17.1.10.3 Vendors

Vendor quality assurance programs provide for internal inspection and tests in addition to surveillance and audits of subvendors as required. Vendor inspection programs must meet the applicable requirements of 10CFR50, Appendix B and must be equivalent to Duke's inspection program. Vendor quality assurance programs are evaluated and monitored by Quality Assurance Vendors Division Personnel. Vendor approval and surveillance are described in 17.1.7.1.

17.1.11 TEST CONTROL

The Duke quality assurance program provides for the control of safety-related tests. These tests may be specified by codes, standards, vendors and/or Duke's various departments.

17.1.11.1 Engineering

Design Engineering includes performance or qualification test requirements in purchase specifications which are approved by both line and quality assurance personnel. The tests may also be specified by referenced codes or standards. The QA Technical Services Division includes acceptance, certification and non-destructive tests and examinations in the purchase specification. It is the responsibility of the vendor to perform tests as required by the specificiations. The vendor may not vary from the required tests unless the variation is approved and the tests results must be submitted to, and approved by, the responsible engineer in Design Engineering or the QA Manager, Technical Services, as appropriate. Monitoring of vendor tests is performed by Duke Engineering or Quality Assurance representatives as appropriate. 6 6

17.1.11.2 Construction

Construction Engineering performs field tests in accordance with procedures contained in the Construction Quality Assurance Program. Detailed procedures are developed for each type of test. The procedures include the system status, environmental conditions, required test equipment, acceptance criteria, and requirements for data collection. Process control procedures and checklists are used to indicate hold points for inspection as specified by Quality Assurance. All tests are performed such that test results demonstrate the item will perform as designed. Test records include the following information:

a) A description of the type of observation

b) Evidence of completing and verifying the test

c) The date and results of the test

d) Information related to nonconformance

e) Inspector or data recorder identification

f) A statement as to the acceptability of the results

The tests are inspected and documented by Quality Control inspectors qualified in accordance with certification procedures. Only equipment calibrated as described in 17.1.12.2 may be used. The test results are evaluated and approved by Quality Assurance engineers under the direction of the Senior Quality Assurance Engineer. 6

17.1.11.3 Vendors

Vendor quality assurance programs contain adequate procedures to assure that test control meets Duke requirements. Duke Quality Assurance evaluates and monitors vendor quality assurance programs. Vendor qualification and surveillance are discussed in 17.1.7.1.

17.1.12 CONTROL OF MEASURING AND TEST EQUIPMENT

To maintain accuracy within specified limits, Duke quality assurance programs require that tools, gauges, instruments, and measuring and test devices, used in activities affecting the quality of safety-related items, are properly controlled, calibrated, and adjusted at specific periods.

17.1.12.1 Engineering

17.1.12.1.1 Vendor Measuring and Test Equipment Control

Each vendor quality assurance program is evaluated and approved by the Quality Assurance Vendors Division to assure that an adequate system for control of measuring and test equipment is in effect. The system performance is subjected to surveillance and audit to assure continued adequacy.

17.1.12.1.2 Vendors

Vendor quality assurance programs contain measures to assure that all measuring and test equipment used for verification of product quality are maintained and controlled in accordance with Duke quality assurance requirements. Duke evaluates and monitors vendor quality assurance programs. Vendor qualification and surveillance are discussed in 17.1.7.1.

17.1.12.2 Construction

Written procedures in the Construction Quality Assurance Program assure that measuring and testing equipment used in activities affecting the quality of safety-related items are calibrated for accuracy. The following requirements are included in these written procedures:

(a) Equipment identification by the use of permanently etched or attached serial number.

(b) Calibration interval by device or generic grouping of devices.

(c) Any inventory of measuring and test equipment which is controlled by the system.

(d) A label to indicate calibration status.

(e) Reevaluation of items which have been accepted based on measurements made with instruments which are subsequently found to be out of calibration.

(f) Techniques and methods for calibration and adjustment of tools, gauges, and other measuring devices which include the appropriate tolerance requirements.

(g) A recall system to assure return of devices due for calibration.

(h) Preparation and maintenance of calibration records to indicate identity of equipment, date of calibration, identity of calibration technician, type of observation, results, acceptability, and actions to make the necessary corrections with any deficiencies noted.

(i) Environmental limitations.

(j) Standards used to calibrate measuring and test equipment have the capability for the accuracy, stability and range required for the intended use and are certified and traceable to the National Bureau of Standards. If no national standards exist, the basis for calibration is documented.

(k) Control measures for the storage, issuance, and shipment of measuring instruments.

The intervals between calibrations are based on the manufacturer's recommendations, frequency of use, measurement criticality and accuracy, and ruggedness of the equipment. Experience with particular equipment and evaluation of calibration results also determines the calibration frequency.

As a rule the calibration program achieves a minimum ratio of 4-to-1 calibration standard accuracy to measuring and test equipment accuracy unless limited by the state of the art; however, when an accuracy ratio of less than 4-to-1 is utilized, an evaluation of the specific case is made.

17.1.13 HANDLING, STORAGE, AND SHIPPING

Specifications for handling, storage, shipping, cleaning, and preservation are prepared by the appropriate department and include special requirements such as: environmental control (i.e., temperature, humidity, pressure, space, loading, etc.) and identification and documentation (i.e., records of identification, quality control, shipping, receipt, and storage). The receipt and storage of items are performed in compliance with procedures and instructions by Construction and Nuclear Production. | 6

17.1.13.1 Engineering

Handling, storage, shipping, and cleaning requirements to assure preservation of items are specified in procurement documents in accordance with procedures detailed in the Engineering Quality Assurance Program. When appropriate, surveillance is performed by qualified individuals to assure proper preparation for shipment and handling.

17.1.13.2 Construction

The Construction Department has responsibility for assuring that items are properly received and stored at the jobsite as set forth in the procurement documents. Procedures for receipt inspection, handling, and storage of items at the jobsite are detailed in the Construction Quality Assurance Program.

17.1.13.3 Vendors

Vendor quality assurance programs contain measures to assure that handling, storage, shipping, and preservation of items furnished to Duke are in accordance with Duke quality assurance requirements. Duke evaluates and monitors vendor quality assurance programs. Vendor qualification and surveillance are discussed in 17.1.7.1.

17.1.14 INSPECTION, TEST, AND OPERATING STATUS

17.1.14.1 Engineering

The quality assurance manuals and procedures of vendors are reviewed by Quality Assurance to assure that adequate procedures exist for the status control of tests and inspections. A document, such as a shop traveler, is required for a component or assembly throughout the manufacturing, inspecting, and testing processes which lists the required inspections and tests and provides for signatures for the individuals responsible for approving them. Labeling procedures are evaluated to assure that the vendor has means for ascertaining the status of a component or assembly as "Accepted," "Hold" or "Rejected."

17.1.14.2 Construction

During plant construction, the Construction Department uses process control procedures, test and inspection procedures, installation records, travelers, and checklists to control the installation of components, structures and systems. These documents contain hold points, activity checklists, and in many cases, step-by-step signoffs which indicate the status of fabrication, installation, inspections, and tests. This system is used for such activities as welding and installing of piping systems, concrete placement, electrical wiring installation, and equipment installation. In addition to this status documentation, a chart of system and structure status is maintained by project management at the jobsite.

In the welding and installation of piping systems, the welder places his stamp near a weld when it is completed. The inspector then performs the required inspections. After inspection, the inspector initials the traveler. After cleaning, the assembly is marked. This activity is also followed in detail on weld reports and checklists.

Nonconforming items are controlled by procedures as described in 17.1.15.2. Status of equipment and material arriving at the jobsite is controlled through receiving inspection procedures, discussed in 17.1.7.2.4, and nonconformance procedures. Procedures which require the use of tags include provisions for control of the tags.

Prior to transfer of portions of the plant to Nuclear Production, Construction marks drawings and prepares checklists of components indicating their release for transfer. Nuclear Production is then responsible for controlling status. 6

17.1.15 NONCONFORMING MATERIALS, PARTS, OR COMPONENTS

Duke's quality assurance program requires that any nonconforming nuclear safety related materials, parts, or components be identified, segregated, or otherwise controlled in such a manner that the item will not be used, and will be reported to the department originating the specification in accordance with established procedures for review and ultimate disposition. The responsibilities of each department within the Duke organization relating to nonconforming items are discussed below. Nonconformances are periodically analyzed by the Quality Assurance Department to show quality trends, and the results are forwarded to management.

17.1.15.1 Engineering

Design Engineering has responsibility for resolution and approval of the ultimate disposition of nonconforming item reports concerning the design and when appropriate, the physical condition of items for which Design Engineering originates the specification. The Engineering Quality Assurance Program provides a detailed procedure for handling nonconforming item reports. These nonconforming item reports are forwarded for processing to the Project Sponsor Engineer, as appropriate. The nonconforming item report procedure requires that the Project Sponsor Engineer forward the nonconforming item report to the responsible engineer for resolution and coordination, and that the Project Management Division maintain a log and file of all nonconforming item reports. After resolution, review and approval (including approval by Quality Assurance), the responsible engineer returns the cleared nonconforming item report to the Project Sponsor Engineer who returns it to the using organization. Copies of completed reports are maintained in a permanent Quality Assurance file at the site. 6

17.1.15.2 Construction

The Construction Department has responsibility for resolution of nonconforming item reports concerning deficiencies in receipt, fabrication, erection, or construction. Any deviations from design requirements must be resolved by Design Engineering. The Construction Quality Assurance Program contains procedures for the control of nonconforming materials, parts, or components. These procedures are applicable to items located at the construction site, and include the following:

(a) The inspector or engineer notifies the responsible Manager of nonconforming items. 6

(b) The items are tagged or marked (and isolated where possible) to establish their status as nonconforming and are controlled in such a manner so as to preclude their use until appropriate action has taken to clear the nonconformances. Tags which indicate a nonconformance can only be removed after approval of the resolution of the nonconformance by Quality Assurance.

(c) "Nonconforming Item Reports" are initiated which identify the nonconforming item; describe the nonconformance, the disposition of the nonconformance, and the inspection requirements; and include signature approval of the disposition. These are forwarded to the appropriate Project Sponsor Engineer in Design Engineering or Senior Engineer in Construction or Quality Assurance for resolution (see 17.1.15.1). The

Project Quality Assurance Manager is responsible for assuring that the proper departments are assigned responsibility for resolution. Resolution of nonconformances by the Construction Department is performed by the Engineering Manager. | 6 | 6

(d) The processing of each "Nonconforming Item Report" is monitored by the Planning and Control Manager. | 6

(e) The acceptability of rework or repair of materials, parts, components, systems, and structures is verified by reinspecting the item as originally inspected or by an approved method and that inspection rework and repair procedures are documented.

(f) The Project Quality Assurance Staff reviews and approves all "Nonconforming Item Reports" which are resolved by Construction.

17.1.15.3 Vendors

Prior to award of the contract for equipment or services, the quality assurance programs of vendors are evaluated by Duke Quality Assurance to assure that they include the following:

(a) Identification of nonconforming items.

(b) Documentation of nonconformances.

(c) Control of nonconforming items to preclude their use until appropriate action has been taken to clear the nonconformances.

(d) Current status of nonconformances.

(e) Disposition of nonconformances and notification of such disposition to the Design Engineering Department or Quality Assurance Department, as appropriate.

Resolutions of nonconformances are audited by Duke personnel for compliance with approved procedures.

17.1.16 CORRECTIVE ACTION

The Duke quality assurance program identifies the responsibilities and provides authority for those individuals involved in quality activities to identify any condition adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective materials and equipment, and nonconformances. These persons identify and document conditions, analyze and determine how the conditions can be corrected and take such steps as necessary to implement corrective actions in accordance with documented procedures. The quality assurance program requires regularly scheduled inspections, surveillance, and audits to assure that when there is a need for corrective action, such need is identified. Anyone involved in quality activities in the Duke organization has the authority and responsibility to stop work if he discovers deficiencies in quality.

17.1.16.1 Engineering

The Engineering Quality Assurance Program contains procedures for identifying, reporting, resolving, documenting, and analyzing design conditions adverse to quality. In summary, the procedures cover the following:

(a) The means by which nonconformances are resolved.

(b) The means by which variations from design are processed.

(c) The means by which modifications to systems and structures are processed.

(d) Provisions for revising engineering calculations when required to make necessary corrective actions.

(e) Provisions for revising item specifications.

(f) Provisions for revising engineering documents.

Provisions for closing out corrective action documentation on the above, including final review, signature, and filing, are included in all procedures.

Error trends are determined by the QA Manager, Technical Services, and referred to the Corporate Quality Assurance Manager and other appropriate management for resolution. Where appropriate, corrective action includes changes to procedures or the quality assurance program to prevent recurrence.

17.1.16.2 Construction

The Construction Quality Assurance Program contains procedures for identifying, reporting, resolving, recording, and analyzing construction site conditions adverse to quality. In summary, the procedures include the following:

(a) A method to appropriately mark or identify nonconforming items so that related work cannot continue until a course of corrective action is established.

(b) Nonconforming Item Reports are originated by Construction and resolved or are forwarded to Design Engineering or Quality Assurance for resolution, as appropriate.

(c) The means by which nonconformances are resolved.

(d) A system for keeping adequate records of nonconformances and for periodically reporting their status to management and other affected organizations.

(e) Analyzing nonconformances for trends and determining appropriate corrective actions.

The Project Quality Assurance staff will monitor and audit work in progress for compliance with approved procedures and for identification and correction of conditions adverse to quality. Deficiencies which cannot be resolved at the project or department level are referred to the Corporate Quality Assurance Manager.

17.1.16.3 Vendors

Vendors are required to have quality assurance programs which include procedures for the identification and disposition of conditions adverse to quality, documentation of deficiencies or nonconformances, and trend analysis where necessary to prevent recurrent problems, all of which result in necessary corrective actions. Deficiencies found which require significant rework or redesign are required to be reported to Duke. Recommended corrective actions require the approval of Duke.

17.1.17 QUALITY ASSURANCE RECORDS

Duke's quality assurance program assigns responsibility for quality assurance record retention to the Quality Assurance Department. The applicable design specifications, procurement documents, or other documents specify the quality assurance records to be generated by, supplied to, or held by Quality Assurance. Quality Assurance records are not considered valid until they are authenticated and dated by authorized personnel.

17.1.17.1 Engineering

The QA Technical Services Division is responsible for quality assurance records during design and initial procurement for nuclear stations. This includes records generated by vendors. Quality Assurance records include design calculations, purchase orders, specifications and amendments, personnel certifications, procedures, deviations during manufacture and approvals or corrective action taken, various certification forms, source surveillance and audit reports, component data packages, and any other quality assurance documentation required by specifications.

Quality Assurance records are numbered, filed, and stored so that they are identifiable and retrievable. These packages require that the quality assurance records be prepared or received from the vendor, reviewed and approved by the QA Technical Services Division, periodically audited, stored in a secure place and accessibility to these files be controlled. It also provides for transfer of complete records to the Quality Assurance Project or Operations Division at the site or station at an appropriate time such that records are available at the location where they are needed prior to the onset of work for which they are needed. | 6

17.1.17.2 Construction

The Construction Quality Assurance Program contains procedures for reviewing, approving, and handling quality assurance records produced during the construction phase. These records include the results of tests and inspections required by applicable codes and standards, erection and installation records, procurement and receiving records, and personnel certification records. These records are maintained by the Quality Assurance Projects Division on site at a location where they can be reviewed and audited to establish that the required quality has been assured. Quality Assurance records are transferred to Quality Assurance Operations Division at the station for controlled storage at the completion of the construction phase.

17.1.17.3 Vendor

Vendor and subvendor quality assurance programs specify the responsibility for the generation, retention, and/or submission to Duke, of any quality assurance documentation related to the fabrication, inspection, and test of items and services which are nuclear safety related. Quality Assurance documentation submitted by vendors is reviewed and approved by the QA Technical Services Division to assure conformance with specification requirements prior to item installation or use.

17.1.17.4 Record Storage Facilities

Record storage facilities are constructed, located, and secured in accordance with ANSI N45.2.9.

17.1.18 AUDITS

Duke's quality assurance program requires a comprehensive system of periodic and planned internal, vendor, and subvendor audits for all phases of design, construction, and procurement. Audits are performed to determine effective implementation of all criteria in 10CFR50, Appendix B in those areas where the criteria are being implemented. This includes site preparation and investigation; preparation, review, approval and control of design and procurement documents; and indoctrination and training programs. The quality assurance program establishes periodic review by management to verify that the design, material procurement, construction, and operation are consistent with company policy, approved procedures and regulatory requirements to verify the effectiveness of the quality assurance program, and also to assess the scope and implementation of the quality assurance program. Audit data are analyzed for quality trends, and the results are forwarded to management.

All organizational components performing quality assurance activities are audited with a system of audits. Surveillance or continual review of finished products (e.g., design or procurement documents, procedures, inspection records, or vendor quality assurance programs) and work in progress is performed to determine conformance with all quality assurance requirements. Periodic audits of records of processes or activities (e.g., welding, vendor qualification, development of design, record maintenance, or quality control inspections) to determine that procedures are properly and effectively implemented are performed. Corporate audits of the entire quality assurance program to ascertain its effective implementation are performed on a once a calendar year basis.

The QA Managers of the Projects, Technical Services, Operations, and Vendors Divisions of the Quality Assurance Department are responsible for surveillance of activities under the cognizance of their respective divisions. The Senior Quality Assurance Supervisor, Audit Division, is responsible for audits on all departments performing nuclear safety related work. The Executive Vice-President, Engineering and Construction, is responsible for the corporate audit performed on the Quality Assurance Department. Personnel performing audits have no responsibilities in the area being audited. | 6

The frequency of audits and surveillance is based upon the status and safety importance of the activities being performed and upon work history. The audit system is reviewed periodically and revised as necessary to assure coverage commensurate with current and planned activities.

17.1.18.1 Surveillance

Periodic surveillance and review of safety related activities is performed by the Quality Assurance Department. The quality assurance manager of each Quality Assurance Department division determines the frequency and scope of the surveillance. The surveillance activities are directed by individuals as follows:

Area	Surveillance Responsibilities
Design Engineering Department	QA Manager, Technical Services
Construction Department - Project	Project QA Manager
Nuclear Production Department-Station	Senior QA Engineer
Vendors	QA Manager, Vendors

| 6

The surveillance consists of the checking of documents, records, and work in progress to determine that quality assurance and quality control procedures are being properly implemented. Work in progress includes such activities as placing concrete, welding, maintenance, system testing and operation, design activities, inspection, record maintenance, etc.

The individuals responsible for surveillance develop and maintain schedules for periodic surveillances; they review each new Quality Assurance and Quality Control procedure and associated records and work in progress in their area within three months of its effective date to determine its effective implementation. These individuals also develop schedules for surveillances of other existing quality assurance and quality control procedures in their area commensurate with the work in progress.

Persons performing surveillances develop written reports which document the surveillance and list all findings. Copies of surveillance reports with deficiencies and summaries of other reports are provided to the appropriate Quality Assurance Division Manager and to management responsible for the area. Deficiencies are documented and action is taken to the satisfaction of the applicable QA Manager. 6

17.1.18.2 Departmental Quality Assurance Audits

The Senior Quality Assurance Supervisor Audit Division by direction of the Corporate Quality Assurance Manager initiates all departmental audits. He and the responsible Lead Auditor determine the scope of each audit. The Corporate Quality Assurance Manager may initiate special audits or expand the scope of audits. The Lead Auditor directs the audit team in developing checklists, instructions, or plans and performing the audit. The audit shall be conducted in accordance with the checklists, but the scope may be expanded by the audit team during the audit. The audit team normally consists of a Lead Auditor ard at least one other qualified individual.

An audit is performed at least every six months, or as directed by the Corporate Quality Assurance Manager for each of the following: Design Engineering Department, Construction Project, Operating Nuclear Station.

The scope of each audit includes the following as a minimum:

(a) Review a major system, component, process, or activity (e.g., design and procurement of a system or component, placement of concrete, and operation, maintenance of the station) which involves quality assurance functions.

(b) Review of the surveillance reports.

The audit team concludes with a post audit conference between the audit team and responsible management. The conference includes a brief discussion of audit results, including any deficiencies and recommendations. The audit results are documented in a report.

Within thirty days of the post audit conference, the Senior Quality Assurance Supervisor, Audit Division issues the report to the responsible management with copies sent to the Vice-President of the audited department and the Corporate Quality Assurance Manager.

Within thirty days after receipt of the audit report, responsible management replies in writing to the Senior Quality Assurance Supervisor, Audit Division, describing corrective action and an implementation schedule. When necessary, after receipt of the management reply, the audit team performs a reaudit to verify implementation of corrective action. The reaudit is documented. The Senior Quality Assurance Supervisor documents the close of the audit with a letter to the responsible management. All correspondence, checklists, and reports related to the audit are placed in the quality assurance file.

17.1.18.3 Corporate Audit

Corporate audits are initiated and directed by the Executive Vice-President, Engineering and Construction. This audit is performed at least once in each calendar year on the Quality Assurance Department which is responsible for the functions listed in Table 17.1-4. 6

The Executive Vice-President, Engineering and Construction, selects the audit team and appoints a team leader. The audit team consists of at least three qualified individuals, none of which is from the area audited. 6

The scope of audit is determined by the Executive Vice-President, Engineering and Construction, and the audit team. In each a review of Departmental Quality Assurance audits is included. The audit is performed with preapproved checklists, instructions, or plans. 6

The audit team conducts a post audit conference with the responsible management of the area audited to discuss the audit results, including deficiencies. The audit team prepares checklists and the audit report. The report is sent to the Executive Vice-President, Engineering and Construction, and the Corporate Quality Assurance Manager. 6

The Executive Vice-President, Engineering and Construction, determines the need for corrective action and reaudit. Necessary corrective action and reaudit are performed as required for Departmental Quality Assurance audits. 6

All correspondence, checklists, and reports related to the audit are placed in the quality assurance file.

17.1.18.4 Vendors

Vendor quality assurance programs require a system of periodic and planned internal and subvendor audits conducted by persons not directly involved in the activity being audited. The vendor quality assurance programs are

evaluated and monitored by the Quality Assurance Vendors Division to assure that quality assurance requirements are met. See 17.1.7.1.

The Quality Assurance Vendors Division maintains surveillance and performs audits on NSSS suppliers' quality assurance programs including the activities of their vendors and subvendors, to assure that operations are in compliance with specified quality assurance requirements. In the case of an audit of a vendor, any deficiencies noted by the auditor are clearly outlined in writing and given to both the Duke and NSSS quality assurance organizations, which take appropriate steps to resolve the deficiencies.

A reaudit is performed to verify the implementation of the corrective action.

Table 17.1-1
Engineering Quality Assurance Program

Section	10 CFR 50 Appendix B -Criteria Reference-	Scope
Quality Assurance Plan	I, II	Describes how the program will be applied and establishes the organization and responsibility of personnel performing activities affecting quality.
100 - Design Control	III, V	Controls the design of systems, structures, and components which are nuclear safety related; review, approval, and revision of such designs; and licensing commitments.
200 - Corrective Actions	III, XV, XVI	Provides reqirements for processing, controlling approving and resolving nonconforming items and design variations.
300 - Procurement	IV, VII, XIII	Provides requirements to control procurement of items and services; procurement document review, approval and revision.
800 - Administrative	II, V, VI	Establishes the requirements for the preparation, approval, revision, and control of quality assurance procedures.
	II, XVIII	Establishes the procedures, frequency, and method of audit to determine the effective implementation of the quality assurance program. 4
	II	Establishes the quality assurance training program for employees in Design Engineering.

Table 17.1-1
Engineering Quality Assurance Program

Section	10 CFR 50 Appendix B -Criteria Reference-	Scope	
900 - Document Control	VI	Controls the distribution and issue of drawings, specifications, instructions, and procedures and revisions thereto.	
	XVII	Establishes the method for collection and storage of design QA records.	3

Table 17.1-2
Construction Quality Assurance Program

Section	10 CFR 50 Appendix B -Criteria Reference-	Scope
A - Manual and Procedure Revisions	V, VI	Establishes the requirements for preparation, approval, revision and control of Construction Quality Assurance Program procedures.
D - Control of Field Design	III, V, VI	Controls the design of structures, foundations, equipment, and any other facility that is designed by Construction Department engineers and requires that all such designs meet the requirements of applicable codes, standards, safety criteria, and quality assurance procedures. 4
E - Control of Field Procurement	IV, V, VI, VII	Provides procedural requirements for auditing of vendors supplying materials and services to the field, and control of procurement and procurement documents.
F - Process Control	V, VIII, IX, XIV	Describes methods of preparing and obtaining approval of installation procedures prepared in the field, specification of hold points, and documentation.
G - Document Control	V, VI, XVII	Assures that only current and properly released drawings, specifications, procedures, manuals, and supplements are used by crafts, engineers, and inspectors for all Construction Department nuclear projects.

Table 17.1-2
Construction Quality Assurance Program

Section	10 CFR 50 Appendix B -Criteria Reference-	Scope	
G - Document Control (Cont.)		Directs the internal preparation and distribution of correspondence dealing with plant construction. Directs the internal routing, distribution and filing of quality assurance correspondence and memoranda.	
H - Identification and Control of Materials and Components	V, VIII, IX, X, XIII, XIV	Establishes the requirements for the control and identiffcation of materials and components used in the construction of structures and systems.	
I - Certification of Craft Personnel Performing Special Processes	V, IX	Establishes the certification program for craft personnel performing special processes such as welding and mechanical splicing of reinforcing bars.	
J - Certifiction of Inspection Personnel		Deleted. This is now part of the Quality Assurance Department Quality Assurance Program. See Table 17.1-3.	6
K - Certification of NDE Personnel		Deleted. This is now part of the Quality Assurance Department Nondestructive Examination Program Manual. See Table 17.1-3.	
L - Control of Special Processes	V, IX	Establishes the requirements for controlling special processes such as welding, heat treating, nondestructive examination, and cleaning.	

Table 17.1-2
Construction Quality Assurance Program

Section	10 CFR 50 Appendix B -Criteria Reference-	Scope
M - Inspection Program	V, VII, X, XI, XVII	Establishes the requirements for inspection of site work to assure conformance with applicable design, codes, standards, and specifications.
N - Control of Test Programs	V, XI	Establishes the requirements for conducting and documenting the tests of systems and structures during construction.
O - Calibration of Measurement and Test Equipment	V, XII	Establishes the requirements for the calibration of measurement of test equipment used in construction activities affecting quality and safety and for the documentation of the program.
P - Receiving and Storage Controls	V, VII, VIII, X, XIII	Establishes the methods for receipt inspection, proper storage, and field issue of equipment and materials which affect quality.
Q - Control of Nonconforming Items	V, XV	Establishes methods for identification, resolution and documentation of items that do not conform to specifications, drawings, or procedures.
R - Corrective Actions	III, V, XVI	Establishes the methods to stop any work that is creating a condition adverse to quality, establishes procedures to follow to correct a condition that is adverse to the quality, and establishes the method for controlling and permitting variations in design drawings and specifications.

Table 17.1-2
Construction Quality Assurance Program

Section	10 CFR 50 Appendix B -Criteria Reference-	Scope
S - Control of Records	V, XVII	Defines methods for establishing system or structure boundaries, tabulating items within those boundaries, accumulating and filing QA documentation for performing and documenting an inspection; and for transferring systems or structures from Construction to Nuclear Production and documentation within the Quality Assurance Department. 6

Table 17.1-3

Quality Assurance Department Quality Assurance Manual

Section	10 CFR 50 Appendix B -Criteria Reference-	Scope	
100 - Administrative	II, V, VI, XVI, XVIII	Establishes the requirements for preparation, approval, revision, and control of quality assurance procedures, departmental training, qualification and training of auditors, qualification and training of Quality Control Inspectors (except NDE Inspectors); trend analysis and Regulatory Reporting Requirements.	6
200 - Audit	II, XVIII	Establishes the requirements for Departmental Quality Assurance Audit Program.	
300 - Construction	XVI, XVII, XVIII	Establishes the requirements for surveillance of Construction Department Activities, control of associated records and trend analysis.	
400 - Engineering	IV, VII, XVII	Establishes the requirements for QA review of specifictions, processing of procurement records surveillance of Engineering actions.	
500 - Operations	II, III, IV, V, VII, X, XVII, XVIII	Establishes the requirements for surveillance of Operations, review of station procedures, quality assurance and quality control records, quality control inspection procedures, review of procurement documents, and review of station modifications.	6
600 - Vendors	VII, XVIII	Establishes the requirements for vendor evaluation, qualification and surveillance and for the approved vendor's list.	

Table 17.1-3

Quality Assurance Department NDE Program

Duke Power Company Quality Assurance Department Nondestructive Examination	Nondestructive Examination Program	Establishes the requirements for qualification and training of NDE inspectors. Also provides procedures and acceptance criteria for nondestructive examination.

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TABLE 17.1-4

QUALITY ASSURANCE FUNCTIONS

The Quality Assurance Functions listed below apply only to nuclear safety related items and activities; Quality Control Functions are included as part of QA Functions.

The following are Quality Assurance functions:

1. Placing, reviewing, and approving QA requirements* on procurement documents.
2. Placing, reviewing, and approving QA requirements* on design documens.
3. Placing, reviewing, and approving QA requirements* on construction and operation process control documents.
4. Placing, reviewing, and approving QA requirements* on construction, engineering, and operating plant maintenance and modification procedures.
5. Writing and approving QC inspection procedures.
6. Evaluating and approving QC inspection records.
7. Approving and maintaining the records of calibration tests of tools and gauges used for construction.
8. Performing on-the-job surveillance of engineering, construction, and operational activities.
9. Evaluating and approving a vendor's QA program, including follow-up.
10. Maintaining QA surveillance of vendors, including follow-up.
11. Maintaining and controlling QA Approved Vendors List. | 6
12. Evaluating and approving vendor QA records.
13. Witnessing acceptance testing of QA activities of vendors.
14. Originating nonconforming reports (can be done by others).
15. Assuring the resolution of nonconforming reports and corrective action, including engineering justification reports.

*QA requirements are those inspection, test, examination, certification and documentation requirements which are imposed to provide objective evidence of the conformance of an item or activity to established design, engineering, standards and code requirements. The establishment of design, engineering, standards, and code requirements is an engineering and technical support responsibility. The specification of QA requirements is a Quality Assurance responsibility.

TABLE 17.1-4
QUALITY ASSURANCE FUNCTIONS (continued)

16. Assuring the resolution of variation notices.

17. Conducting appropriate training for QA and QC personnel.

18. Verifying correct transfer of information from purchase requisition to purchase order.

19. Specifying QA standards and criteria.

20. Writing, maintaining, controlling, and approving QA manuals and procedures.

21. Writing QA portions of SAR's.

22. Providing principal NRC contact on QA matters.

23. Maintaining liaison with ASME Code Inspector for QA matters.

24. Performing internal company QA audits.

25. Evaluating the status and adequacy of the QA program.

26. Compiling data and trend analysis for QA matters for management review.

27. Providing solutions to QA problems.

28. Collecting, maintaining, and controlling QA records.

29. Determining which documents must be controlled.

30. Approving the records of procedure and operator qualification of special processes.

31. Certification of QC inspectors, document control inspectors, and calibration personnel. | 6

32. Maintaining qualification and certification records of QA and QC personnel.

33. Reporting QA matters to management.

The following Quality Assurance functions are considered Quality Control:

34. Performing inspections and recording the results.

35. Performing "destructive" and "nondestructive" tests.

36. Performing receipt and storage inspections and reporting the results.

37. Originating nonconforming item reports and inspecting corrective action taken.

38. Witnessing acceptance testing in construction and operation.

39. Performing inspections and tests required in the qualification of special processes and personnel performing special processes.

3

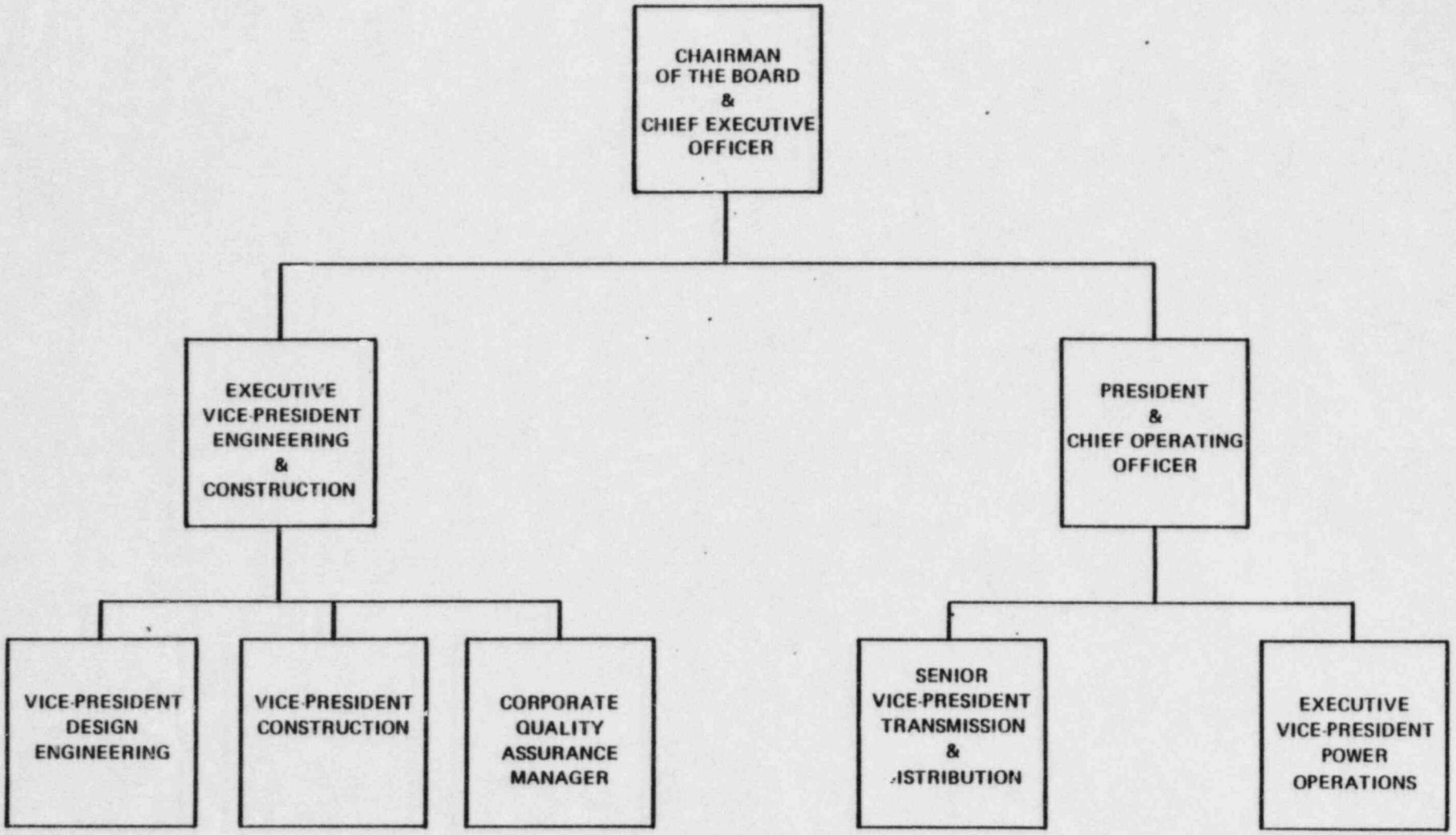
TABLE 17.1-4

TECHNICAL FUNCTIONS

Technical functions are those activities performed by engineers and technical personnel in the engineering, construction, and operation of a plant. Not all functions are listed below -- only those which are similar to or might be confused with QA and QC Functions.

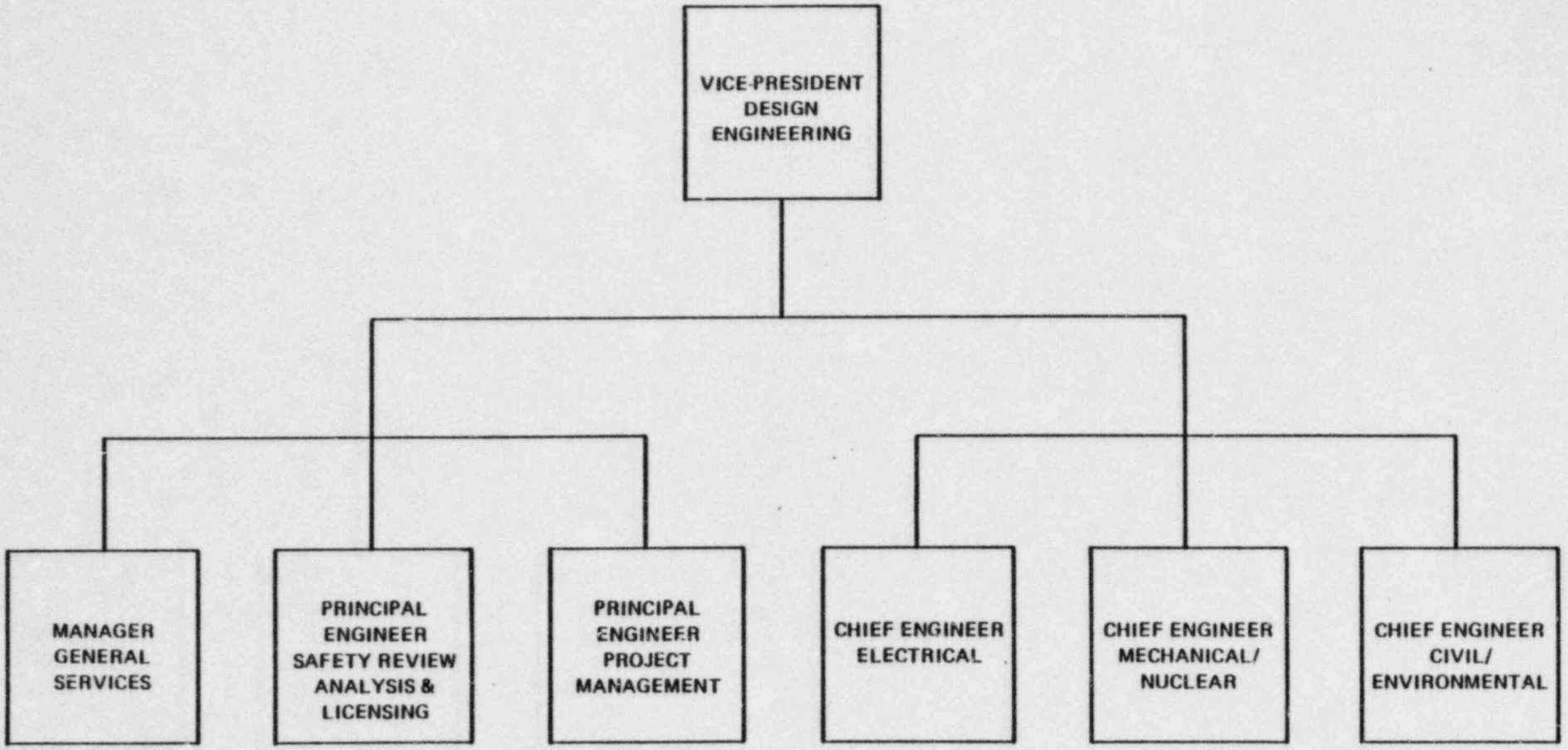
1. Originating and checking design documents.
2. Originating and checking procurement documents.
3. Determining safety-related systems and components.
4. Approving a vendor's manufacturing and technical capabilities.
5. Originating and resolving nonconforming item reports.
6. Originating and resolving variation notices.
7. Specifying and witnessing functional tests on vendor supplied equipment. 3
8. Writing construction procedures.
9. Writing functional test and operating procedures.
10. Writing procedures for welding and other special processes.
11. Qualifying welders and welding procedures, and reporting results.
12. Originating process control documents.
13. Development and approval of engineering procedures.
14. Determining the storage requirements for materials.
15. Controlling the distribution of drawings, specifications, and other documents used for construction and operation.
16. Administering the tool and gauge calibration program.
17. Specifying standards, tests and inspections which demonstrate the qualifications and design adequacy of vendor equipment. 3

DUKE POWER COMPANY
CORPORATE ORGANIZATION
FOR QUALITY ASSURANCE



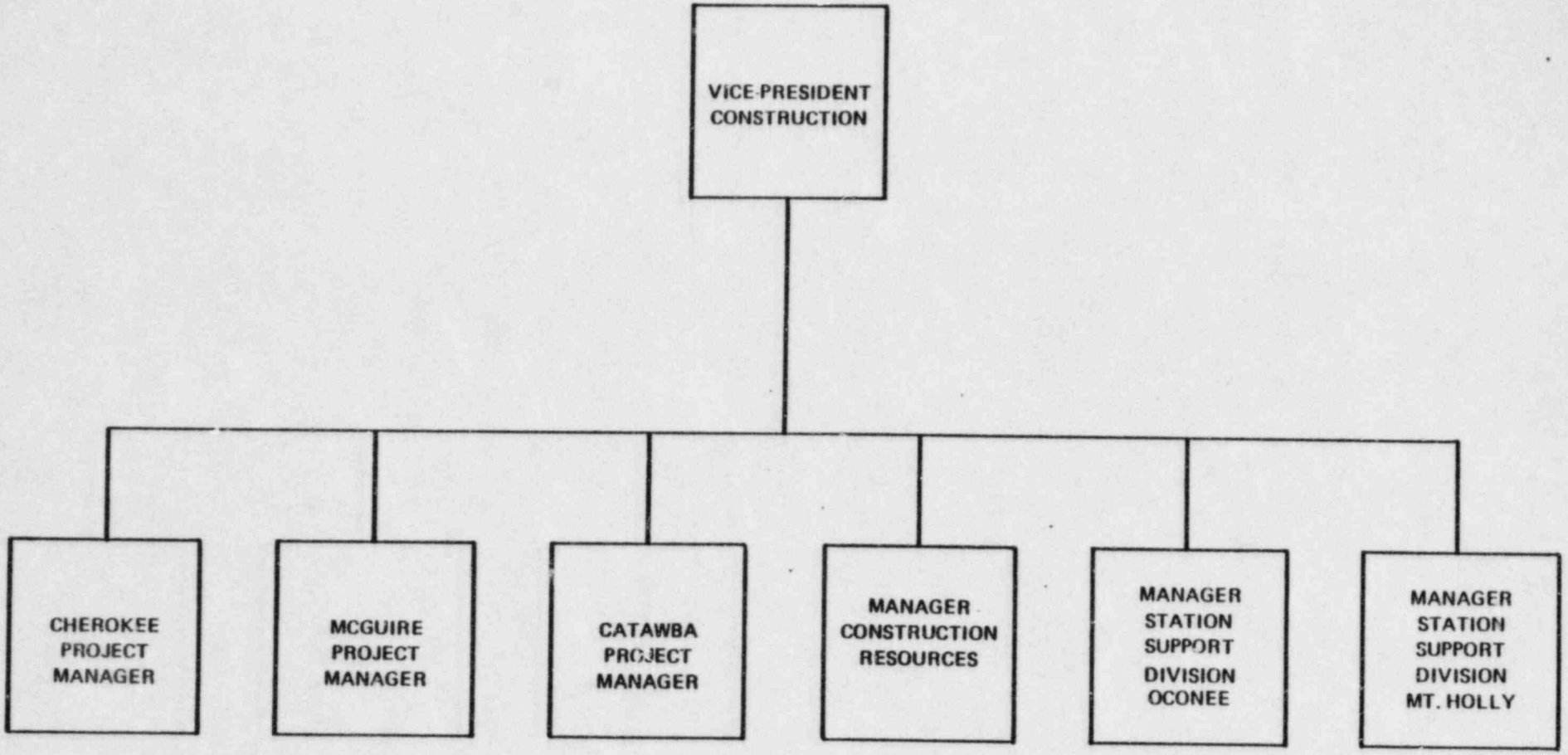
TOPICAL REPORT
QUALITY ASSURANCE PROGRAM
FIGURE 17.1 – 1
AMENDMENT 6

DESIGN ENGINEERING DEPARTMENT
ORGANIZATION CHART



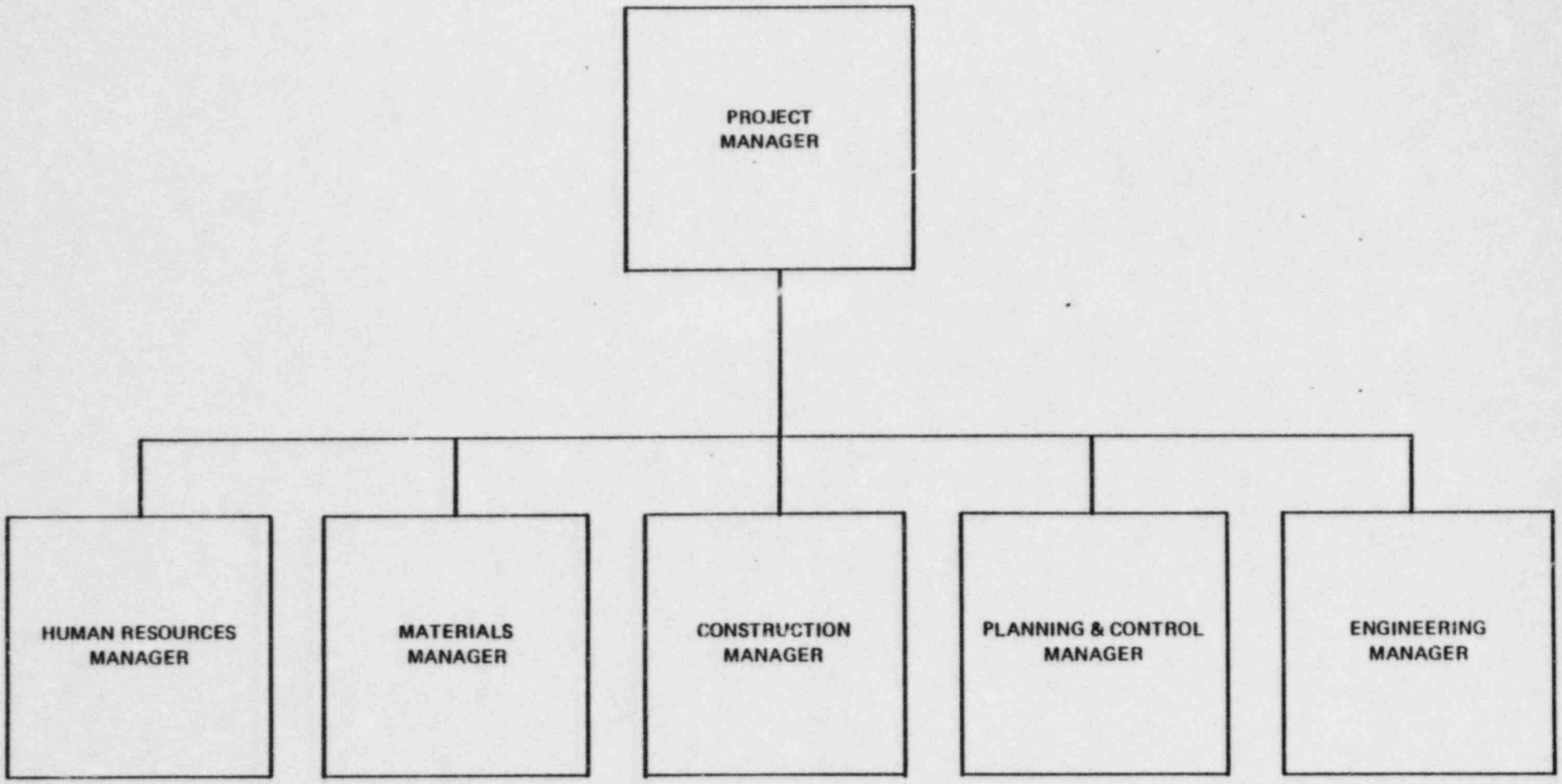
TOPICAL REPORT
QUALITY ASSURANCE PROGRAM
FIGURE 17.1 -- 2
AMENDMENT 6

CONSTRUCTION DEPARTMENT
ORGANIZATION CHART



TOPICAL REPORT
QUALITY ASSURANCE PROGRAM
FIGURE 17.1 – 3 (SHEET 1)
AMENDMENT 6

CONSTRUCTION DEPARTMENT ORGANIZATION
CHEROKEE PROJECT

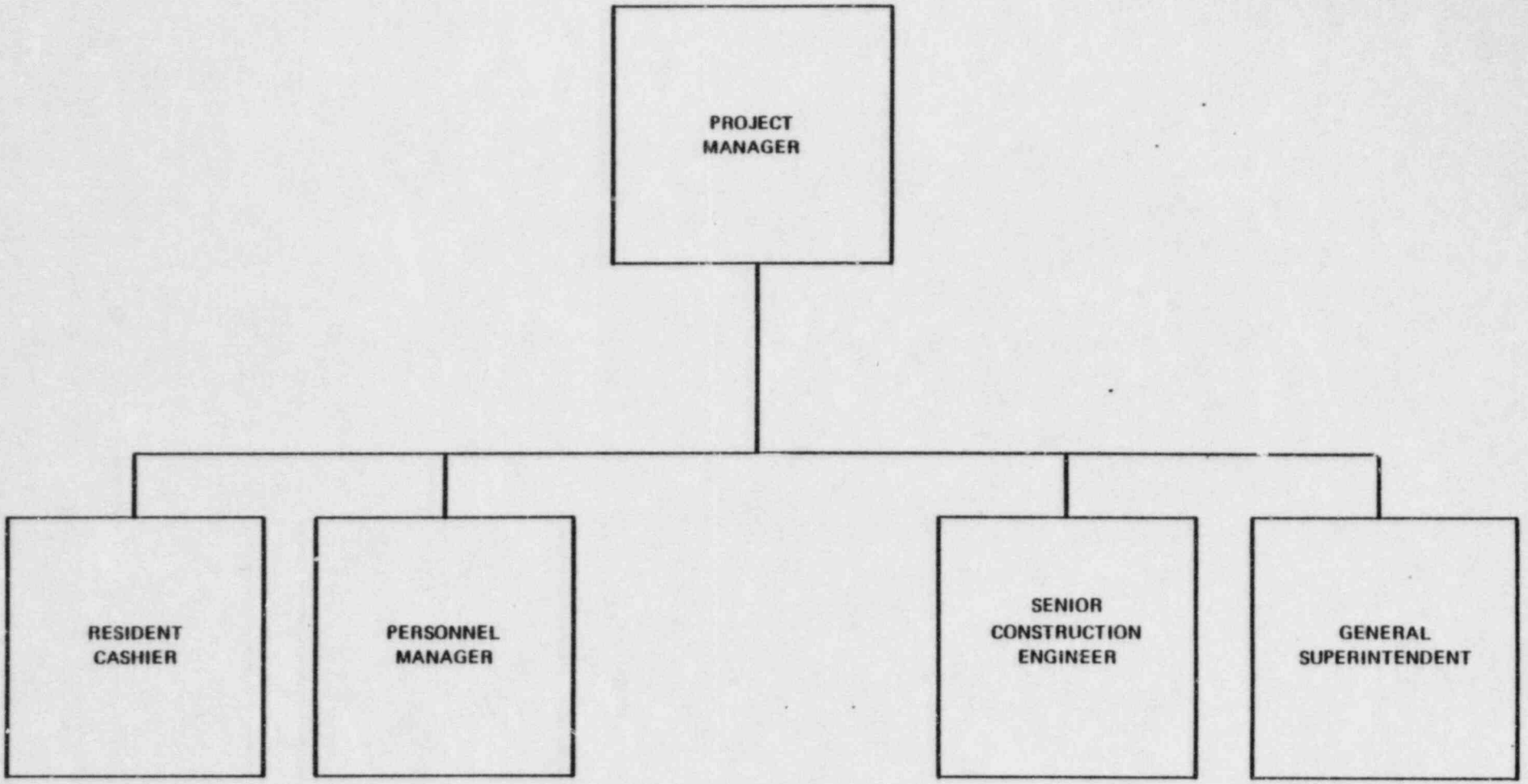


TOPICAL REPORT
QUALITY ASSURANCE PROGRAM
FICURE 17.1 – 3 (SHEET 2)

AMENDMENT 6

NOTE: THIS CHART SHOWS THE CONSTRUCTION ORGANIZATION. AT VARIOUS STAGES DURING A NEW NUCLEAR PROJECT ALL POSITIONS MAY NOT BE FILLED.

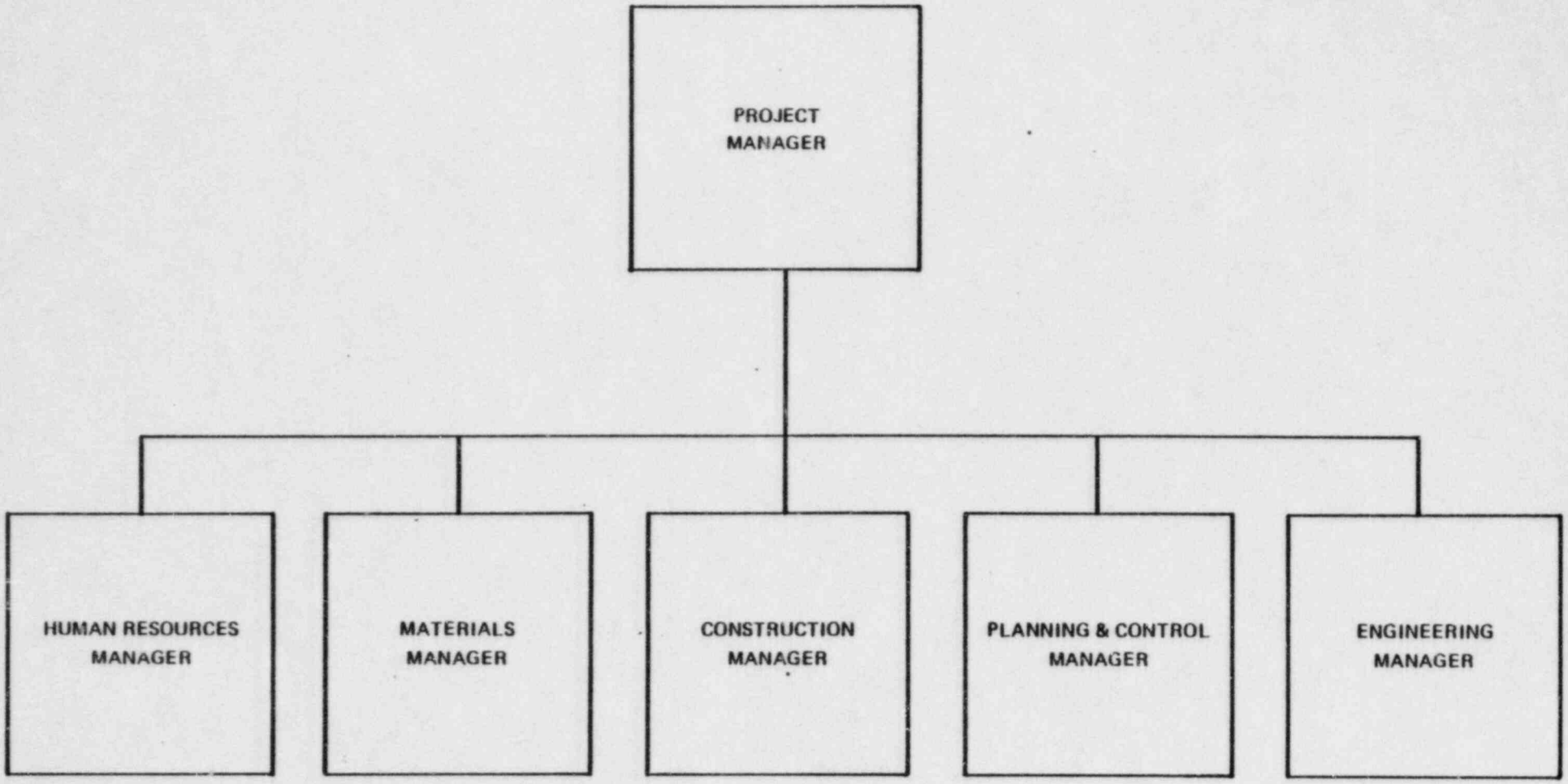
CONSTRUCTION DEPARTMENT ORGANIZATION
MCGUIRE PROJECT



TOPICAL REPORT
QUALITY ASSURANCE PROGRAM
FIGURE 17.1 – 3 (SHEET 3)

AMENDMENT 6

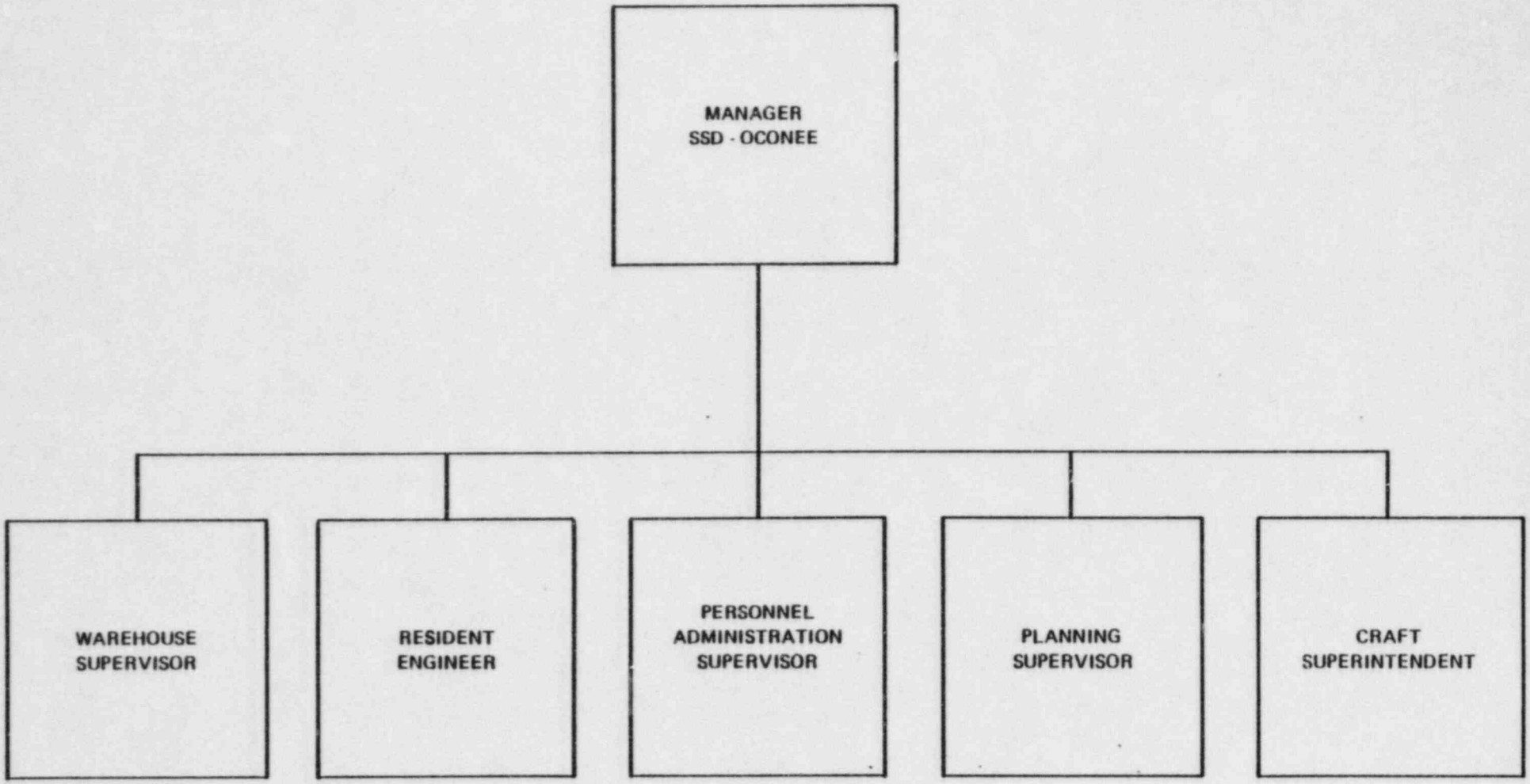
CONSTRUCTION DEPARTMENT ORGANIZATION
CATAWBA PROJECT



TOPICAL REPORT
QUALITY ASSURANCE PROGRAM
FIGURE 17.1 – 3 (SHEET 4)

AMENDMENT 6

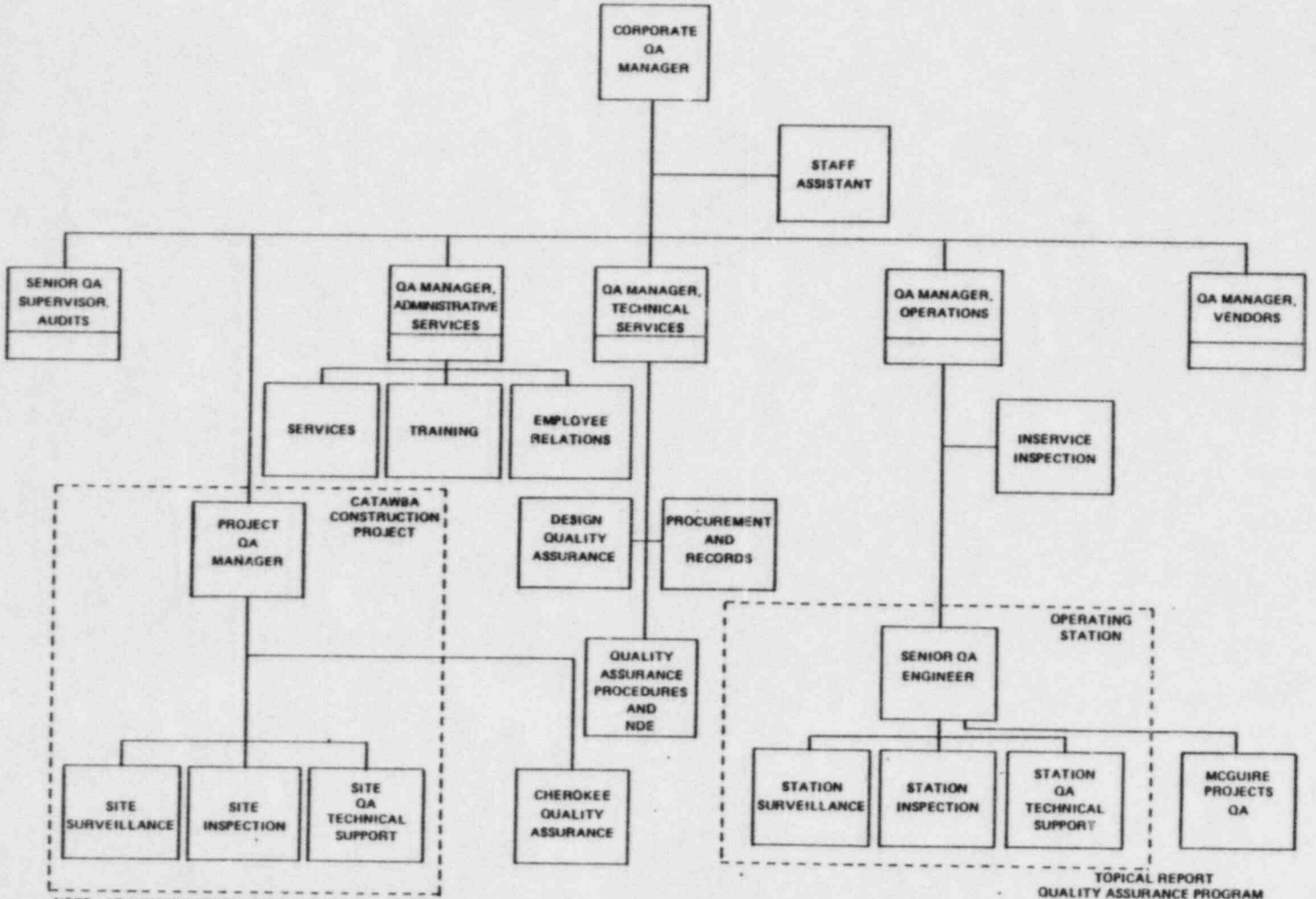
CONSTRUCTION DEPA..,MENT ORGANIZATION
STATION SUPPORT DIVISION - OCONEE



TOPICAL REPORT
QUALITY ASSURANCE PROGRAM
FIGURE 17.1 – 3 (SHEET 5)

AMENDMENT 6

QUALITY ASSURANCE DEPARTMENT ORGANIZATION CHART



NOTE: AT VARIOUS STAGES OF PLANT CONSTRUCTION, SOME POSITIONS MAY NOT BE REQUIRED.

TOPICAL REPORT
QUALITY ASSURANCE PROGRAM
FIGURE 17.1 - 4
AMENDMENT 8

17.2 OPERATIONAL QUALITY ASSURANCE

17.2.1 ORGANIZATION

17.2.1.1 Corporate Organization

The Duke Power Company corporate organization for Quality Assurance is shown in figure 17.1-1. The president has overall responsibility for planning and operation of the company's generation and transmission facilities. The Chief Executive Officer has overall responsibility for Design and Construction of generation and transmission facilities. Reporting to the Chief Executive Officer is the Executive Vice President, Engineering and Construction, who directs activities of the Engineering, Construction, and Quality Assurance Departments. Reporting to the President are an Executive Vice President, Power Operations, and a Senior Vice President, transmission and distribution, who are responsible for directing the operation of the company's generation and transmission facilities. 6

The Executive Vice President, Engineering and construction, is the corporate executive responsible for the Company's quality assurance program and is the highest level of management responsible for establishing Duke's quality assurance policies, goals and objectives.

Duke management is committed to applicable quality assurance regulations, codes, and standards as identified in 17.0.2 of this report.

The following is the basic philosophy of the Duke Power Quality Assurance Program.

The individuals who constitute Duke Power Company have full personal and corporate responsibility to assure that nuclear power plants are designed, constructed, tested and operated in a manner to protect the public health and safety. The comprehensive program to assure this begins with initial design and continues throughout the life of the station. The Duke Power Quality Assurance Program must assure that the necessary quality requirements for safety related structures, systems, components and materials are achieved.

This program applies to the nuclear safety related portions of the plant but may also be optionally applied, in whole or in part, to other selected items necessary for reliable operation.

The Quality Assurance Department Quality Assurance Program Manual establishes the basic policies of the comprehensive program. The chapters of this manual correspond to the eighteen criteria of 10CFR50, Appendix B. 6

The policies described in the Quality Assurance Department Quality Assurance Program Manual are implemented through departmental program manuals and procedures, and are, therefore, transmitted to all levels of management. 6

17.2.1.2 Nuclear Production Department

17.2.1.2.1 Vice President, Nuclear Production 6

The Nuclear Production Department has direct line responsibility for all Duke Power Company nuclear station operations. The Nuclear Production Department is responsible for acheiveing quality results during preoperational testing, operation, testing and maintenance of the Company's nuclear stations and with complying with applicable codes, standards and NRC regulations. The functions of Nuclear Production are directed by the Vice President, Nuclear Production. The Vice President, Nuclear Production, formulates, recommends, and carries out plans, 6

policies, and programs related to the generation of electric power; and reports to the Executive Vice President, Power Operations. The Vice President, Nuclear Production is informed of significant problems or occurrences relating to safety and quality assurance through established administrative procedures, and participates directly in their resolution, where necessary. 6

17.2.1.2.2 Nuclear Safety Review Board

The Vice President, Nuclear Production, appoints a Nuclear Safety Review Board to serve as a nculear safety review and audit backup to the normal operating organization. The organizational structure, administrative requirements, responsibilities and authorities specific to the Board are detailed in the Technical Specifications for each station. 6

The Nuclear Safety Review Board reviews proposed tests and experiments, proposed station modifications, and proposed changes to procedures, when such involve an unreviewed safety question. Also, the Board reviews reportable occurrences and violations of a station's Technical Specifications and makes recommendations to prevent recurrence.

17.2.1.2.3 Nuclear Production Department General Office

The Nuclear Production Department General Office is divided into various sections as shown in Figure 17.2-1. The activities of each section are directed by a manager who reports to the Vice President, Nuclear Production. These sections are staffed with professional personnel experienced in all phases of station operation who provide technical support to each nuclear station. 6

17.2.1.2.4 Station Organization

The station Managers report to the Vice President, Nuclear Production, through the General Manager, Nuclear Stations. For each nuclear station, the assigned station Manager is directly responsible for the safe operation of the facility. The station Manager is also responsible for the administration and implementation of the quality assurance program as it applies to station operation. The qualification requirements for the station Manager are in accordance with the provision of ANSI N18.1-1971 and are presented in each station's PSAR and FSAR. In the discharge of their responsibilities, the station Managers direct the activities of the station organizations. A typical station organization is shown in Figure 17.2-2. 6

17.2.1.3 Quality Assurance Department

The Quality Assurance Department organizational structure is shown in Figure 17.1-4. The Quality Assurance Department is responsible for verifying that plans, policies and procedures comply with NRC regulations; for verifying that procedures are properly implemented; and for performing quality control inspections. The activities of the Quality Assurance Department are directed by the Corporate Quality Assurance Manager, who reports to the Executive Vice President, Engineering and Construction. 6 6

Carryover

The qualification requirements for the Corporate Quality Assurance Manager are given in Appendix A. Resident at each operating nuclear station is a Senior Quality Assurance Engineer who reports to the Corporate Quality Assurance Manager, through the Quality Assurance Manager, Operations. A Senior Quality Assurance Engineer is responsible for all Quality Assurance Department activities at an operating station. He is supported by quality assurance engineers and technicians and by a quality control staff. The qualification requirements of the Senior Quality Assurance Engineer are given in Appendix A. 6 6

The Quality Assurance Department has the authority and organizational function freedom to:

(a) Identify quality problems.

(b) Initiate, recommend or provide solutions to quality problems through designated channels.

(c) Verify the implementation of solutions to quality problems.

If significant quality problems are identified by Quality Assurance Department personnel, the Station Senior Quality Assurance Engineer, or his designee, has the responsibility and authority to notify the station Manager, or his designee, to direct the affected work activity to cease pending satisfactory resolution of the identified problem.

Specific responsibilities of the Quality Assurance Department with regard to nuclear station operational activities are identified in subsequent subsections of this report. In general, however, the Quality Assurance Department performs checking, auditing, and inspecting functions in order to verify that activities have been correctly performed. Therefore, due to the corporate organizational structure, the individuals performing such verifications are distinctly independent of the personnel directly responsible for performing the activities being checked, inspected, or audited.

17.2.1.4 Department Interfaces

With regard to the operational quality assurance program, activities affecting the quality of nuclear safety-related structures, systems, and components are performed by, or under the cognizance of, the Nuclear Production Department and the Quality Assurance Department. If a disagreement arises between members of these departments, resolution is sought at successively higher levels of management, as necessary. Such a disagreement may be resolved at any level of management up to and including the Chief Executive Officer. 6 6

17.2.2 QUALITY ASSURANCE PROGRAM

The Duke Power Company operational quality assurance program is described in various Company manuals. A summary of the topics addressed, and their relationship to the criteria of 10CFR50, Appendix B, is presented in Table 17.2-1.

Procedures and work instructions necessary to implement the requirements of the operational quality assurance program are developed by the organization responsible for the activity. These procedures and instructions may be contained in manuals, station procedures and directives, administrative instructions and/or other documents. Onsite implementation of procedures and work instructions is the responsibility of the Station Manager. Quality Assurance Department personnel verify that the procedures are followed by means of inspections, audits and other surveillance. Procedures for such inspections, audits and other surveillances are developed, approved and implemented by the Quality Assurance Department.

For each nuclear unit, those structures, systems and components which are considered to be nuclear safety-related are identified. As design and construction of such structures, systems and components are completed, the responsibility for the control of activities affecting the items is formally transferred to the Nuclear Production Department. This transfer is documented and the affected structures, systems and components are identified by means of tags, labels, stamps or other suitable means as being under the control of the Nucle r Production Department. Applicable records such as vendor documentation packages and inspections reports, piping isometric drawings, welding records, etc. compiled during design and construction are transferred by the Quality Assurance Department Projects Division to the Quality Assurance Department Operations Division concurrent with transfer of structures, systems and components to the Nuclear Production Department. Such transfer of records is performed in accordance with established procedures. 6 6 6

The operational quality assurance program is implemented as structures, systems and components are transferred. A preoperational test program is established and controlled to assure that all necessary inspection and testing on transferred structures, systems and components is performed and properly evaluated. The Operational Quality Assurance Program is gradually expanded as necessary until full implementation at least (90) ninety days prior to fuel loading. At issuance of an operating license for the unit by the Nuclear Regulatory Commission, all nuclear safety related activities for the unit will be under the jurisdiction of the Operational Quality Assurance Program. After the program has been fully implemented, it is continued throughout the operating life of the unit. The program receives on-going review and is revised as necessary to assure its continued effectiveness. When judged necessary by Duke Management, major station modification activities may be performed by the Construction Department. In such cases, all quality assurance activities will be controlled under the quality assurance program described in 17.1. 6

A training program is established for each nuclear station to develop and maintain an organization qualified to be responsible for operation, maintenance and other technical aspects of the nuclear station involved. The program is formulated to provide the required training based on individual employee experience and intended position. The program is in compliance with Nuclear Regualtory Commission licensing requirements, where applicable. The training program is such that trained and qualified operating, maintenance, technical support and supervisory personnel are available in necessary numbers at the times required. In all cases, the objectives of the training program shall be to assure safe and reliable operation of the section. The training program is kept current to reflect station modifications and changes in procedures. A continuing effort is used after a station goes into commercial operation for training of replacement personnel and

for periodic retraining, reexamining, and/or recertifying as required to assure that personnel remain proficient. Station personnel receive formal orientation training in basic quality assurance policies and practices. Special training of station personnel in quality assurance related matters, particularly new or revised requirements, is conducted as necessary. Training records are maintained for each employee. Documentation of formal training shall include the objectives, content of the program, attendees, and date of attendance. | 6 | 6

New Quality Assurance Department personnel attend an indoctrination class concerning quality assurance authority, organization, policies, manuals and procedures. Personnel receive additional formal training, as appropriate, which addresses specific topics such as NRC regulations and guides, quality assurance procedures, auditing and applicable codes and standards. Retraining is performed as required. On-the-job training is performed by an employee's supervisor in the specific procedures and requirements related to the employee's work activity. Training records are maintained for each employee.

Independent surveillances under the direction of the Quality Assurance Manager, Operations, and Departmental Quality Assurance audits, under the direction of the Senior Quality Assurance Supervisor, Audit Division provide assurance of compliance with the requirements of the operational quality assurance program.

All special equipment, environmental conditions, skills and processes that are determined to be nuclear safety related will be provided within the scope of the Quality Assurance Program. | 6

17.2.3 DESIGN CONTROL

In order to provide for the continued safe and reliable operation of a nuclear station's nuclear safety-related structures, systems and components, design control measures are implemented to assure that the quality of such structures, systems and components is not compromised by modifications. A controlled listing of safety related structures, systems, and components is jointly approved and issued by the Vice President, Design Engineering and Vice President, Nuclear Production. Revisions to this document are jointly approved and issued until an operating license is issued. The Vice President, Nuclear Production is responsible for approval and issuance after issuance of the operating license. 6

Prior to commercial operation, all design verification shall be completed on systems that are required for operations of the plant. Design modifications, including field modifications are subject to design control measures commensurate with those applied to the original design and are approved by the organization that approved the original design unless another responsible organization has been designated. These design control measures assure that modifications are designed and implemented in accordance with applicable codes, bases, standards, specifications, etc. Design verification may consist of reviews, alternate calculations, and/or qualification testing. Design reviews are intended to verify the correctness of design inputs, logic, calculations, and analyses. Calculations by alternate methods provide assurance that, for instance, computer codes are performing as expected, and that no systematic error in calculational procedure exists. Qualification testing, when suitable, is guided by Duke Power's adoption of various regulatory guides which deal with qualification testing. Design verification shall be performed by qualified individuals in accordance with approved procedures which identify the responsibilities, features and pertinent considerations to be verified, and documentation requirements. The use of the originator's immediate supervisor for verification shall be restricted and justified to special situations where the immediate supervisor is the only individual competent to perform the verification. 6

In order to assure proper interface control, the responsibilities of the various individuals/organizations involved in modifictions are formally identified. The assignment of responsibility for the evaluation and design of a particular modification to a specific individual/organization is documented. Also, the written instructions addressing the control of modifications address the communication of information between involved individuals/organizations and, where appropriate, require documentation of such communications.

Each request for a modification is reviewed by a cognizant, designated individual at the station to determine if the station is adequately qualified to perform the necessary evaluation and design of the modification. If it is determined that the station is adequately qualified, then the request for a modification is transmitted to the Nuclear Production Department General Office for assignment of evaluation and design responsibility to a qualified individual/organization. If the station is not qualified or staffed to design the modification, then the responsibility to evaluate and design the modification shall be transferred to the Manager, Nuclear Maintenance. 6

For each proposed modification, the individual/organization assigned responsibility for evaluation and design of the modification considers the following in the design of the modification:

(a) Necessary design analyses, e.g., physics, stress, thermal, hydraulic, accident, etc.

(b) Compatibility of materials.

(c) Accessibility for operation, testing, maintenance, inservice inspection, etc.

(d) Necessary installation and periodic inspections and tests, and acceptance criteria therefor.

(e) The suitability of application of materials, parts, components, and processes that are essential to the function of the structure(s), system(s) and/or component(s) to be modified.

The individual/organization assigned responsibility for evaluation and design of a modification performs a safety evaluation of the proposed modification. This evaluation provides the bases for the determination that the modifiction does or does not involve an unreviewed safety question. This evaluation is reviewed by an individual/group other than the individual/group performing the safety evaluation, but who may be from the same organization as the individual/group which performed the safety evaluation. This evaluation and the review thereof are documented.

Following completion of design and evaluation of a modification, the responsible individual/organization provides a summary of the design of the modification and information pertinent thereto. This summary addresses such items as:

(a) A description of the modification.

(b) References utilized in the evaluation and design of the modification, and necessary for the implementation of the modification.

(c) Special installation instructions.

(d) Operational, test, maintenance and inspection requirements.

(e) Materials, parts and components required in order to implement the modification.

(f) Drawings revised and/or requiring revision.

(g) FSAR revision(s) and/or Technical Specifications amendment(s) necessary.

(h) Whether or not the modification involves an unreviewed safety question.

The design summary is reviewed by an individual/group other than the individual/group preparing the summary, but who may be from the same organization as the individual/group which prepared the summary. The design summary is approved by a cognizant, responsible individual within the organization which prepared the summary. The design summary and the review and approval thereof are documented. Qualification testing of the design of a modification, including qualification testing of prototype units, is performed as necessary.

The Quality Assurance Department reviews the proposed modification, including applicable implementing procedures associated therewith, certifies that quality

Carryover

assurance requirements have been met and determines inspection requirements prior to implementation of the modification. For modifications which are evaluated and designed by the station, the Nuclear Production Deparmtent General Office is forwarded a description of the modification prior to or concurrent with implementation. Modifications which are determined to involve an unreviewed safety question are reviewed by the Nuclear Safety Review Board and must be authorized by the Nuclear Regulatory Commission prior to implementation. 6

Prior to a modification being declared operable and returned to service, all procedures goverring the operation of the modification are reviewed and revised as necessary. If the modification significantly alters the function, operating procedure, or operating equipment, then additional training is administered as necessary. 6

Final approval of each station modification is the responsibility of the applicable station Manager. Modifications are then executed in accordance with approved checklists, instructions, procedures, drawings, etc., appropriate to the nature of the work to be performed. These checklists, instructions, procedures, drawings, etc. include criteria for determining the acceptability of the modification.

Errors and deficiencies noted in the design of a modification are corrected by means of a variation notice or a revision to the modifiation. The control measures applied to each such modification revision or variation notice are equivalent to the control measures applied to the modification originally. Each modification revision or variation notice and the review and approval thereof, is documented.

Adequate identification and retrievable documentation of station modifications is retained for the life of the station.

Computer programs are controlled in accordance with Design Engineering's Quality Assurance Manual and Nuclear Production's Administrative Policy Manual, whereby programs are certified to demonstrate their applicability and validity. 6

17.2.4 PROCUREMENT DOCUMENT CONTROL

Procurement of materials, parts, and components associated with a staion's nuclear safety related structures, systems and components is controlled during the operational life of the station so as to assure that the safety and reliability of the station are not compromised. This control is commensurate with the controls utilized for procurement during the design and construction of the station.

Each purchase requisition for materials, parts, and components associated with nuclear safety related structures, systems and components is identifiably designated as such. The level of control and protection applicable to each item is determined by a cognizant individual. This determination is reviewed by an individual/group other than the individual/group which determined the applicable control and protection levels, but which may be from the same organization as the individual/group making the determination. Requisitions for items with the highest control level include or reference detailed purchase specifications. Requisitions for items with lower control levels include on the requisitions or reference sufficient information to fully specify the items. Subsequent to preparation, each purchase requisition is approved by the station manager, or his designee, or by a manager in the General Office.

Purchase requisitions for nuclear safety related materials, parts and components are reviewed by the Quality Assurance Department to assure that quality assurance requirements including vendor documentation requirements and applicable 10CFR50, Appendix B requirements, are adequately incorporated into the purchase document(s). Significant changes to the content of such purchase requisitions are approved by the applicable purchase requisition originator and are reviewed by the Quality Assurance Department. Review of procurement documents and changes thereto assures the documents are prepared, reviewed, and approved in accordance with quality assurance procedures. 6

Where necessary, procurement documents require that nuclear safety related materials, parts, and components be acquired from vendors determined to be acceptable by the Quality Assurance Department - see Section 17.2.7. Determination of acceptability requires that a vendor provide Duke the right of access to the vendor's facilities and records for inspection and audit.

17.2.5 INSTRUCTIONS, PROCEDURES AND DRAWINGS

The basic, written instructions and procedures for operation activities affecting quality are contained in the Nuclear Production Department's "Administrative Policy Manual for Nuclear Stations." It is required that personnel implement this manual as it pertains to the performance of their activities. 6

With regard to specific operational activities associated with nuclear safety-related structures, systems and components, it is required that such activities be accomplished in accordance with procedures, instructions, drawings, checklists, etc. appropriate to the nature of the activities being performed. As necessary, such documents identify equipment necessary to perform an activity, specify conditions which must exist prior to and during performance of an activity, and include quantitative and/or qualitative acceptance criteria, compatible with any applicable design specifiations, for determining that the activity addressed is satisfactorily accomplished. Examples of documents established concerning quality related operational activities are:

(a) Preoperational Test Procedures

(b) Periodic Test Procedures

(c) Operating Procedures

(d) Emergency Procedures

(e) Maintenance Procedures

(f) Instrument Procedures

(g) Health Physics Procedures

(h) Alarm Responses

(i) Chemistry Procedures

In addition to the above, files of drawings and vendor documents applicable to the station's structures, systems and components are maintained at each nuclear station and are utilized, as appropriate, in the performance of quality related activities.

17.2.6 DOCUMENT CONTROL

The Nuclear Production Department's "Administrative Policy Manual for Nuclear Stations" contains the basic written instructions and procedures for Nuclear Production activities. This document and subsequent revisions thereto, are approved by the Vice President, Nuclear Production and certified to meet NRC Quality Assurance regulations by the Corporate Quality Assurance Manager. This is considered a controlled document and numbered copies of the manual are distributed by cover letter from the Vice President, Nuclear Production. The Safety Analysis Reports are considered controlled documents and are distributed by cover letter from the Vice President, Nuclear Production or his designee. 6

The Quality Assurance Department's "Quality Assurance Program Manual" contains the basic written instructions and procedures for Quality Assurance activities. The Topical Report describes the Duke Power Quality Assurance Program for all phases of its Nuclear Power Plants. These documents are approved and certified to meet NRC Quality Assurance Regulations by the Corporate Quality Assurance Manager. These manuals are considered controlled documents and numbered copies are distributed by cover letter from the Corporate Quality Assurance Manager.

Station procedures which address activities associated with nuclear safety related structures, systems and components are subjected to a well-defined, established review and approval process. This process includes the requirement that each procedure be reviewed by an individual/group other than the individual/group which prepared the procedure, but who may be from the same organization as the individual/group which prepared the procedure. As appropriate, such procedures are also reviewed by personnel from the Nuclear Production Department General Office, by the Quality Assurance Department, by other departments within the Company, by the Nuclear Safety Review Board and by vendor personnel. Final approval of a procedure is by senior station management. Major changes to approved procedures also require final approval by senior station management. Maintenance, inspection, and modification procedures are reviewed by quality assurance to determine the need for inspections. Procedures developed and implemented by the Quality Assurance Department identify the certifications, inspection methods, acceptance criteria, and provide means for documenting inspection results. 6 6

In the case of station activities of a non-recurring nature, e.g., preoperational tests, only an original copy of an approved procedure is available for use. Such copies are controlled and are replaced whenever the procedure is superseded by a new issue. For activities which are of a recurring nature, e.g., surveillance testing, current original copies of approved procedures are maintained in a controlled manner. Copies of these original copies are then utilized in the performance of work activities. When such "working copies" involve the documentation of compliance with acceptance criteria contained in the procedure, the "working copy" of the procedure utilized is compared with the applicable original copy to assure validity. The signature of the individual responsible for the work activity, and the date the activity was performed, on the completed "working copy" of the procedure provides documentation of the fact that this comparison was made. Such completed procedures are retained - See Section 17.2.17. When recurring work activities do not involve documentation of compliance with acceptance criteria within the procedure, e.g., certain operating activities, issuance of the applicable "working copies" is controlled to assure that only current copies are available for use. In all cases, activities are performed in accordance with Section 17.2.5.

Drawings and vendor documents, as-built drawings and changes thereto, are normally received from the Design Engineering Department for distribution and use by each nuclear station. Distribution indices are established and utilized for such documents within each station in order to assure their proper distribution and use. A master file of drawings is maintained and a master index, updated regularly, is used to identify drawings, revisions, number of copies, and distribution. The master index at each station is updated by the document control group as each revision to a document is received. Reviews are performed regularly and documented to assure proper functioning of the control system. Original design and procurement documents are maintained and controlled by the Quality Assurance Department and are updated, as necessary, by the Design Engineering Department. As drawings are received from Design Engineering all superseded copies shall be destroyed or clearly marked superseded. 6 6 6

17.2.7 CONTROL OF PURCHASED MATERIAL, EQUIPMENT AND SERVICES

As stated in Section 17.2.4, the determination of vendor acceptability is the responsibility of the Quality Assurance Department. Where necessary, this determination of acceptability is based on an audit of the vendor by the Quality Assurance Department. Such an audit is performed in accordance with a comprehensive, written checklist to determine the ability of the vendor to comply with applicable criteria of 10 CFR 50, Appendix B. The results of each such audit are summarized in a written audit report which identifies whether or not the subject vendor is qualified to provide specific items. Each audit report is reviewed by the Quality Assurance Manager, Vendors, and if approved by the Quality Assurance Manager, Vendors, the subject vendor is placed on a list which identifies acceptable vendors. When the nature of an item is such that there is adequate experience and/or historical evidence to verify vendor capability, a vendor may be determined to be acceptable by the Quality Assurance Department without performance of a formal audit. Vendors are requalified by reaudit, or evaluation of previous experience or current performance, as appppropriate.

As required by procurement criteria, in order to assure that material and equipment are fabricated in accordance with applicable requirements, vendor review, audit and surveillance are performed by the Quality Assurance Department, Vendors Division. This review, audit and surveillance includes witnessing of tests and fabrication checkpoints, and evaluation of overall vendor performance and is documented.

Materials, parts and components shall be procured to specifications and codes at least equivalent to those applicable to the original equipment or those specified by a properly reviewed and approved revision. As required by the applicable purchase documents, vendors furnish documentation which identifies the material and equipment purchased and the specific procurement requirements met by the items. Also, as required by the applicable purchase documents, vendors provide documentation which identifies any procurement requirements which have not been complied with, together with a description of any deviations and repair records. Vendor evaluation and reevaluation are done in accordance with procedures to assure their certificates of conformance are valid. 6 6

Upon receipt at a station, the station organization is responsible for the control of nuclear safety-related materials, parts and components. Such items are placed in a controlled, designated area and are subjected to a receipt inspection by station Quality Assurance Department personnel. This inspection is intended to determine whether or not each item received conforms with applicable procurement requirements. Such inspections and the subsequent determination of conformance or nonconformance are documented by means of reports, which are retained on file by the Quality Assurance Department, and, as appropriate, by tags attached to the items. Until a determination of conformance is made by the Quality Assurance Department, a nuclear safety-related material, part or component cannot be issued and installed.

17.2.8 IDENTIFICATION AND CONTROL OF MATERIALS, PARTS AND COMPONENTS

Control of materials, parts, and components at nuclear stations is the ultimate responsibility of the Vice President, Nuclear Production with responsibilities delegated to each station through the respective station manager. 6

Following receipt inspection, materials, parts and components which are determined to be acceptable are assigned an identifying designation (such as a serial number), as appropriate, in order to provide quality assurance traceability of each item. In the event that the identification of an item becomes lost or illegible, the item is considered nonconforming and not utilized until proper resolution of the nonconformance. When a designated item is subdivided, each subdivision is identified in accordance with the above requirements. Where physical identification of an item is impractical or insufficient, physical separation, administrative controls or other appropriate means are utilized.

Conforming, nuclear safety-related materials, parts and components are stored in controlled, segregated areas designated for the storage of such items. The issue of nuclear safety-related materials, parts and components is controlled and documented in such a manner that quality assurance traceability and inventory accountability is provided.

Nonconforming materials, parts and components are identified and segregated in such a manner as to preclude their inadvertent substitution for and use as conforming materials, parts and components.

17.2.9 CONTROL OF SPECIAL PROCESSES

The Station Manager through the maintenance supervisor is responsible for directing the organization and performance of the station's program for the control of special processes, and for assuring the necessary qualified personnel are available.

The operational quality assurance program contains or references procedures for the control of special processes such as welding, heat treating, non-destructive examination, coatings, crimping, and cleaning. The program requires that approved, written procedures, qualified in accordance with applicable codes and standards, be utilized when the performance of such processes affects the proper functioning of a station's nuclear safety-related structures, systems, and components. These procedures shall provide for documented evidence of acceptable accomplishment of special processes using qualified procedures, equipment, and personnel. 6

Personnel performing such activities must be certified in accordance with applicable codes and standards. Adequate documentation of personnel qualifications is required prior to performance of the applicable special process.

Entire Page Revised

17.2.10 INSPECTION

In order to assure safe and reliable operation, a program of inspections for nuclear safety-related structures, systems and components is established at each nuclear station. The program addresses:

(a) Inservice inspections required by Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.

(b) Inspections to verify compliance with cleanliness criteria.

(c) Inspections to verify compliance with certain station procedures for operation and maintenance.

(d) Inspections to verify conformance of materials, parts, and components received at a nuclear station with applicable specifications and requirements.

(e) Inspections to verify the integrity of safety-related structures, systems and components during and/or after maintenance and modification.

The personnel performing these inspections are qualified, in the inspection activities performed, in accordance with appropriate quality control procedures. These procedures comply with the requirements of applicable codes and standards. Modifications, repairs and replacements are inspected in accordance with the original design and inspection requirements, or acceptable alternatives. Mandatory inspection hold points are included in the documents addressing the activities being performed, as necessary, and work does not proceed beyond such hold points until satisfactory completion of the requirement inspection by the Quality Assurance Department. Inspection procedures, instructions, and checklists contain the following information or require this information on inspection reports:

(a) Characteristics to be inspected

(b) Method of inspection

(c) Measuring and test equipment information

(d) Responsibility for the inspection

(e) Acceptance or rejection criteria

(f) Identification of required procedures, drawings, specifications, etc.

(g) Signature or initials of inspector

(h) Record of results of the inspection.

After inspection data is collected and reviewed by Quality Control Inspectors, the reports are technically reviewed by Quality Assurance before becoming valid.

Inspection activities involving the vendor quality assurance program are evaluated and approved by the Vendors Division.

6

17.2.11 TEST CONTROL

The operational quality assurance program addresses both preoperational and periodic (surveillance) testing. The program requires that such testing associated with nuclear safety-related structures, systems and components be accomplished in accordance with approved, written procedures and that schedules be provided and maintained in order to assure that all necessary testing is performed and properly evaluated on a timely basis.

Test controls include requirements on the review and approval of test procedures, and on the review and approval of changes to such procedures, as discussed in Subsection 17.2.6 above. Also, specific criteria are established with regard to procedure content. Examples of items which must be considered in the preparation and review of procedures include:

(a) References to material necessary in the preparation and performance of the procedure, including applicable design documents.

(b) Tests which are required to be completed prior to, or concurrently with, the specified testing.

(c) Special test equipment required to perform the specified testing.

(d) Limits and precautions associated with the testing.

(e) Station, unit and/or system status or conditions necessary to perform the specified testing.

(f) Criteria for evaluating the acceptability of the results of the specified testing, compatible with any applicable design specifications.

Test procedures contain the following information or require this information be documented:

(a) Requirements and acceptance limits contained in applicable Design and procurement documents.

(b) Instructions for performing the test.

(c) Test prerequisites such as calibrated instrumentation, adequate test equipment and instrumentation including their accuracy requirements, completeness of the item to be tested, suitable and controlled environmental conditions, and provisions for data collection and storage. 6

(d) Mandatory inspection hold points.

(e) Acceptance and rejection criteria.

(f) Methods of documenting or recording test data and results.

(g) Provisions to assure test prerequisites have been met.

Requirements are also established for verification of test completion and for determining acceptability of tests results. In the event that test results do not meet test acceptance criteria, a review of the test, test procedure and/or test results is conducted to determine the cause and the required corrective action.

In addition to the above, after maintenance to, or modification of, nuclear safety-related structures, systems and components certain proof tests, electrical tests, operational tests or other special tests are performed and documented as required to verify the satisfactory performance of the affected items.

17.2.12 CONTROL OF MEASURING AND TEST EQUIPMENT

The Station Manager has responsibility to assure the required accuracy of tools, gauges, instruments, radiation measuring equipment, and other measuring and test devices affecting the proper functioning of nuclear safety-related structures, systems and components and that a program of control and calibration for such devices is provided. This program includes the following: 6

(a) Devices are assigned permanent, identifying designations.

(b) Devices are calibrated at prescribed intervals, and/or prior to use, against certified equipment having known, valid relationships to nationally recognized standards. The calibration interval for a device is based on the applicable manufacturer's recommendations. If experience dictates that the manufacturer's recommendations are not appropriate, the calibration interval is changed as necessary.

(c) Devices that have been acceptably calibrated are affixed with a tag, or tags, showing the date of calibration, the date the next calibration is due, an indication that the device is within calibration specifications and the identification of the individual who was responsible for performing the calibration.

(d) Devices which fail to meet calibration specifications are affixed with a tag, or tags, showing the date of rejection, the reason for rejection and the identification of the individual rejecting the device. "Accepted" and "Rejected" calibration tags are sufficiently different to preclude confusion between them.

(e) Items and processes determined to be acceptable based on measurements made with devices subsequently found to be out of calibration are re-evaluated.

(f) Devices stored under conditions which are in accordance with, or more conservative than, the applicable manufacturer's recommendations.

(g) Devices are issued under the control of responsible personnel so as to preclude unauthorized use.

(h) Devices are shipped in a manner that is in accordance with, or more conservative than, the applicable manufacturer's recommendations.

(i) Records are maintained on each device which identify such items as the device designation and the calibration frequency and specifications. Records are maintained to reflect current calibration status.

(j) As a rule, the calibration program achieves a minimum ratio of 4-to-1 calibration standard accuracy to measuring and test equipment accuracy unless limited by the state of the art; however, when an accuracy ratio of less than 4-to-1 is utilized, an evaluation of the specific case is made and documented.

However, installed instrumentation is subject to the requirements of the Technical Specification and is not subject to the tagging requirements discussed in (c) and (d) above. The Quality Assurance Department verifies implementation of the calibration program through periodic surveillance. 6

17.2.13 HANDLING, STORAGE AND SHIPPING

The operational quality assurance program requires that nuclear safety-related materials, parts and components be handled, stored and shipped in such a manner that the serviceability and quality assurance traceability of an item is not impaired. Handling, storage and shipping of an item is in accordance with any special requirements identified in documents pertaining to the item. Such requirements may include special handling tools and equipment, special protective coverings and/or special protective environments. Procedures identify predetermined requirements for handling, preservation, storage, cleaning, packaging, and shipping and are utilized by suitably trained individuals. 6

Conforming nuclear safety-related materials, parts and components are stored in controlled, segregated areas designated for the storage of such items. Inspections and examinations are performed on a periodic basis to assure that recommended manufacturing shelf life of chemicals, reagents, lubricants, and other consumable materials are not exceeded. These items shall be stored in well ventilated areas which are not in close proximity to safety related structures, systems, or components. Nonconforming items are stored such that they are segregated from conforming items, in order to preclude their inadvertent substitution for and use as conforming materials parts and components. 6

17.2.14 INSPECTION, TEST AND OPERATING STATUS

In order to assure that equipment status is clearly evident, and to prevent inadvertent operation, the operational quality assurance program requires nuclear safety-related structures, systems and components which are in an other than operable status to be identified as such. This identification may be means of tags, labels, stamps or other suitable methods. Where appropriate, an independent verification of the correct implementation of such identification measures is performed. When tags, labels or stamps are utilized for the identification of equipment status, the issuance and removal thereof is documented in order to assure proper control of such identification measures. Also, procedures require that the operability of an item removed from operation for maintenance or testing be verified prior to returning the item to normal service. 6

Inspections and tests required by the written approved procedures which address work activities are infrequently, temporarily deferred. When such a deferral does occur, a discrepancy is considered to exist and documentation of the acceptable completion of the affected work activity is not performed until the discrepancy is resolved.

Measures taken to identify equipment status by Nuclear Production Department personnel are controlled by the Nuclear Production Department. Measures taken by Quality Assurance Department personnel, during the performance of required inspections and quality control activities, to identify equipment status are controlled by the Quality Assurance Department. 6

17.2.15 NONCONFORMING MATERIALS, PARTS AND COMPONENTS

Nuclear safety-related materials, parts and components which are determined to be nonconforming are identified, segregated or otherwise controlled in such a manner as to prevent installation and/or use. The determination of an item's nonconformance is documented by means of a report, which is retained on file by the Quality Assurance Department, and, as appropriate, by tags attached to the item. Nuclear Production Department personnel are notified by Quality Assurance Department personnel of any nonconformances identified. 6

The Quality Assurance Department maintains a listing of the status of all nonconforming item reports. These reports, when complete, identify the nonconforming material, part or component; applicable inspection requirements; and the resolution, and approval thereof, of the nonconformance. Provisions are established for identifying those Quality Assurance Department personnel with the responsibility and authority for approving the resolution of nonconformances. Until a determination of conformance is made by the Quality Assurance Department, a nuclear safety-related material, part or component cannot be issued or installed. Tags which are placed on items to identify nonconformances are removed by the Quality Assurance Department upon resolution.

Information relating to nonconforming materials, parts and components is analyzed by the Quality Assurance Department to determine if any discernible trends which might affect quality exist. When recurring nonconformances indicate possible vendor deficiencies, such information is considered in evaluation of vendor acceptability by the Quality Assurance Department.

17.2.16 CORRECTIVE ACTION

Station personnel are responsible for the implementation of the operational quality assurance program as it pertains to the performance of their activities. Specific to this responsibility is the requirement for informing the responsible supervisory personnel and/or for taking appropriate corrective action whenever any deficiency in the implementation of the requirements of the program is determined.

Discrepancies revealed during the performance of station operation, maintenance and testing activities must be resolved prior to verification of the completion of the activity being performed. In the event of the failure of nuclear safety-related structures, systems, and components, the cause of the failure is evaluated, appropriate corrective action taken, and items of the same type evaluated to determine whether or not they can be expected to continue to function in an appropriate manner is documented in accordance with applicable procedures. Corrective action with regard to nonconforming materials, parts, and components is discussed in Subsection 17.2.15 above. Procedures require that conditions adverse to quality be corrected and action be taken to preclude repetition. 6

Significant incidents occurring during operation which are, or could be, related to the nuclear safety of the station are also the subject of special reports. These reports:

(a) Contain a summary description of the information relating to the subject incident,

(b) Contain an evaluation of the effects of the incident,

(c) Describe corrective action taken or recommended as a result of the incident, and

(d) Describe, analyze and evaluate any significant nuclear safety-related implications of the incident.

Each such report is approved by the responsible station Manager and transmitted to the Vice-President, Nuclear Production, or his designee, and to the Nuclear Safety Review Board. Outstanding corrective action commitments made with regard to such incidents are identified and periodically reviewed to assure that the identified corrective actions are properly completed and documented. An identified corrective action commitment is closed out upon written notification by a cognizant, responsible individual or other written documentation, of the satisfactory completion thereof. Closure of corrective action commitments which specifically involve the Quality Assurance Department require written notification by the Quality Assurance Department of the satisfactory completion thereof. 6

17.2.17 QUALITY ASSURANCE RECORDS

Each nuclear station is required to maintain adequate identifiable and retrievable quality assurance records. Such records are managed in a controlled and systematic manner by means of a station Master File. Access to, and use of, this file is controlled. Records required to be retained include:

(a) Nuclear safety-related preoperational testing records.

(b) Records of modifications to station nuclear safety-related structures, systems and components.

(c) Radiation monitoring records.

(d) Personnel radiation exposure records.

(e) Records of radioactive releases and waste disposal.

(f) Isotopic and physical inventory records of special nuclear materials.

(g) Records of the qualifications, experience and training of appropriate station personnel.

(h) Current calibrations for measuring and test devices.

(i) Copies of approved purchase requisitions for items requiring quality assurance certification.

(j) Maintenance histories on nuclear safety-related instrumentation and electrical and mechanical equipment.

(k) Records of special processes affecting nuclear safety-related structures, systems and components.

(l) Copies of purchase specifications.

(m) Operating records and logbooks.

(n) Periodic testing records.

(o) Records of inspections.

(p) Copies of approved and of completed station procedures.

(q) Copies of audit and surveillance reports received from the Quality Assurance Department, and responses thereto.

(r) Copies of reports concerning station activities sent to the Nuclear Regulatory Commission.

(s) Copies of drawings and vendor documents.

(t) Copies of minutes of meetings of the Nuclear Safety Review Board applicable to the station.

(u) Copies of station incident reports.

Records of activities within the purview of the Quality Assurance Department are maintained by the Quality Assurance Department in a manner similar to that described above for station quality assurance records. These records include:

(a) Records of inservice inspections.

(b) Records of quality control inspections.

(c) Records such as vendor documentation packages and inspection reports, piping isometric drawings, welding records, etc. compiled during the design and construction of a nuclear station.

(d) Records of audits and surveillances performed by the Quality Assurance Department of station activities.

(e) Records of the qualifications of quality control and other appropriate Quality Assurance Department personnel.

Test records maintained by the station and inspection records maintained by the Quality Assurance Department contain the following:

(a) A description of the activity performed.

(b) The date and results of the activity.

(c) Information relating to discrepancies identified with regard to the activity.

(d) An identification of the data recorder(s) or inspector(s) involved in the activity.

(e) Evidence of the completion, and verification thereof, of the activity.

(f) An identification of the acceptability of the results of the activity.

The retention times for the various quality assurance records are in accordance with applicable requirements, including those of the Code of Federal Regulations, a station's Technical Specifications and established national codes and standards. To the maximum extent practicable, records are stored such that are protected from possible destruction by causes such as fire, flooding, theft, insects and rodents and from possible deterioration due to a combination of extreme variations in temperature and humidity conditions.

17.2.18 AUDITS

Operational quality assurance activities are periodically audited by the Quality Assurance Department. The program for such audits is identical to that described in Subsection 17.1.18.

17.2.18.1 Surveillance

Periodic surveillance of safety related activities at each nuclear station is the responsibility of the Quality Assurance Manager, Operations. Primary responsibility for the administration of the surveillance program is assigned to the Senior Quality Assurance Engineer.

Surveillance consists of checking documents, records and work in progress to determine that quality assurance requirements are being properly implemented. Work in progress includes such activities as welding, maintenance, system testing, station operation, station modifications, refueling, and record management.

The Senior Quality Assurance Engineer or his designee is responsible for developing and maintaining surveillance schedules, reviewing and approving surveillance checklists and approving written reports documenting surveillance results. Surveillance findings are reported to management in the form of nonconforming item reports and surveillance summaries. The surveillance summaries listing nonconforming item reports, repetitive and other identified problems are forwarded to the Station Manager. Verification of corrective action is performed by the Station Surveillance Group.

The Senior Quality Assurance Engineer or his designee reviews each new applicable Quality Assurance Department Quality Assurance procedure and Quality Control procedure within three (3) months of its effective date to determine its effective implementation.

Table 17.2-1
Operational Quality Assurance Program

- Section -	10 CFR 50 Appendix B -Criteria Reference-	Scope
Organization	I, II	Describes the Duke Power Company organization applicable to operational quality assurance.
Administration of the Manual	I, II, V, VI, XVI	Addresses the authority, implementation and revision of the "Administrative Policy Manual for Nuclear Stations."
Document Control	I, II, V, VI, XVII	Establishes requirements for the handling and distribution of drawings, vendor documents, station procedures, copies of the FSAR and copies of the "Administrative Policy Manual for Nuclear Station."
Records Management	I, II, V, VI, VII, XVII	Addresses the contents of the station's files and the record retention and management requirements for these files.
Control of Measuring and Test Equipment	I, II, V, XII, XVII	Describes the requirements for the identification, calibration, storage, shipment and issue of measuring and test equipment.
Control of Materials, Parts and Components	I, II, IV, V, VI, VII, VIII, XIII, XV, XVII	Addresses the procurement, receipt, receipt inspection, identification, handling, storage, shipping and issue of materials, parts and components.
Qualifications and Training of Personnel	I, II, V, XVII	Establishes requirements for the qualifications and training of applicable station personnel.

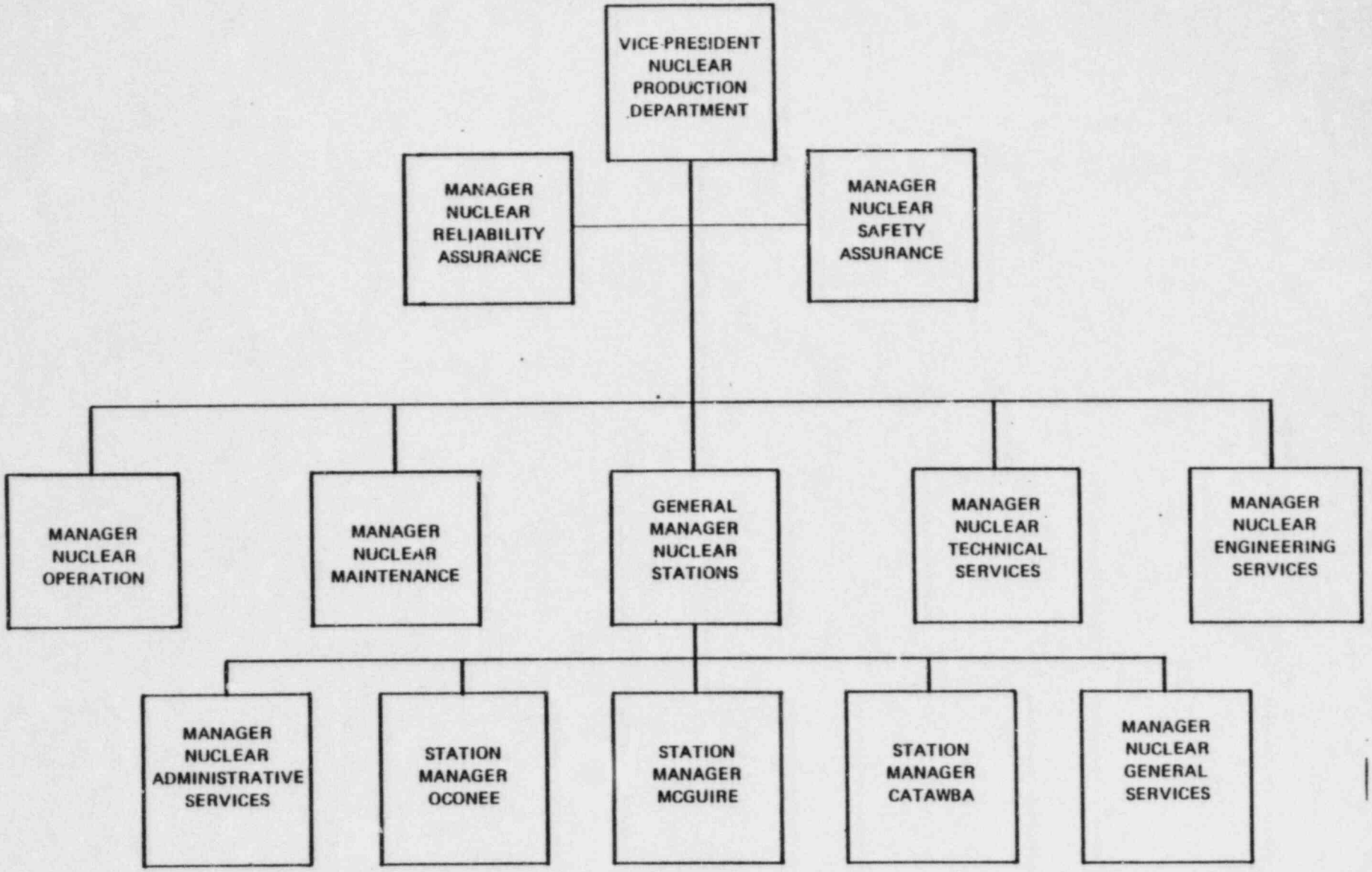
Table 17.2-1 (Cont'd)
Operational Quality Assurance Program

- Section -	10 CFR 50 Appendix B -Criteria Reference-	Scope	
Review and Audit	I, II, V, XVII, XVIII	Describes the responsibilities for review and audit of the Nuclear Safety Review Board and the Quality Assurance Department.	3
Control of Interfacing Individuals and Organizations	I, II, V, XVII	Establishes requirements for controlling the activities of individuals and organizations which interface with a station operating organization.	
Incident Reports	I, II, V, VI, XVI, XVII	Addresses the reporting of significant station incidents and the content of such reports.	
Operations	I, II, V, XIV, XVII	Addresses the responsibilities of the operating organization, the content of Operating Procedures, the content of Emergency Procedures, the content of the Alarm Response Manual and the content of necessary operating records.	
Testing	I, II, V, XI, XIV, XVII	Establishes requirements for the content of test procedures, the scheduling of testing and the performance of testing for both preoperational and periodic testing.	
Maintenance	I, II, V, X, XIV, XVI, XVII	Addresses the performance of maintenance, the investigation of equipment failures, the evaluation of replacement parts, the scheduling of maintenance and the content of Maintenance Procedures and Instrument Procedures.	

Table 17.2-1 (Cont'd)
Operational Quality Assurance Program

- Section -	10 CFR 50 Appendix B -Criteria Reference-	Scope
Modifications	I, II, III, V, XVII	Establishes requirements for the initiation of a modifiction request, the review and approval of modification requests and the implementation of modifications.
Inspections	I, II, V, X, XVII	Describes the responsibilities of personnel for inspections.
Special processes	I, II, V, IX, XVII	Addresses the responsibilities of personnel for the control of special processes, the qualifications of personnel performing special processes and the requirements for procedures for special processes.
Administrative Instructions for Preoperational Test Procedures	I, II, V, VI, XI, XVI, XVII	Establishes requirements for the preparation, review, approval and revision of Pre-operational Test Procedures and the conduct and documentation of preoperational tests.
Administrative Instructions for Permanent Station Procedures	I, II, V, VI, XI, XVI, XVII	Addresses the preparation, review, approval, revision and use of permanent station procedures.
Administrative Instructions for Temporary Station Procedures	I, II, V, VI, XI, XVI, XVII	Addresses the preparation, review, approval, revision and use of temporary station procedures 2
Administrative Instructions for Modifications	I, II, III, V, VI, XVII	Establishes requirements for the initiation of a modification request; the evaluation, design, review, approval and implementation of the modification; and the documentation thereof.

OPERATIONAL QU TY ASSURANCE
NUCLEAR PRODUCTION DEPARTMENT



TOPICAL REPORT
FIGURE 17.2 – 1
AMENDMENT 6

OPERATIONAL QUALITY ASSURANCE
TYPICAL NUCLEAR STATION ORGANIZATION

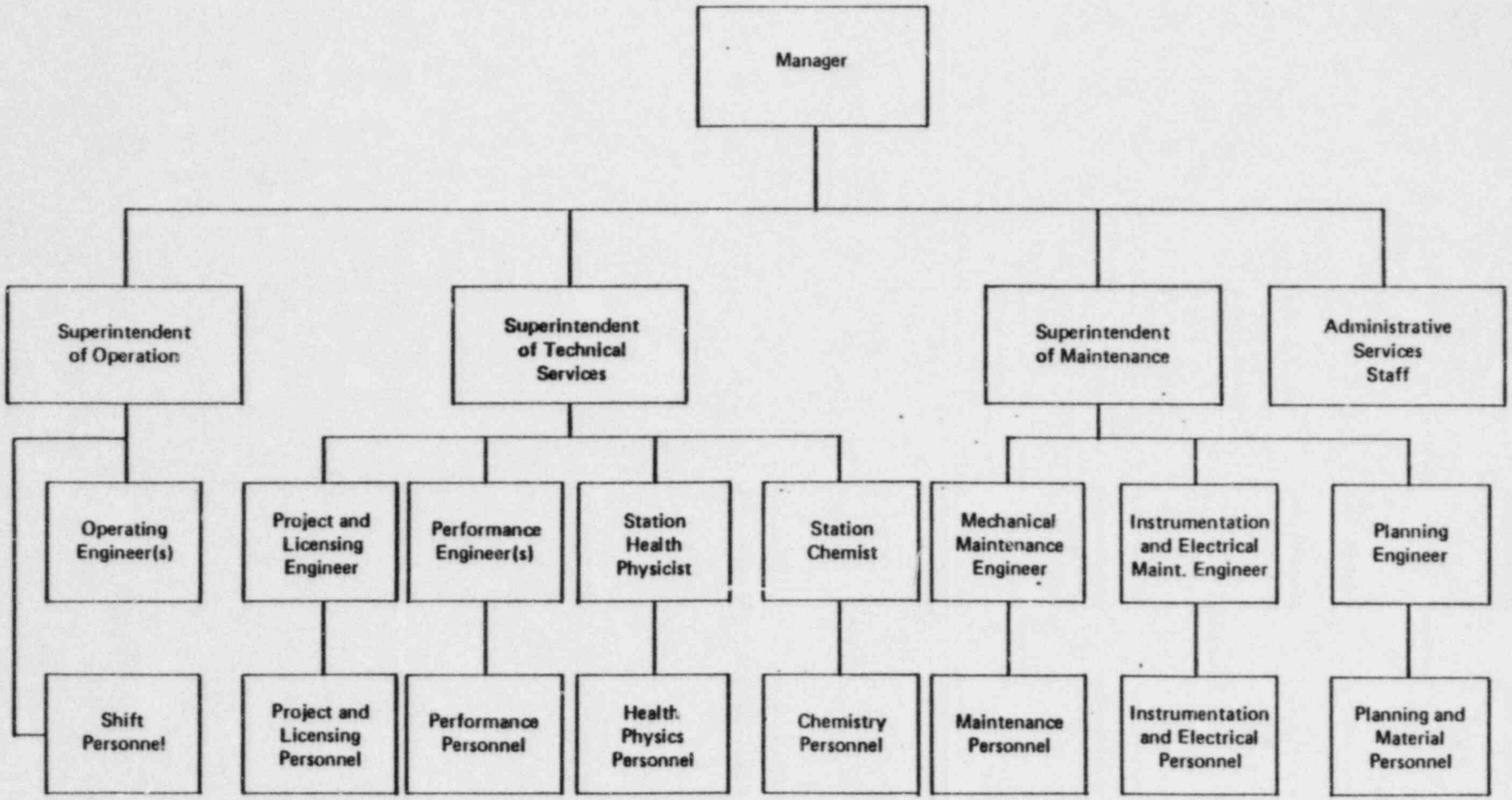


Figure 17 - 2 - 2

Appendix A

Qualification Requirements

and

Responsibilities

QUALIFICATIONS AND RESPONSIBILITIES
CORPORATE QUALITY ASSURANCE MANAGER

A. Qualifications

Must meet the Company's general requirements and in addition:

1. Have a Bachelor's degree in engineering or the equivalent in practical experience. Must also have at least one (1) year of experience in the implementation of the Quality Assurance Program. 6
2. Must have developed a high level of competence in the field of quality assurance or related technical areas associated with nuclear stations.
3. Must be innovative and have the ability to plan an effective overall quality assurance program for the Company.
4. Must have the ability to effectively coordinate the implementation, monitoring and modification of quality assurance programs among the several departments of the Company.
5. Must exhibit qualities of leadership and communications ability, both oral and written.

B. Responsibilities

Under the general direction of the Executive Vice President, Engineering and Construction, the Corporate Quality Assurance Manager is responsible for the overall direction of the Company's quality assurance program including technical supervision of quality assurance managers in the several divisions. More specific responsibilities include: 6

1. Develop and maintenance of overall quality assurance policy complying with the requirements of the Company and regulatory authorities.

2. Direct the implementation of the program within the several divisions of Quality Assurance with particular attention to interfaces.
3. Planning of the training and development of quality assurance personnel in the company.
4. Monitoring and surveillance of the effectiveness of quality assurance efforts in the company, including periodic reporting to the Executive Vice President, Engineering and Construction. | 6
5. Representing Company management at high level quality assurance meetings with regulatory agencies and industry groups.
6. Maintaining a current file of quality assurance plans, programs and procedures in effect.
7. Reviewing the results of departmental audits through the reaudit stage and preparing a summary report for the Executive Vice President, Engineering and Construction. | 6
8. Directing such special audits as may be required from time to time.

QUALIFICATIONS AND RESPONSIBILITIES

SENIOR QUALITY ASSURANCE ENGINEERS

A. Qualifications

Must meet the Company's general requirements and in addition:

1. Must have six (6) years experience in the field of quality assurance, four (4) of which may be fulfilled by related technical or academic training. At least one (1) year of this experience shall be in the overall implementation of the quality assurance program as an employee of the Quality Assurance Department.
2. Must have developed a high level of competence in the field of quality assurance or related technical areas associated with nuclear stations.
3. Must have the ability to effectively implement the operational quality assurance program at a nuclear station.
5. Must exhibit qualities of leadership and communications ability, both oral and written.

B. Responsibilities

Under the direction of the Quality Assurance Manager, Operations, the Senior Quality Assurance Engineer is responsible for the implementation of the Company's operational quality assurance program at a nuclear station. More specific responsibilities include:

1. Implementing the quality control inspection program.
2. Providing adequate technical support to the quality control inspection program.
3. Implementing the operational surveillance program.
4. Planning of the training and development of assigned quality assurance personnel.

5. Monitoring the effectiveness of the implementation of the operational quality assurance program and making recommendations for any improvements deemed necessary.
6. Maintaining current files of applicable quality assurance plans, programs and procedures and associated documentation.