17.0 QUALITY ASSURANCE

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17.0 - QUALITY ASSURANCE

A. General

Chapter 17 describes the QA programs developed and implemented during the design, construction, and operation of FNP. Appendixes describing the design and construction QA programs of four major vendor organizations follow this chapter.

B. Introduction

The responsibility for the design, construction, testing and operation of the Joseph M. Farley Nuclear Plant (FNP) rests with the applicant, Alabama Power Company (APC)[(a)] To provide assurance that the design and construction of the FNP conforms with applicable regulatory requirements and with the design bases specified in the license application, a quality assurance (QA) program was developed and implemented under the supervision of APC's executive vice president. This program was applicable to all safety-related structures, systems, and components. The responsibility for developing and implementing certain phases of the overall program was delegated by APC to Southern Company Services, Inc. (SCS) subject to the review and approval of the applicant. The portion of the program delegated to SCS included the review or audit of design concepts, detail designs, specifications, drawings (including compliance with the requirements of the FSAR), and certain vendor shop quality control surveillance. APC was responsible for the development and implementation of the quality control program at the construction site through its general contractor, Daniel Construction Company of Alabama (Daniel).

C. Definitions

Quality Assurance (QA) - All those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component will perform satisfactorily in service.

Quality Control (QC) - Those quality assurance actions related to the physical characteristics of a material, component, or system which provide a means to control the quality of the material, component, or system to predetermined requirements.

Quality Assurance Manual (QAM) - A manual prepared for the FNP setting forth the procedures and methods to be employed to ensure compliance with applicable codes, standards, criteria, and other requirements in the design and construction of the FNP for all safety-related systems, structures, and components.

a. Southern Nuclear Operating Company became the plant licensed operator on December 23, 1991.

Owner - The persons, company, or corporation responsible for the nuclear power plant construction permit or operating license.

Contractor - Any organization under contract for furnishing items or services to an organization operating with the FNP QA program. It includes the terms vendor, supplier, subcontractor, and subtier levels of these where appropriate.

Safety - Related Structures, Systems, and Components – Those structures, systems, and components that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. They will be listed in the Quality Assurance Manual (QAM) for the FNP in a Q-List.

Procurement Documents - Binding documents that identify and define the requirements to which items or services must comply in order to be accepted by the owner.

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

Objective Evidence - Any statement of fact, information, or record, either quantitative or qualitative, pertaining to the quality of an item or service based on observations, measurements, or tests which can be verified.

Documentation - Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results.

Nonconformance - A deficiency in characteristic, documentation, or procedure that renders the quality of an item unacceptable or indeterminate. Examples of nonconformance include physical defects, test failures, incorrect or inadequate documentation, and deviation from prescribed processing, inspection, or test procedures.

Repair - The process of restoring a nonconforming characteristic to a condition such that the capability of an item to function reliably and safely is unimpaired even though that item may still deviate from an original requirement.

Rework - The process by which a nonconforming item is made to conform to a prior specified requirement by completion, remachining, reassembling, or other means.

Quality Assurance List (Q-List) - The list identifying FNP safety-related items is included in section 17.3.

[HISTORICAL]
[17.1 QUALITY ASSURANCE DURING DESIGN AND CONSTRUCTION

Section 17.1 contains historical information implemented during design and construction of FNP. The current QA program is described in section 17.2.

17.1.1 ORGANIZATION

The major organizations participating in the design and construction of the Farley Nuclear Plant (FNP) are:

A. Alabama Power Company (APC) - Owner.

B. Southern Company Services, Inc. (SCS) - Architect/engineer (A/E) (agent for Alabama Power Company).

C. Bechtel Power Corporation - Architect/engineer (subcontractor responsible to SCS for major portion of plant design).

D. Westinghouse Electric Corporation - Designer and supplier of the nuclear steam supply system (NSSS).

E. Daniel Construction Company of Alabama (Daniel) - General contractor for the construction of the FNP.

The organization chart for each of these companies appears at the end of this section (figure 17.1-1).

The following describes the quality assurance (QA) responsibilities and authorities of each major organization.

17.1.1.1 Alabama Power Company

Alabama Power Company is the owner and is responsible for the overall development and implementation of the total QA program for the FNP during design and construction.

The manager - quality assurance (design and construction) (MQA) and his staff, reporting ultimately to the executive vice president via the vice president - nuclear generation and the senior vice president, manages the FNP QA program and ensures through a system of audits that all facets of the program are properly documented, implemented, and enforced. The MQA and his supporting staff are located in APC's General Office Building in Birmingham, Alabama; their primary duties and responsibilities are as noted in paragraph 17.1.2.2. The quality

assurance field representatives (QAFRs) provide a completely independent review and evaluation of the adequacy and effectiveness of the construction site quality control (QC) program. The QAFRs report regularly to the MQA on the status and adequacy of the construction site QA program. They have been provided with sufficient organizational freedom to monitor field construction and erection activities and to identify quality problems. Those problems requiring management decisions are referred to the MQA for appropriate action.

The Nuclear Engineering and Technical Support Section of the Nuclear Generation Department is responsible for the audit and acceptance of all specifications, general design drawings, and procedures, with particular emphasis on the coordination of audits by other interested APC departments. This responsibility involves assessment of the adequacy of applicable codes and standards made a part of any specifications related to the project and ensuring that adequate quality assurance programs are clearly made a contractual responsibility of contractors, vendors, and suppliers. Assessing the qualifications of all outside consultant specialists used on the project is also a responsibility of this section.

The Construction Department has the responsibility for all site construction activities, including monitoring functions of Daniel, to see that terms of the contract (cost, accounting, scheduling, and QC) are met and that any corrective actions that may be required are taken. The Construction Department also provides limited procurement and inspection services at the site. QC activities of Daniel, which encompass its work as well as that of its subcontractors, will be monitored by Construction Department personnel.

Corrective actions shall be one of the following:

A. Daniel supervisors are cautioned regarding any observable trends leading toward laxity in QC.

B. An actual ordering of a shutdown of some phase of the work is made because of an observed deviation.

In the latter case, this action will be immediately reported to the Daniel project manager or his representative and to the representative of the APC MQA for handling by the prescribed procedure.

Notwithstanding any inspection performed above, the final responsibility for the adequacy of all field quality control and assurance procedures is the responsibility of the MQA and his field representatives who will monitor and audit all QC activities and will assist in establishing an effective program.

The Nuclear Generation Section is responsible for component/preoperational testing and startup, maintenance, and operation at the FNP.

The Purchasing Department is responsible for maintaining APC's bidders' list and reviewing the proposed bidders submitted by SCS, Bechtel, and Daniel. APC Purchasing will cooperate with Daniel in the preparation of a bidders' list and will approve purchasing recommendations by Daniel in excess of a specified monetary value. APC purchase orders will be placed based on quotations which may be obtained by SCS, Bechtel, and APC. Inquiries or purchase orders will be issued on requisitions prepared by SCS, Bechtel, and the Construction Department. Requisitions from SCS and Bechtel may be assigned to Daniel, in which case Daniel will issue the inquiry, obtain the bids, issue the purchase order, and perform vendor surveillance. In some instances, APC purchase orders are assigned to Daniel. In these cases, Daniel will perform vendor surveillance.

17.1.1.2 Southern Company Services, Inc.

Southern Company Services, Inc. is the architect/engineer for the FNP. SCS has developed and implemented that portion of the QA program relating to the review or audit, approval, and documentation of basic design concepts, detail designs, drawings, and specifications. SCS assures that all drawings and specifications for structures, systems, and components clearly set forth the requirements, codes, and special procedures which must be met to render all items suitable for their intended service and to provide for quality manufacture, fabrication, and construction installation.

SCS is also responsible for the analysis of all proposals for the furnishing and installation of equipment and structures to ensure that contractors and manufacturers have an adequate program to meet all QA requirements and codes which are a part of the specifications.

SCS is responsible for the administration of the vendor surveillance program.

For a description of the SCS QA program, refer to appendix 17A. For the SCS organization chart, see figure 17.1-1.

17.1.1.3 Bechtel Power Corporation

Bechtel Power Corporation has been retained by Southern Company Services, Inc. to act as its consultant on the nuclear portion of the plant. In this capacity, Bechtel is responsible for the review or audit, approval, and documentation of basic design concepts, detail designs, drawings, and specifications for certain structures, systems, and components. Bechtel assures that all drawings and specifications for structures, systems, and components for which they are responsible clearly set forth the requirements, codes, and special procedures which must be met to render all items suitable for their intended service.

Bechtel is also responsible for the analysis of all proposals for the furnishing and installation of equipment and structures for which they are responsible and for ensuring that the involved

contractors and manufacturers have an adequate program to meet all QA requirements and codes which are a part of the specifications.

For a description of the Bechtel QA program, refer to appendix 17B. For the Bechtel organization chart, see figure 17.1-1.

17.1.1.4 Westinghouse Electric Corporation

APC has contracted with Westinghouse Electric Corporation to design and fabricate the nuclear steam supply system and the initial reactor core (comprised of the Westinghouse standard 3-loop plant) for the FNP.

The Westinghouse QA program is applicable to the design, procurement, and inspection of all systems and components in the Westinghouse scope of supply whether manufactured by Westinghouse or purchased through other suppliers.

Over the course of performing the design and initial procurement activities for the Joseph M. Farley Plant, the Westinghouse quality assurance program was upgraded to reflect changes in regulatory requirements and industry standards. These changes first culminated in WCAP-8370, Revision 7A. This revision of the Westinghouse QA program was applicable to activities within the Westinghouse scope performed for the FNP which were initiated from January 1, 1975 to October 1, 1977. Subsequently, the Westinghouse QA program, which is described in WCAP-8370, Revision 8A, was applicable to activities within the Westinghouse scope which were initiated after October 1, 1977 and through October 1979. The Westinghouse QA program, described in WCAP-8370, Revision 9A, is applicable to activities within the Westinghouse scope which were initiated after October 31, 1979 and through February 1, 1981. The most recent Westinghouse QA plan, described in WCAP-8370, Revision 12A, issued in 1992 was recently replaced with QMS Rev. 1 (Reference 6 of Chapter 4.2) which is applicable to activities within the Westinghouse scope initiated after January, 1996.

The original quality assurance program implemented by Westinghouse for the Joseph M. Farley Plant is described in appendix 17C. For the Westinghouse organization chart, see figure 17.1-1.

17.1.1.5 Daniel Construction Company of Alabama

Daniel Construction Company of Alabama has been retained by Alabama Power Company as the general contractor for FNP construction activities. Daniel will execute a quality control program in full accord with APC's QA program. The quality control program includes the procedures, instructions, and control actions necessary to assure that the field fabrication and construction, material and equipment, and workmanship are controlled to meet applicable requirements of the drawings and specifications. All personnel performing quality control functions have been delegated sufficient operational authority to exercise their knowledge and

responsibility through quality control surveillance and inspections to assure that the specified requirements are achieved.

The accumulation, filing, and storage of quality-related documentation shall be the responsibility of Daniel.

Daniel is responsible for administering QA supplier surveillance for Daniel-originated procurements and APC procurements which have been assigned to Daniel.

For a description of the Daniel QA program, refer to appendix 17D. For the Daniel organization chart, see figure 17.1-1.

17.1.2 QUALITY ASSURANCE PROGRAM

The FNP QA program is applicable to those structures, systems, and components classified as safety related. These items are identified in section 17.3 along with the associated QA responsibilities of the major participating organizations. The QA program shall be in force throughout the design and construction of the FNP.

The APC QAM requires procedures and instructions which govern the activities of APC in the design and construction of the FNP. In addition, each contractor of safety-related structures, systems, or components is required to develop and implement his own QA program subject to acceptance by APC. Audits are conducted by APC to ensure that the QA provisions are met.

The APC design and construction program is composed of the Quality Assurance Committee (QAC), the manager – corporate quality assurance, the manager - quality assurance (design and construction), and the Quality Assurance Manual (QAM). These elements are discussed in the following paragraphs.

17.1.2.1 Quality Assurance Committee

The Quality Assurance Committee advises and assists the executive vice president of APC on all phases of the QA program. This executive vice president serves as chairman of the Committee. Other members of the Committee are the senior vice president and the vice presidents of the Nuclear Generation Department and the Construction Department of APC, the senior vice president of SCS and the vice president - nuclear of SCS.

The Committee meets semiannually, or more often if called by the chairman (either at his discretion or at the request of any member), to review the adequacy and practicality of the QA program, the functioning of the program in regard to implementation and effectiveness, and any proposed modifications to the program.

The QAC has the duty of proposing revisions or modifications to the chairman in the event its review indicates the need for such. The MQA, his staff, and any other personnel of APC and SCS are available to assist the Committee in its review and to record the minutes of all meetings.

The MQA reports to the Committee at each semiannual meeting, or at such other times as requested, on the overall effectiveness of the program, other matters which he considers significant, and any phase of the program on which any member of the Committee requests a report.

17.1.2.2 Manager-Quality Assurance

APC has appointed an experienced graduate engineer with a broad general background of construction management to function as manager-quality assurance for the FNP project. He will report to the vice president - nuclear generation but will have direct access to the executive vice president. Specific duties and responsibilities of the MQA, which may be delegated to personnel in the QA Section, include:

A. The maintenance of close communication with Southern Company Services, Bechtel, and Daniel to ensure that the portion of the QA program assigned to them is being properly developed and implemented.

B. The maintenance of close communication with APC Construction, Nuclear Generation, and Purchasing Departments and with the Nuclear Engineering and Technical Support Section of the Nuclear Generation Department with respect to the APC portion of the QA program.

C. Reporting periodically via the vice president - nuclear generation to the executive vice president of APC regarding the overall progress and status of the QA program and any deviations. Any deficiency or discrepancy considered a significant deviation must be reported immediately.

D. Auditing specifications with respect to quality assurance requirements.

E. Prior to the award of a contract, examining the supplier's proposal and the recommendations, including quality assurance programs, to verify that each vendor recommended as a supplier of a safety-related structure, system, or component has an adequate QA program at his manufacturing or fabricating plant to meet the requirements of the specifications, drawings, and contract documents.

F. Coordinating through SCS and Daniel the activities of outside organizations and special consultants engaged to monitor and document the QA programs being utilized at the manufacturing or fabricating plants of vendors furnishing safety-related structures, systems, orcomponents.

G. Other duties as may be assigned by APC's executive vice president via the vice president – nuclear generation to ensure proper development and adequate implementation of the QA program.

The MQA and his supporting staff are located in the APC General Office Building. Onsite representatives reporting directly to the MQA keep him fully informed regarding day-by-day progress of construction and compliance with the provisions of the QA program.

The MQA visits the construction site frequently for consultation with his representatives and for persona observations to ensure compliance with the provisions of the QA program. He periodically participates with representatives of outside organizations and special consultants on visits to manufacturing plants of vendors to ensure proper monitoring and documentation of their QA programs.

The MQA or his representatives have authority to stop any work in progress at the construction site and to require the removal of any item not conforming to the approved specifications and drawings or which is not in accordance with the provisions of the QA program.

17.1.2.3 The Quality Assurance Manual

The Quality Assurance Manual (QAM) defines the policies and procedures employed to implement the QA program and to ensure compliance with applicable codes, standards, design criteria, and other requirements identified in the design, procurement, and construction documents of the FNP for all safety-related structures, systems, and components. The QAM contains a detailed listing, referred to as the Q-List, identifying these structures, systems, and components.

The QAM references the QC Procedure Manual which contains procedures for work in the construction of the FNP. The QAM and the QC Procedure Manual are amended to include changes and additional procedures as they are developed. The changes and additional procedures are prepared, approved, and released prior to the initiation of any work governed by changes or new procedures.

17.1.3 DESIGN CONTROL

17.1.3.1 Procedure Manual

A procedure manual has been developed for the FNP which contains detailed instructions regarding design control measures. This manual includes engineering correspondence procedures, design and engineering approval procedures, engineering division of responsibility, and the checks, reviews, and audits required to integrate Westinghouse, Bechtel, Southern Company Services, and Alabama Power Company into a common effort on plant design and, at the same time, provide a system of checks and balances to assure both quality design and adequate participation by SCS and APC.

17.1.3.2 Designs Originating with SCS

The design bases and performance criteria for structures, systems, and components under SCS's responsibility are contained in the FSAR. They were reviewed and approved by APC and served as the starting point in design by SCS's engineers.

All drawings, specifications, and calculations are subject to internal review. Each discipline (Mechanical, Electrical, Structural) has a project engineer who is responsible for assuring:

A. The incorporation of requirements and design bases as outlined in the FSAR into specifications and drawings.

B. The incorporation of QA requirements into design documents commensurate with the function of the item.

C. General conformance to good engineering practices which ensures compatibility of items incorporated into the plant.

D. Proper coordination with project engineers of other disciplines.

Staff specialists and outside consultants are available as required by project engineers. The vice president – design engineering has overall responsibility for all designs submitted by SCS.

17.1.3.3 Designs Originating with Bechtel

The design bases and performance criteria for structures, systems, and components under Bechtel's responsibility are contained in the FSAR. They were audited and approved by SCS and APC and served as the starting point in design by Bechtel's engineers. All drawings, specifications, and calculations are subject to internal review. In these design reviews,

independent checks of the drawings, specifications, and/or calculations are made to ensure accuracy and adherence to FSAR requirements. During various stages of design, these engineers consult with the discipline chief engineers and their staff specialists. By means of a design control checklist, chief engineers designate those documents they want to review and approve. Review and approval is indicated by the signature of the appropriate chief engineer on the document. Outside specialists are consulted if the occasion demands. The project engineer, who reports to the engineering manager, has overall responsibility for all designs submitted to SCS and APC.

17.1.3.4 Design Interfaces

The APC QAM requires procedures that govern the interface relationship among the design organizations with regard to review, approval, release, distribution, and revision of engineering data. Verification of design adequacy is accomplished by the following procedures:

A. Westinghouse specifications and drawings affecting the Bechtel-Westinghouse interface are submitted by Westinghouse to Southern Company Services, Inc., and Bechtel for comment and are subject to final acceptance by the APC Nuclear Generation Department.

B. The design concepts and specifications developed by Bechtel covering the nuclear aspects of the FNP are audited and documented by SCS and are subject to final acceptance by the APC Nuclear Generation Department.

Drawings and documents covering the portion of the FNP developed by Bechtel are submitted to Westinghouse for comment when they have a bearing on the Westinghouse NSSS or result from criteria supplied by Westinghouse; they are also submitted to the APC Nuclear Generation Department.

C. The design concepts, detail designs, specifications, and drawings covering the portion of the FNP developed by SCS are, where appropriate, audited for nuclear aspects only and documented by Bechtel subject to final acceptance by the APC Nuclear Generation Department.

17.1.3.5 Design Changes

Design changes, including field changes, are governed by design control measures commensurate with those applied to the original design and are reflected in accurate "as-built" drawings and specifications. All design changes are reviewed and approved by the organizations that performed the original design, review, and approval. The APC QAM requires that procedures be prepared to control design changes.

17.1.4 PROCUREMENT DOCUMENT CONTROL

Procurement documents are prepared by APC, SCS, Bechtel, and Daniel. In most cases, procurement packages contain detail specifications which are prepared in accordance with preceding and subsequent subsections. Purchase orders not described by a specification are reviewed by APC's QAM to ensure that adequate QA/QC requirements are included prior to contract award. The QAM sets forth the review and approval procedures that are followed by the preparing agency. Changes in procurement documents are subject to the same degree of control that is utilized in the preparation of the original document.

Procurement documents include provisions for the following:

A. Supplier Quality Assurance Program

Each bidder shall submit with his proposal a description of the quality assurance control program which will be followed to ensure meeting the requirements of the procurement documents.

B. Basic Technical Requirements

Procurement includes provisions regarding drawings, codes, and standards, with applicable revision data, inspection requirements, and special instructions and requirements such as for designing, fabrication, cleaning, erecting, packaging, handling, shipping, and storage at the construction site.

C. Source Inspection and Audit

Procurement documents shall provide for access to the plant facilities and records.

D. Documentation Requirements

Procurement documents shall require records (such as drawings, procedures, procurement documents, inspection and test records, personnel and procedure qualifications, and material, chemical, and physical test results) to be prepared,

maintained, submitted, or made available for review. Instructions on record retention and disposition shall be provided.

APC reviews procurement documents to ensure that appropriate requirements are included to provide a quality product. Such requirements, as appropriate, include reference to applicable codes and standards, welding requirements, testing and inspection requirements, and any special requirements dictated by the uniqueness of the item.

17.1.5 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

The QAM requires procedures governing the interfacing activities of the major design organizations and the activities of the APC General Office and field forces.

17.1.5.1 Major Design Organizations

The quality assurance manuals of major design organizations are reviewed by APC to ensure that instructions and procedures exist for the preparation of drawings and specifications. Of particular concern is the assurance that provisions are made for the incorporation of design requirements imposed by codes, standards, and the FSAR; adequate checking of design documents; and control of design changes. Audits by APC's MQA or his designee are performed periodically to verify compliance.

17.1.5.2 Contractors

Contractors' quality assurance manuals are reviewed to ensure that all activities are described by procedures and instructions adequate to provide satisfactory accomplishment of activities. APC's inspectors audit offsite contractors to ensure compliance with approved procedures while the onsite contractors are monitored by Daniel and by APC's MQA and QAFRs.

17.1.5.3 Construction Site

The QAM requires that procedures be prepared to set forth the QA/QC requirements and practices that are followed at the construction site. These requirements are applicable to all APC personnel, contractors, and subcontractors performing work at the plant site. They include, but are not limited to, the following:

A. Receipt, control, distribution, updating, filing, and utilization of approved drawings and specifications and the retrieval of void drawings and specifications.

B. Receipt and inspection of materials and equipment upon arrival.

C. Identification, control, and proper utilization of material and equipment.

D. Storage and handling of material and equipment.

E. Appropriate fabrication or erection processes.

F. Destructive and/or nondestructive testing as may be required.

G. Calibration and control of test and measurement equipment.

H. Documenting, recording, and retention of results of inspection and tests.

I. Reporting and documenting deviations in or from the drawings, specifications, or procedures.

J. Resolution of construction deviations from drawings, specifications, or procedures.

K. Reporting and documenting the results of incidents.

All new and revised procedures are reviewed and approved by APC's MQA prior to release.

17.1.6 DOCUMENT CONTROL

The QAM requires that procedures be prepared to provide control of approved drawings, specifications, and instructions which apply to the various phases of work. This ensures that work is performed in accordance with the latest approved documents. The procedures include the following:

A. The documents applicable to various phases of the field construction work.

B. The distribution of each of the documents to responsible individuals in the field construction organization and to the contractor and their subcontractor performing work at the plant site.

C. The method by which revisions to these documents are issued and distributed and void documents are retrieved.

D. A means by which a document may be marked to indicate that a portion of the document may or will be changed by a revision at some later date.

E. A means by which persons involved in the work can verify that the copy of any document which they hold is an up-to-date, complete, and approved copy

Design changes, including field changes, are subjected to the same control procedures as the original documents and are reviewed and approved by the same organization that performed the original review and approval. Periodic audits are performed to ensure that the latest engineering data are being used at the construction site.

17.1.7 CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

To qualify as a prospective bidder for the FNP, a manufacturer, supplier, or contractor must not only have a good record of quality performance on all types of work, either nuclear or nonnuclear, but must provide special assurance to APC of its capability, competence, and willingness to produce under contract the high performance level which is consistent with APC's complete QA program on the FNP.

A list of qualified bidders for each type of equipment and material is maintained by the APC Purchasing Department. This list is kept current by the addition of newly-qualified bidders and prompt deletion of any bidder whose performance is unsatisfactory. Names of prospective qualified bidders are obtained from various sources such as:

A. Bidder lists on past APC work.

B. Recommendations by SCS, Bechtel, Daniel, consultants, and other electric utilities.

C. Vendor's lists of major component manufacturers.

The QAM requires procedures for qualifying and approving bidders by APC when procurement is initiated by APC, SCS, Bechtel, or Daniel.

Manufacturing and fabricating facilities of prospective bidders may be inspected as part of the qualification procedure. Meetings with prospective bidders may be held to appraise technical expertise and QA/QC competence. All bidders are required to submit a QA/QC program with their bid. APC's MQA verifies, prior to award of a contract, that the successful bidder has a QA program adequate to meet the requirements of the procurement documents at his manufacturing or fabricating plant.

SCS administers vendor shop quality control surveillance for components procured by APC. Daniel administers vendor shop quality control surveillance for components which are supplied as part of their scope of work. Prior to shipment of components from manufacturers' facilities, the release is approved by the source inspector who verifies compliance with procurement documents.

Procured materials are inspected at the construction site for damage, identification, and conformance to the procurement documents. Receiving, storing, and handling of materials and equipment at the construction site are performed in accordance with approved procedures referenced in the QAM which preclude acceptance of material that does not conform to the procurement documents and ensures that correctly identified, acceptable materials are properly controlled to preclude damage or deterioration prior to use in construction. The receiving QC representative initiates required QC documentation and is also responsible for initiating corrective action and control for damaged or nonconforming materials or equipment according to approved procedures.

Documentation for purchased material and equipment is evaluated to ensure compliance with the procurement documents. When nonconformances are noted, immediate action is taken in accordance with approved procedures.

Periodic supplier evaluations by APC representatives ensure that the QA programs are effective and in compliance with approved procedures and the QAM.

17.1.8 IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS

Identification of materials, parts, and components is required of all suppliers by specifications, drawings, and purchase orders. Requirements for identification are ensured through the process of purchase document review and audit.

Unique equipment numbers are assigned to items of equipment or mechanical devices. These unique numbers are used to identify the equipment in the field and on drawings, schematics, and similar documents. These numbers appear beside or below the equipment description and are used in a variety of listings and tabulations to clearly identify each piece of equipment. Items are permanently identified to permit identification to supporting documentation. Items are traceable from such identification to a specific purchase order, to manufacturers' records, and to quality assurance records and documentation. Identification of material or equipment to the corresponding mill test reports, certifications, and other required documentation is maintained from receipt of the material or equipment throughout the operating life of the plant

Control of material, parts, and components is governed by APC acceptance of contractor procedures and QA programs. Specific control requirements include:

A. Each organization receiving items is required to determine that they are properly identified and that supporting documentation has been obtained.

B. Nonconforming or rejected materials, parts, or components are identified and segregated to ensure against their misuse.

17.1.9 CONTROL OF SPECIAL PROCESSES

Contractors' QA programs and special process procedures are reviewed and accepted to ensure that special processes employed are adequately controlled and documented and that they conform to established codes and standards. Each contractor's QA program is reviewed and accepted by APC's MQA and SCS and/or Bechtel. Special process procedures are reviewed and approved by the appropriate design group within SCS and/or Bechtel. Any document not reviewed by APC is subject to audit by APC. Typical processes include welding, heat treatment, cleaning, preservation, nondestructive examination, and plating.

For APC purchases, APC inspection is utilized to verify the control of processes at the contractor's facilities; for Daniel purchases, this assurance is verified by Daniel personnel. At the construction site, special processes are monitored by Daniel, the Construction Department, and APC's QAFR to ensure that approved procedures are followed. The following aspects of special process control are checked for compliance at the contractor's facilities and at the construction site:

A. Training, testing, and qualification of operator and inspection personnel involved with special process operations.

B. Certification of equipment utilized in the performance of special process operations.

C. Documentation of results.

17.1.10 INSPECTION

17.1.10.1 Contractors

For equipment purchased by APC, the vendor quality surveillance program for contractors is administered by SCS, implemented by companies providing source surveillance, and periodically audited by APC's MQA. The vendor shop quality control surveillance program for equipment purchased by Daniel is administered and implemented by Daniel and periodically audited by APC's MQA.

APC's quality surveillance representatives (QSRs) are required to verify through a program of scheduled surveillance activities that the contractor is abiding by approved procedures, purchaser specifications, and codes during the fabrication process. Specific areas requiring

surveillance include fabrication practices, dimensional accuracy, cleaning, NDE procedures and documentation, and packaging and shipping procedures and documentation. Mandatory hold points are established; the QSR is required to witness and evaluate such tests or procedures as required. Performance tests required by specification may also be witnessed by the QSR.

Each surveillance visit is documented in a formal report which is distributed for review and evaluation. Deficiencies noted during surveillance are reaudited to ensure prompt and satisfactory closeout.

Deviations from approved specifications, repairs, and corrective procedures are documented and submitted to the appropriate design organization for evaluation and approval prior to the equipment being released for shipment by the QSR.

17.1.10.2 Construction Site

Work performed at the construction site is inspected to ensure compliance with applicable contracts, purchase orders, specifications, and drawings. This effort is conducted by the Construction Department Quality Control Group and Daniel's Quality Control Group. The division of responsibility is clearly defined by QC procedures prepared by the respective groups; the division of responsibility is approved by the MQA. Each group is composed of inspectors and technicians who are thoroughly familiar with the specifications, drawings, codes, welding procedures, and NDE procedures applicable to their discipline. Inspection activities may be performed as required by independent testing laboratories.

All inspections are documented and reviewed to ensure that all requirements are satisfactorily fulfilled.

APC's MQA and QAFR audit all inspection and testing activities to ensure that approved procedures are being utilized.

17.1.11 TEST CONTROL

The testing program for the FNP includes all tests necessary to demonstrate that structures, systems, and components will perform satisfactorily in service. This program is organized into the categories expounded in the following subsections.

17.1.11.1 Contractor Tests

Procurement documents require that performance tests be performed by contractors on specific materials and equipment purchased from them. Test requirements and acceptance criteria are provided in the specification by the organization responsible for the design of the item to be

tested. Testing is performed in accordance with approved written test procedures and incorporates all requirements contained in the applicable design documents. Procurement documents require that test results be documented and submitted to the applicable design organization for evaluation and acceptance.

17.1.11.2 Construction Proof Tests

APC's QAM and site contractors' QAMs require that specific testing be performed onsite during construction of the FNP. Such tests include but are not limited to soil tests, rebar splice tests, concrete tests, vacuum box tests, and other special tests as may be required. Such tests are performed in accordance with previously approved procedures requiring results to be documented. Tests results are evaluated and accepted when they are in compliance with engineering requirements.

17.1.11.3 Construction Testing

A division of responsibility between APC's Construction and Nuclear Generation Departments has been established delineating functions and responsibilities concerning the FNP testing program. At the completion of construction, systems and components will be turned over to the Nuclear Generation Department for system and component testing.

17.1.12 CONTROL OF MEASURING AND TEST EQUIPMENT

17.1.12.1 Contractor Facilities

Prior to the award of any contract for equipment or services, the QA programs of each contractor are reviewed by APC's MQA to ensure that procedures are defined for the control of measuring and test equipment. The procedures are evaluated for compliance with the following:

A. Identification of equipment by serial number or the equivalent.

B. Frequency of calibration schedule.

C. Preparation and maintenance of calibration records to indicate identity of equipment, date of calibration, and due date for recalibration.

D. Assurance that equipment is removed from service when calibration date is exceeded or when equipment is damaged or suspected to be inaccurate.

E. Proper handling and storage facilities for equipment.

For APC-purchased equipment, control of measuring and test equipment is audited by APC inspectors for conformance to procedures. For Daniel-purchased equipment, Daniel inspection personnel perform this audit function.

17.1.12.2 Construction Site

The QAM requires that procedures be established for the control of measuring and test equipment to ensure that inspection and testing of material and equipment at the construction site is performed with devices that are properly calibrated.

Onsite contractors are audited by Daniel and the APC QAFR for compliance with procedures for the control of measuring and test equipment.

17.1.13 HANDLING, STORAGE, AND SHIPPING

17.1.13.1 Contractor Facilities

Procurement documents are reviewed by APC's MQA to ensure that special handling, storage, shipping, cleaning, and preservation requirements are included.

The QA programs of contractors providing items or services are evaluated to ensure that adequate procedures exist for the special handling, storage, shipping, cleaning, and preservation of materials and equipment.

For APC-procured equipment, compliance with approved procedures is ensured through the shop surveillance program administered by SCS. Shop inspection for Daniel-procured equipment is implemented by Daniel and procedure compliance is verified by them.

17.1.13.2 Construction Site

The QAM requires that procedures be established for the control, identification, protection, and handling of material and equipment from the time they are received onsite until turnover to APC's Nuclear Generation Department. These procedures require:

A. Adherence to suppliers instructions for storage and handling equipment.

B. Special storage areas and facilities for various types of materials and equipment.

C. Special storage methods for various types of materials and equipment.

D. Inspections to be performed during the storage period.

E. Identification and marking of equipment to enable tracing of its source of documentation.

F. Control steps to ensure that material and equipment are used only as indicated by approved design documents.

G. Special handling tools and equipment to ensure safe and adequate handling.

H. Records of receipt and storage inspections.

I. Identifying nonconforming items.

Compliance with approved procedures is ensured by the construction site audit program conducted by Daniel and the APC QAFR.

17.1.14 INSPECTION, TEST, AND OPERATING STATUS

17.1.14.1 Contractor Facilities

The QA programs of contractors are reviewed by APC's MQA to ensure that adequate control exists to identify the status of required inspections and tests. Generally, a document, such as a shop traveler, is required to accompany a component or assembly throughout the manufacturing, inspection, and testing process. This document lists the required activities and provides for signature of the individual responsible for accepting them. These documents are retained by the contractor for use and retention by APC as required.

Tagging procedures or the equivalent are evaluated to ensure that contractors have some means for identifying the inspection status of a component or assembly.

17.1.14.2 Construction Site

Items arriving onsite are accompanied by documented evidence which ensures that all requirements of the procurement documents have been satisfied.

The QAM requires that procedures be established for maintaining the inspection and test status of items. The procedure provides for the methods that are used for identifying material and equipment received at the construction site and for controlling their status throughout the

construction phase in accordance with approved design documents. This is accomplished by the use of tags which are affixed to and remain on the items from receipt through installation inspection.

17.1.15 NONCONFORMING MATERIALS, PARTS, OR COMPONENTS

17.1.15.1 Contractor Facilities

Contractors' QA programs are reviewed by APC's MQA to ensure that procedures are defined for the control of nonconforming materials, parts, or components. The procedures are evaluated to include the following:

A. Identification of the nonconforming item.

B. Documentation of the nonconformance.

C. Segregation of the nonconforming item.

D. Disposition of the nonconformances and notification of the affected organization.

For APC-procured equipment, compliance with approved procedures is ensured through the shop surveillance program administered by SCS. Shop inspection for Daniel-procured equipment is implemented by Daniel and procedure compliance is verified by them.

17.1.15.2 Construction Site

The QAM requires procedures for the control of nonconforming materials, parts, or components. Compliance with approved procedures is ensured by the construction site audit program conducted by Daniel and APC's QAFR. The procedures include the following:

A. The responsibility and authority for the identification, reporting, and resolution of nonconformances.

B. The classification of nonconformances into accept, repair, rework, and reject categories.

C. The method by which nonconformances are identified, documented, segregated, and by which affected organizations are notified and resolution is reached.

D. The means by which the deviant item is processed to fulfill the requirements of the directed resolution.

17.1.16 CORRECTIVE ACTION

17.1.16.1 Contractor Facilities

APC's MQA reviews contractors' QA programs to ensure that adequate procedures are in effect which govern the identification and disposition of conditions adverse to quality. The procedures are evaluated to ensure the documentation of nonconformances or deficiencies, and to ensure that measures for corrective action and trend analysis to prevent recurrent problems are provided.

17.1.16.2 Construction Site

The QAM requires procedures be established for identifying, reporting, resolving, recording, and analyzing construction site conditions adverse to quality. The procedures include the following:

A. A method to appropriately mark or identify nonconforming items so that before related work continues, a course of corrective action is established.

B. The means for reporting nonconformances and the actions taken to resolve them.

C. Identification of the groups and/or persons having authority to approve the resolution of nonconformances.

D. Identification of the groups and/or persons who shall, for information purposes, be made aware of the nonconformances.

E. The means by which nonconformances are resolved.

F. A system for keeping adequate records of nonconformances and for periodically reporting on the status to management.

G. A method for analyzing nonconformances to determine appropriate corrective actions based on trend, rate, and occurrence.

Compliance with approved procedures is verified by the construction site audit program conducted by Daniel and APC's QAFR.

17.1.17 QUALITY ASSURANCE RECORDS

Procurement documents delineate the QA records that are to accompany or precede equipment to the construction site and specify those records which are to be maintained by the manufacturer in his facility. Approved procedures, referenced in the QAM, require construction site-generated records which reflect the as-built condition of items in the plant.

As QA data is received from manufacturers, it is checked against procurement document requirements to ensure that no nonconformances or deficiencies exist. Site-generated records are reviewed for compliance with construction requirements.

QA records for the FNP are collected, evaluated, cataloged, and maintained by Daniel. Daniel employs a filing system which provides for easy identification and access to all records and which encompasses all of the systems and components of the FNP. All documentation for a specific system is filed together with a subfiling for each component within the system. Records include, as applicable, all QA records received from the manufacturer; records of shop inspections; records of field inspections, tests, and audits; records of personnel qualifications and procedures; and all other supplementary records which may be generated.

QA records received by APC are part of the permanent records of the FNP and will be retained at the plant site in accordance with applicable requirements. Those records retained by a manufacturer are available to APC if needed.

17.1.18 AUDITS

17.1.18.1 Design Audits

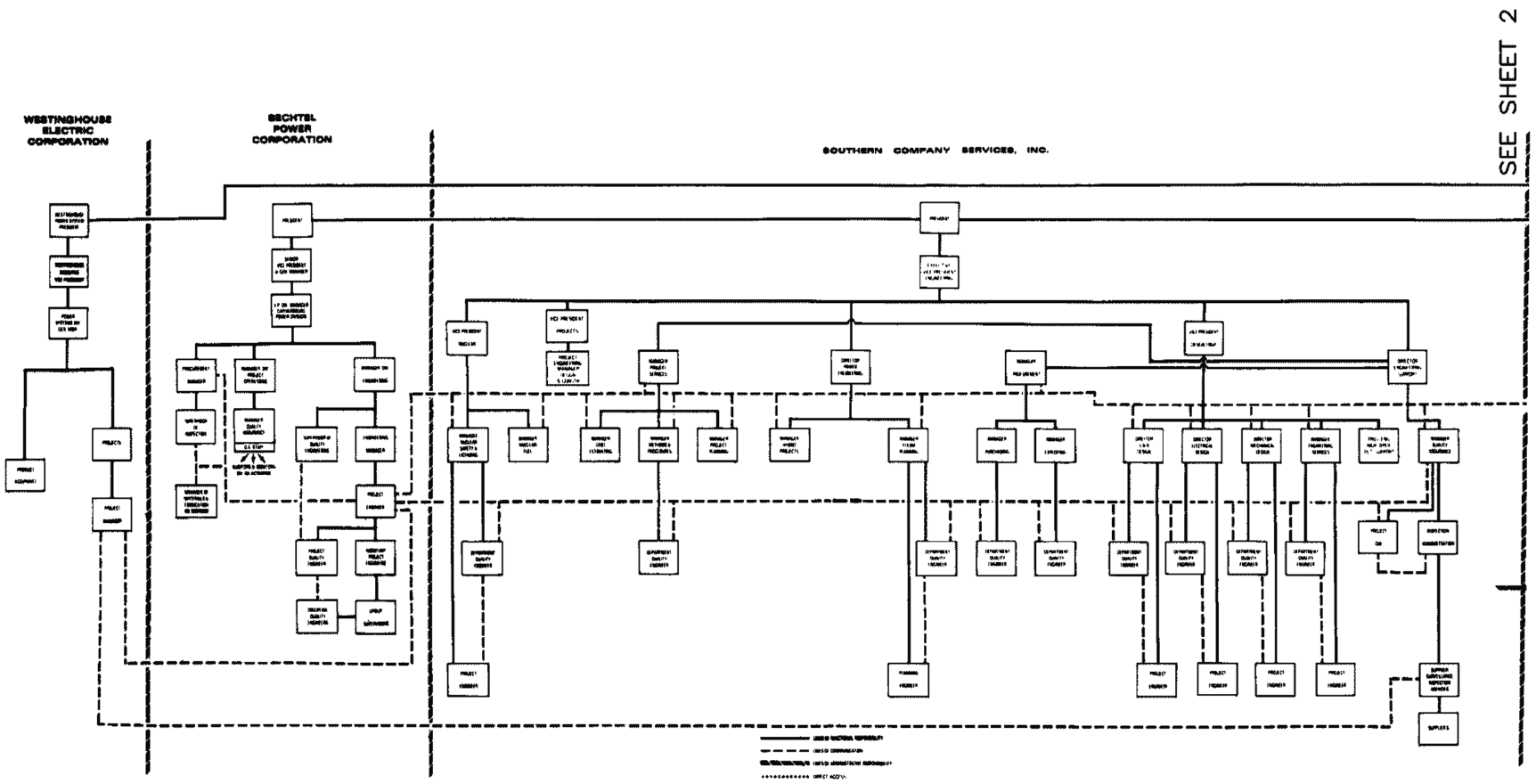
Design audits are intended to evaluate the design organization for compliance with procedures, codes, specifications, and other pertinent areas. On a semiannual basis, the design activities of SCS, Bechtel, and Westinghouse are audited based upon a prepared checklist. The audit of SCS and Bechtel is performed by SCS's manager of quality assurance, and the audit of Westinghouse is performed by Bechtel's project quality engineer. APC's MQA or a representative from his staff participates in the audit of each design organization. Audit reports are prepared and forwarded to appropriate management levels for review.

17.1.18.2 Construction Site Audits

To verify compliance with and to determine the effectiveness of the construction site QA program, audits are conducted by APC's QAFR. Audits are based upon a prepared checklist and are performed every two weeks on specific areas of work at the construction site. On a periodic basis, APC's MQA or a representative from his general office staff assists in performing the audit. Results are documented and audit findings reviewed with appropriate levels of management from the organizations audited. Open items are closely monitored until resolved. Every two weeks, Daniel's project quality assurance manager conducts audits on Daniel's construction site activities. The audits are based upon a prepared checklist and are performed by appropriately trained personnel not having direct responsibilities in the areas being audited. Results are documented and distributed to responsible Daniel management personnel and to APC's MQA for review. Open items are closely monitored until resolved.

17.1.18.3 Vendor Audits

On a selective basis, the MQA or members from his staff accompany SCS or Daniel personnel on audits of vendor facilities. These audits consist of checks on specific areas of a vendor's operation; results are documented and distributed to appropriate management personnel.]



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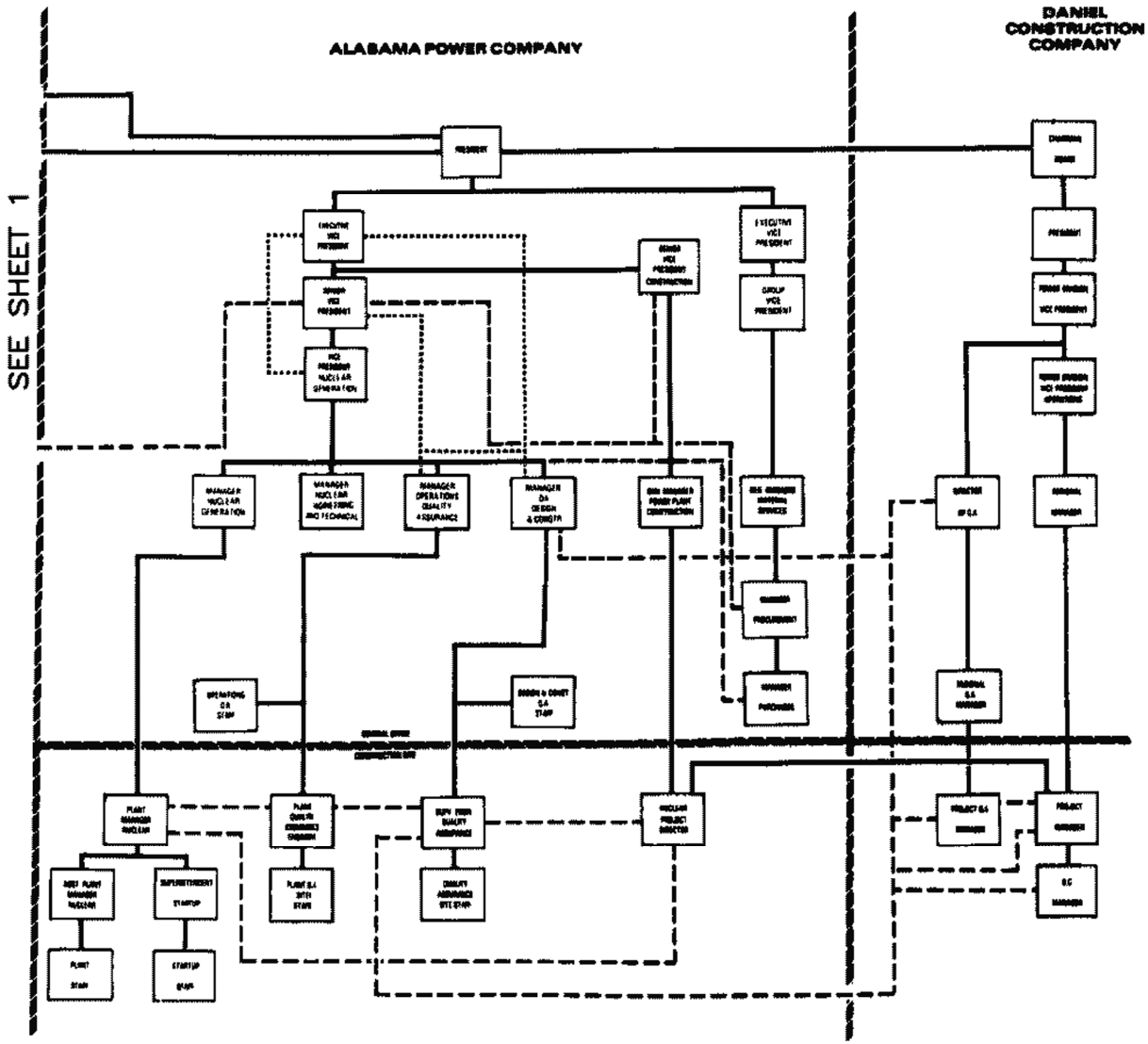
JOSEPH M. FARLEY NUCLEAR PLANT UNIT 1 AND UNIT 2

[PROJECT ORGANIZATION CHART FOR QUALITY ASSURANCE

FIGURE 17.1-1 (SHEET 1 OF 2)]



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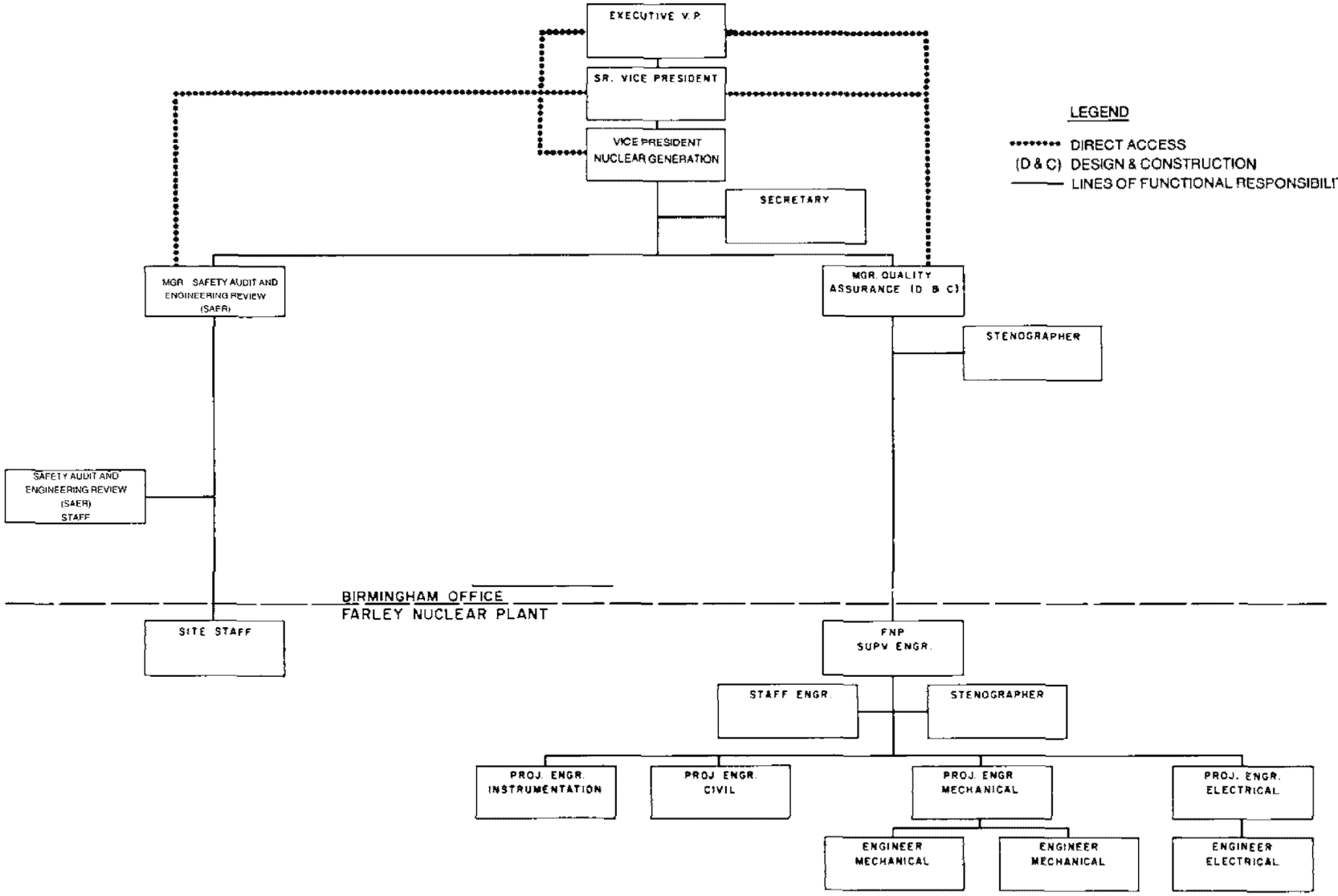
JOSEPH M. FARLEY NUCLEAR PLANT UNIT 1 AND UNIT 2

[PROJECT ORGANIZATION CHART FOR QUALITY ASSURANCE

FIGURE 17.1-1 (SHEET 2 OF 2)]



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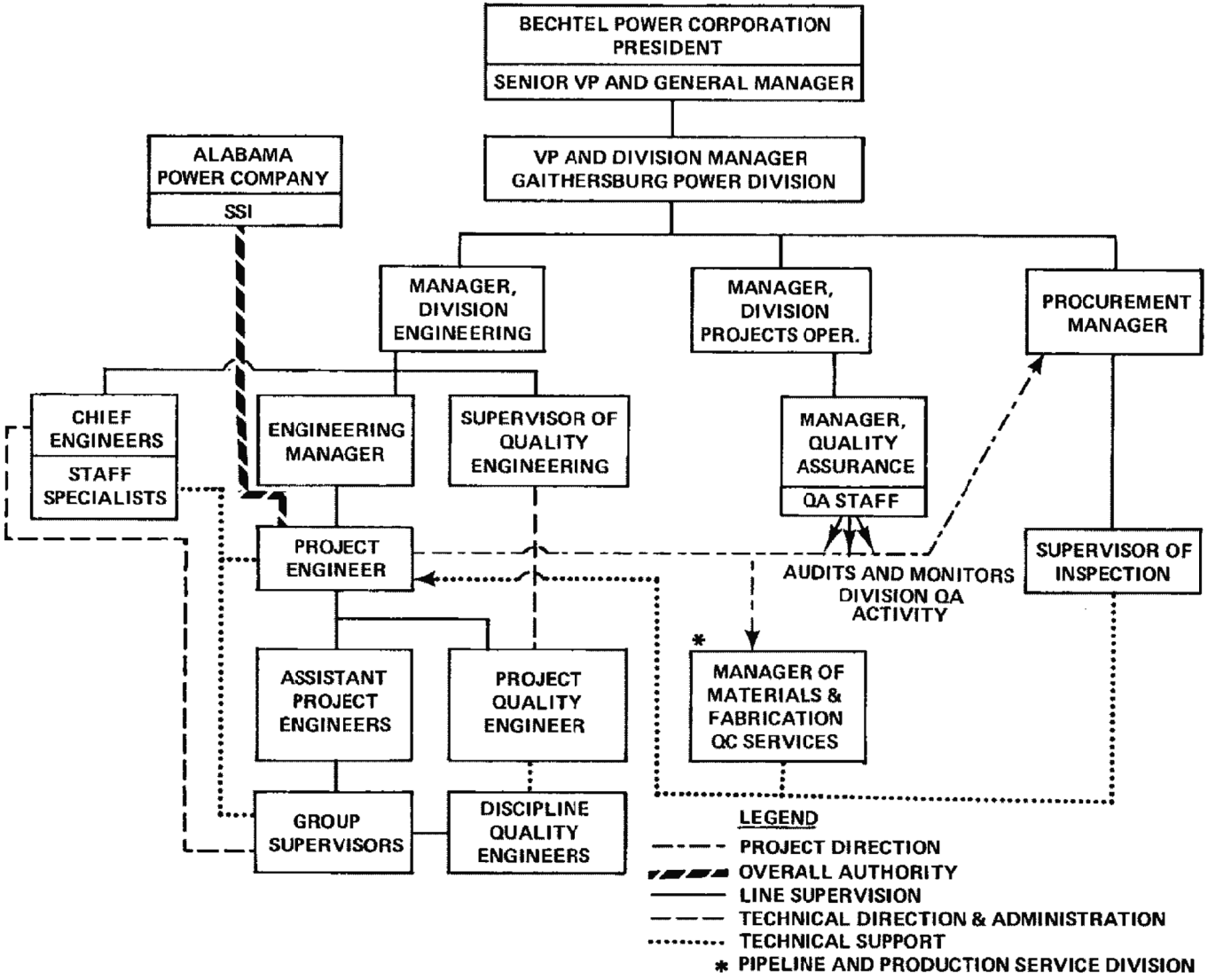
JOSEPH M. FARLEY NUCLEAR PLANT UNIT 1 AND UNIT 2

[ALABAMA POWER COMPANY QUALITY ASSURANCE DESIGN AND CONSTRUCTION ORGANIZATION

FIGURE 17.1-2]



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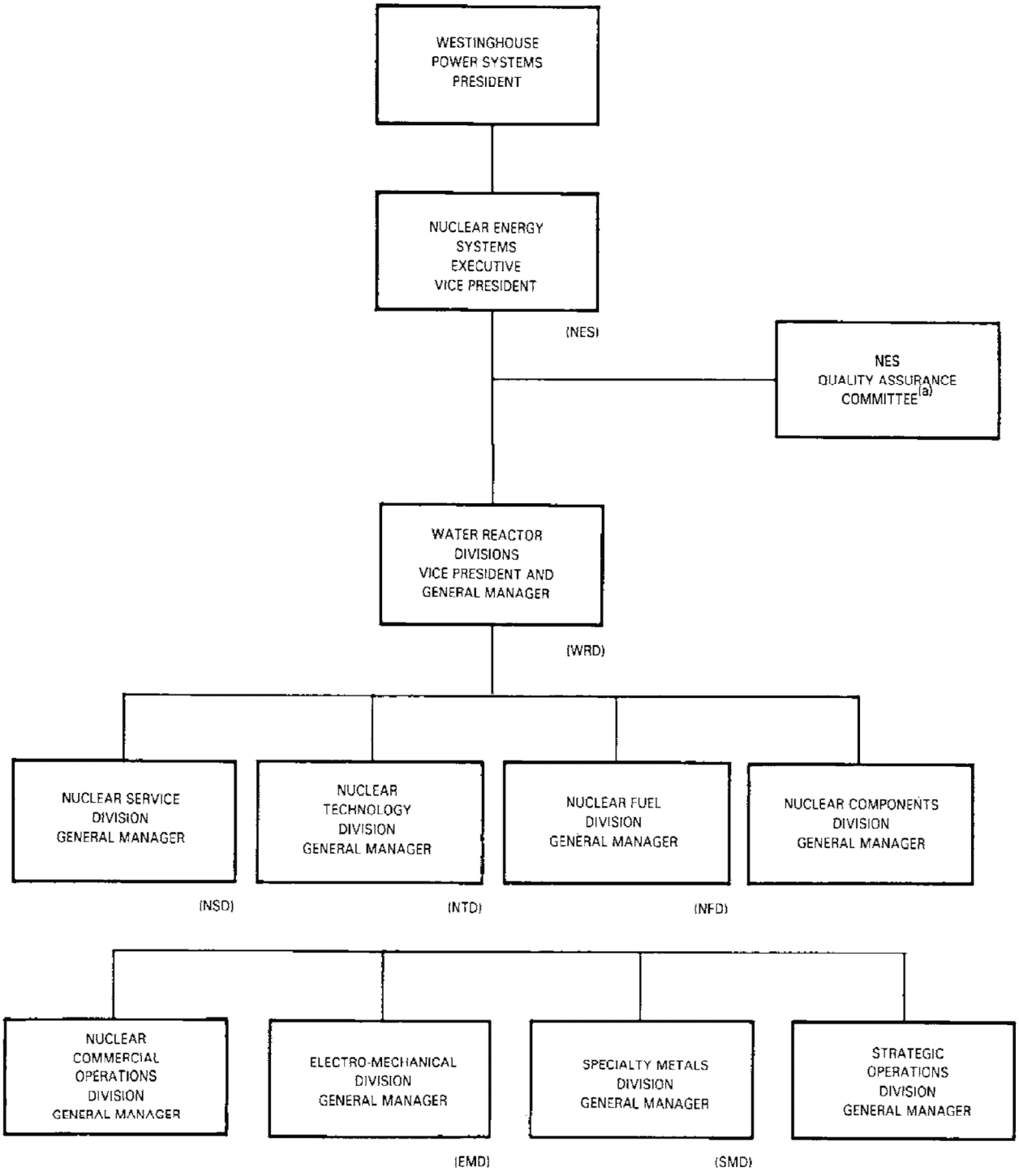
UNIT 1 AND UNIT 2

[BECHTEL POWER CORPORATION
GAITHERSBURG POWER DIVISION
QUALITY ASSURANCE ORGANIZATION
JOSEPH M. FARLEY NUCLEAR PLANT

FIGURE 17.1-3]



a) THE NES QUALITY ASSURANCE COMMITTEE IS COMPOSED OF THE QUALITY ASSURANCE AND RELIABILITY MANAGERS FROM EACH OF THE NES DIVISIONS. THE COMMITTEE'S CHAIRMAN IS THE NTD PRODUCT ASSURANCE MANAGER.

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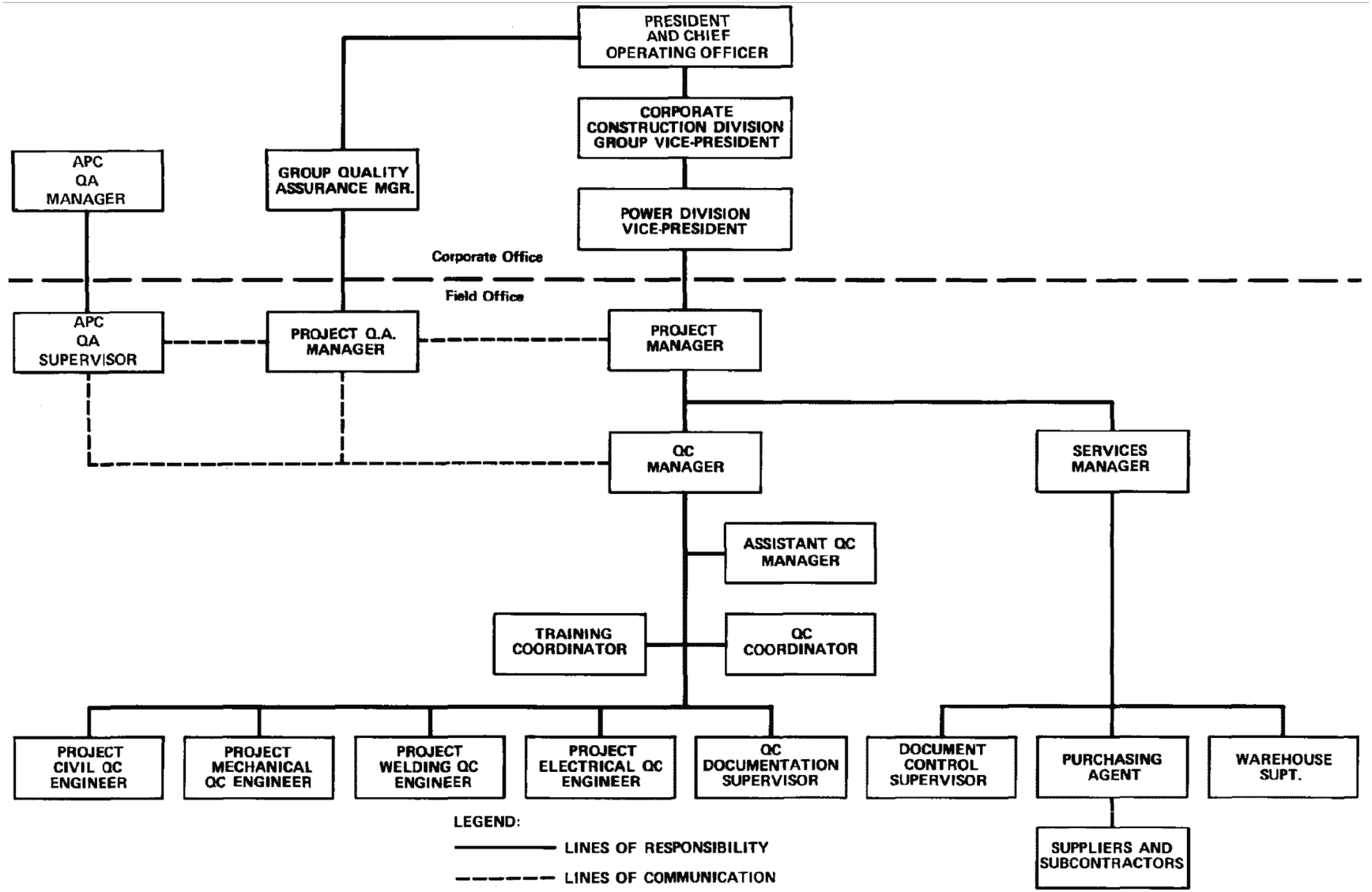
UNIT 1 AND UNIT 2

[NUCLEAR ENERGY SYSTEMS ORGANIZATION

FIGURE 17.1-4]



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[DANIEL CONSTRUCTION COMPANY
OF ALABAMA
QUALITY ASSURANCE ORGANIZATION

FIGURE 17.1-5]

17.2 OPERATIONS QUALITY ASSURANCE PROGRAM (OQAP)

The operations-phase quality assurance (QA) program for Farley Nuclear Plant (FNP) is designed to assure the plant's safe and reliable operation and to satisfy the QA requirements of Appendix B to 10 CFR Part 50. The QA program applicable to operations-phase activities for FNP is described in the Southern Nuclear Operating Company (SNC) Quality Assurance Topical Report (QATR). QA program requirements formerly contained in FNP FSAR section 17.2 are superseded by those contained in the SNC QATR.

TABLE 17.2-1

ONSITE QA STAFF

This table has been deleted.

TABLE 17.2-2

TYPICAL AUDIT FREQUENCIES

This table has been deleted.

TABLE 17.2A-1

CLASSIFICATION OF INDEPENDENT SPENT-FUEL STORAGE INSTALLATION'S STRUCTURES AND COMPONENTS

I. CATEGORY A

- Items specified as Category A in the dry cask storage vendor's Topical Safety Analysis Report (TSAR), unless other category is assigned by this document.

II. CATEGORY B

- Items specified as Category B in the dry cask storage vendor's TSAR, unless other category is assigned by this document.

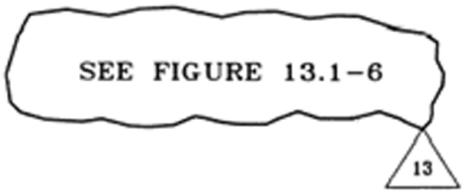
III. CATEGORY C

- Items specified as Category C in the dry cask storage vendor's TSAR, unless other category is assigned by this document.
- Concrete storage pad
- ISFSI Soil Test and Analysis
- Roadways for transport of cask and associated equipment

IV. NOT IMPORTANT TO SAFETY

- Items specified as not important to safety by the dry cask storage vendor's TSAR, unless other category is assigned by this document.
- Security System
- Dose rate boundary fence
- Facility lighting
- Electric power system and backup
- Railways for transport of cask and associated equipment

(DELETED)



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SOUTHERN COMPANY *Energy to Serve Your World®*	**JOSEPH M. FARLEY NUCLEAR PLANT UNIT 1 AND UNIT 2**	FACILITY ORGANIZATION
		FIGURE 17.2-2

17.3 JOSEPH M. FARLEY NUCLEAR PLANT QUALITY ASSURANCE Q-LIST

17.3.1 INTRODUCTION

The Q-List consists of those structures, systems, and components that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public.

Any item contained in the current Q-List that was properly designated and installed as a non-Q item will not be modified, upgraded, or replaced as a result of this subsequent change in designation. However, when these items are replaced, modified, or repaired, the appropriate quality assurance provisions will be applied to the replacement, modification, or repair parts.

The quality assurance provisions to be applied to the structures, systems, and components on the list will be consistent with the safety function which that structure, system, or component is to perform.

17.3.2 GROUP 1 - STRUCTURES

A. Containment Building

1. Substructure

   a. Concrete

   b. Rebar

   c. Liner plate

2. Superstructure

   a. Concrete

   b. Rebar

   c. Structural steel

   d. Liner plate

   e. Tendon system

   f. Tendon grease

g. Hatches - equipment, auxiliary and personnel

h. Penetrations - electrical and mechanical (includes nonsafety systems that penetrate containment boundary up to and including the containment isolation valves)

3. Painting and special coatings

4. Biological shielding

5. Missile barriers (table 3.5-1)

B. Auxiliary Building

1. Substructure

a. Concrete

b. Rebar

2. Superstructure

a. Concrete

b. Rebar

c. Superstructure steel

3. Biological shielding

4. Missile barriers (table 3.5-6)

5. All masonry walls in proximity to or with safety-related equipment attached to them

C. Service Water System

1. Storage pond and dam

2. Service water intake structure at pond

3. Foundation soil for structures and embedded piping

4. All masonry walls in proximity to or with safety-related equipment attached to them

D. Diesel Generator Building

1. Foundation soil and/or piles

2. Concrete

3. Rebar

4. Structural steel

5. All masonry walls in proximity to or with safety-related equipment attached to them

E. Vent Stack

Note: The vent stack is functionally non-nuclear safety (NNS); however, the appropriate criteria of 10 CFR 50, Appendix B, are applied to maintain the structure as Seismic Category 1 to prevent a failure that could impact safety-related structures, systems, and components.

F. Cable Tunnel Structure

1. Concrete

2. Rebar

17.3.3 GROUP 2 - MECHANICAL SYSTEMS

A. Reactor Coolant System (RCS)

1. Reactor vessel and associated equipment, including:

a. Vessel shell

b. Vessel head with control rod drive mechanism (CRDM) adapters

c. Upper internals assembly

d. Lower internals assembly

e. Control rod guide tubes

f. Control rod drive mechanism adapter plugs

g. Integral support pads and brackets

h. Support shoes and shims

i. Closure studs, nuts, and washers

j. Flange leak-off stub

k. Reactor neutron panels

l. Control rod assemblies

m. Fuel assemblies

n. Core support structure

o. Reactor vessel internals other than A.1.m, A.1.n, and A.1.o above

2. Reactor vessel supports

3. Control rod clusters

4. Control rod drive mechanism housing

5. Nuclear instrumentation - out of core

6. Steam generators, including:

   a. Shell and tubes

   b. Integral support pads

   c. Steam generator external supports

   d. Steam generator steam flow restrictors

7. Pressurizer, including:

   a. Relief and safety valves

   b. Integral support pads

   c. Pressurizer external supports

d. Pressurizer spray nozzle assembly (RCPB components only: spray head is NNS.)

8. Reactor coolant pumps, including:

a. Motor supports

b. Motor flywheel

c. Two seal assemblies nearest high-pressure coolant (seal assemblies 1 and 2)

d. Reactor coolant pump seal bypass orifice

9. Reactor coolant system, including:

a. Branch lines up to and including the second isolation valve or first valve outside the containment

Exempt from this list are the pressurizer safety valve water seal drain lines downstream of the first manual isolation valve and the pressurizer vent line beyond the first manual isolation valve

b. Reactor coolant piping

B. Residual Heat Removal (RHR) System

1. RHR piping system

2. Residual heat removal pumps and motors (low-head safety injection pumps; same as E.4)

3. Residual heat removal heat exchangers

C. Containment Cooling System

1. Containment air cooler piping system

2. Containment air cooler fans and drives

3. Containment air cooler coils and housings

4. Fan discharge transition and fusible link plate (Containment ductwork dampers and supports are not Q; fusible links disconnect the ductwork from the cooler discharge after a LOCA. Fan motors and fusible links are Q.)

D. Containment Spray System

1. Containment spray piping system
2. Containment spray nozzles
3. Spray additive eductors (pressure boundary only)
4. Refueling water storage tank
5. Containment spray pumps and motors

E. Emergency Core Cooling System (ECCS)

1. ECCS piping systems
2. Accumulator tanks
3. High-head safety injection pumps (charging pumps) and motors (same as H.5)
4. Low-head safety injection pumps (RHR pumps) and motors (same as B.2)
5. Containment sump
6. Containment sump screening apparatus

F. Spent-Fuel Pool

1. Liner plate
2. Storage racks
3. Fuel transfer tube and blind flange
4. Concrete structure

G. New Fuel Storage Racks

H. Chemical and Volume Control System (CVCS) (Excluding Boron Recycle Loop)

1. Piping systems
2. Volume control tank

3. Boric acid tanks

4. Reactor makeup water storage tank

5. Charging/high-head safety injection pumps and motors (same as E.3)

6. Boric acid transfer pumps and motors

7. Nonregenerative letdown heat exchanger

8. Excess letdown heat exchanger

9. Regenerative heat exchanger

10. Seal water heat exchanger

11. Reactor coolant filter pressure housing only

12. Boric acid filter pressure housing only

13. Seal water injection and return filter housing only

14. Boric acid blender

15. Letdown orifices

I. Waste Disposal System

1. Mechanical alternators, instrumentation, and controls which give operating status of sump pumps in RHR pump rooms, containment spray pump rooms, and other rooms where sump pumps are part of the leak detection system

J. Main Steam System

1. Main steam piping system from steam generator up to and including the first isolation valve outside containment

2. Main steam safety and relief valves, isolation valves, and associated piping system for main steam headers

K. Condensate and Feedwater System

1. Feedwater piping system from steam generator up to and including the first isolation valve outside the containment

2. Condensate storage tank

L. Auxiliary Feedwater System

1. Auxiliary feedwater piping system, including supply lines from service water system

2. Auxiliary feedwater pumps and drives

3. Steam piping to auxiliary feedwater pump steam turbine

M. Component Cooling System

1. Component cooling water (CCW) piping system to safeguard equipment and associated valves

2. Component cooling surge tank

3. Component cooling pumps and motors

4. Component cooling heat exchangers

N. Emergency Diesel Generator System

1. Diesel fuel oil transfer piping system

2. Diesel generator system packages

3. Diesel fuel oil storage tanks

4. Diesel fuel oil day tanks

5. Diesel fuel oil transfer pumps and motors

6. Diesel generator building ventilation fans

O. Containment Cranes

1. Reactor cavity manipulator crane

2. Containment polar crane

P. Auxiliary Building Cranes

1. Spent-fuel pool bridge crane and hoist

2. Cask crane

Q. Penetration Room Filtration System

1. Penetration room filtration fans and drives

2. Penetration room filters and housing

3. Penetration room ductwork and isolation valves

R. Control Room Ventilation System

1. Air conditioning refrigeration system

2. Supply air handling units and drives

3. Filtration fans and drives

4. Filtration filters and housing

5. Isolation valves

S. Pump Room Ventilation Systems

1. High-head safety injection pump room cooler fans and drives, cooling coils, and housings

2. Low-head injection pump room cooler fans and drives, cooling coils, and housings

3. Component cooling pump room cooler fans and drives, cooling coils, and housings

4. Containment spray pump room cooler fans and drives, cooling coils, and housings

5. Auxiliary feedwater pump room cooler fan and drives, cooling coils, and housings

T. Service Water System

1. Service water piping system

2. Service water strainers

3. Service water pumps and motors

4. Service water intake structure heating and ventilation system

U. Spent-Fuel Cooling System

1. Spent-fuel pool cooling system piping

2. Spent-fuel pool heat exchangers

3. Spent-fuel pool pumps

V. Post-LOCA hydrogen Control System

1. Post-LOCA hydrogen recombiners

2. Containment Post-LOCA hydrogen mixing system

3. Post-LOCA containment hydrogen monitoring equipment (The purge supply system inside containment, the containment penetrations, and associated penetration isolation valves are Q. Beyond the isolation valves outside containment, the system receives supply air from the instrument air system, which is non-Q.)

W. Nonsafety Systems

Nonsafety systems that penetrate containment are Q up to and including the containment isolation valves

X. Sampling System

Sampling system lines connected to safety system components are Q up to and including the containment isolation valves

17.3.3.1 Notes on Group 2 - Mechanical Systems

Where a piping system is specified, such system includes the necessary valves, supports, and restraints.

For each system, those portions of the instrumentation and controls that are safety related are included with that system. Q instruments are identified as such in the applicable instrument indexes.

Motor operators for active valves are Q. Active valves are defined as valves which must change position to mitigate the consequences of a design basis accident. Nonactive valves are not required to change positions to mitigate accidents.

17.3.4 GROUP 3 - ELECTRICAL SYSTEMS

A. 4160-V Switchgear (Engineered Safeguard Buses)

B. 4160-V to 600-V transformers (Associated with Engineered Safeguard Systems)

C. 600-V Load Centers (Engineered Safeguard Buses)

D. 600-V and 208-V Motor Control Centers (Associated with Engineered Safeguard Systems)

E. DC Electrical Distribution System (Auxiliary Building and Service Water Building)

1. 125-V dc station batteries

2. Inverters, 125-V dc to 120-V ac (vital instrument buses and control rod drive indicator)

3. 125-V dc distribution panels

4. 125-V dc switchgear

5. 125-V dc battery chargers

6. Battery racks

E. Vital ac Instrumentation and regulated ac distribution panels

F. Control Panels and Vertical Control Boards

1. Protective relay boards and racks, safeguard systems

2. Protective relay boards and racks, reactor protection systems

3. Instrument boards and racks, safeguard systems

4. Instrument boards and racks, reactor protection systems

G. Class 1E Supports for Conduits and Trays

H. Class 1E Power Cables

I. Class 1E Instrumentation and Control Cables

J. DC Emergency Lighting - Battery Pack

K. Onsite AC Power Systems

1. Diesel generators, including auxiliaries

2. Transformers (4160-V-600-V transformers which are part of the Class 1E 600-V switchgear)

3. Protective relays (those mounted in Class 1E switchgear)

4. Containment electrical penetrations

L. Motor Operators

Motor operators for active valves are Q

M. Turbine-Driven Auxiliary Feedwater Pump Uninterruptible Power Supply

17.3.5 GROUP 4 - OTHER SYSTEMS

The following systems were not originally purchased as Q systems. Repairs and modifications to these systems will be documented as if these systems were purchased on a level of quality similar to other systems on this list. Replacement parts will be purchased to meet the original specifications.

A. Reactor Coolant Leakage Detection System

1. Containment Air Particulate Monitor (R-11)

2. Containment Radioactive Gas Monitor (R-12)

3. Condensate Measuring System

4. Dewpoint Measuring System

B. Containment Mini-Purge System Fans

C. Vent Stack Monitor (R-29B/R-29D, and Unit 1 and Unit 2 R-29C)

D. Main Condenser Air Removal Monitor (R-15B, R-15C)

E. Main Steam Line Monitors R-60 (A through C)

17.3.6 GROUP 5 - EXPENDABLE AND CONSUMABLE ITEMS

Administrative procedures ensure that applicable regulatory requirements, design bases, and other quality assurance requirements are included or referenced in procurement documents for expendable and consumable items necessary for the functional performance of critical structures, systems, and components.

APPENDIX 17A

SOUTHERN COMPANY SERVICES, INC. QUALITY ASSURANCE PROGRAM

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

[HISTORICAL]
[APPENDIX 17A

SOUTHERN COMPANY SERVICES, INC. QUALITY ASSURANCE PROGRAM

Appendix 17A contains historical information implemented during design and construction of FNP. The current quality assurance policies are delineated in the SCS Quality Services Policy and Procedures Manual.

17A.1.1 ORGANIZATION

The executive vice president - engineering has overall responsibility for quality of all services performed by Southern Company Services, Inc. (SCS) as the architect/engineer (A/E) on the Farley Plant. The SCS quality assurance (QA) program is implemented by all concerned departments. Each department manager, through his project engineer and other department members, is directly responsible for the quality of the products of that department. Procedures for the preparation and quality verification of work accomplished by the department are contained in corporate, departmental, and project procedures. First-line quality verification of design calculations, drawings, and other documents is accomplished by engineers other than those performing the work. Additional reviews are made by supervisory personnel and/or other engineers. Audits to verify quality are performed by the SCS Quality Assurance Department.

The Quality Assurance Department verifies that engineering procedures and other departmental and project procedures affecting quality are followed through audits and other monitoring techniques. This department is also responsible for assuring that other agencies, such as outside consultants and the nuclear steam supply system (NSSS) supplier, who are contracted by SCS to provide portions of the nuclear plant design, maintain adequate quality assurance programs through coordination of quality activities and audits. Another responsibility includes administration of the vendor shop inspection program through which vendors are qualified and monitored for quality performance by inspectors assigned to the vendors' shops. This is accomplished principally through contracts with vendor shop inspection agencies. The SCS QA Department participates in a number of these audits and inspections on a selective basis.

The manager - quality assurance department reports to the director - engineering support services, who in turn reports to the executive vice president - engineering. This provides a separate line of authority independent of the departments and groups involved in the design work.

The organization chart for the SCS quality assurance program is shown in figure 17A-1.

17A.1.2 QUALITY ASSURANCE PROGRAM

The SCS quality assurance program assures that all of the tasks performed by Southern Company Services in their role as architect/engineer on plants designed for the operating companies of The Southern Company are in accordance with the quality standards of SCS and meet the intent of 10 CFR 50, Appendix B.

The primary responsibility of quality rests with the department responsible for the design and procurement of a given item or system. This quality is verified by procedures that provide for independent checks and reviews of all design documents by engineering personnel other than those originating the work. Additionally, design audits are conducted by the SCS QA Department with participation by operating company personnel to assure that quality program procedures are utilized throughout the design and procurement phases.

The Southern Company Services Quality Assurance Department is responsible for:

A. Coordinating and administering the quality aspects of design, procurement, and other related functions within SCS, and providing interface for quality activities with operating companies in The Southern Company.

B. Coordinating the auditing of quality programs of contractors and vendors providing services and materials for SCS.

C. Administering the vendor shop surveillance program to assure that materials and equipment manufactured for SCS meet the desired quality.

The SCS Engineering Policy and Procedures Manual (EPPM) contains procedures governing the operation of the SCS quality assurance program. The procedures are designed to provide guidelines for achieving the established goals of the program.

17A.1.2.1 Design-Related Procedures

Quality assurance program procedures establish quality guidelines to follow in providing design, verification, and documentation control.

QA procedures assist in the implementation of controls over design-related activities such as the following:

A. Working relationships among organizations involved in the program, such as owner, architect/engineer, and NSSS supplier.

B. Administrative and technical instruction within design organizations, such as procedure manuals and guidelines for performing technical work.

C. Information exchange across external and internal interfaces.

D. Document control, including review, approval, release, distribution, and revision of documents.

E. Record keeping of the evolution of relevant work changes and final issues of them, which shall be complete, applicable, accessible, and understandable.

F. Keeping management apprised of the quality posture of the program.

17A.1.2.2 Procurement-Related Procedures and Other Procedures

In addition to procedures related directly to the design function, quality assurance program procedures assist in implementing controls of SCS procurement-related activities such as:

A. Initial quality planning which provides guidelines for inclusion of quality requirements in procurement documents issued by SCS.

B. Procedures used for the review and approval of vendor's quality assurance programs.

C. Procedures used for assignment of vendor shop inspection.

D. Procedures used for performing audits of vendors.

E. Routines used for assuring that all deficiencies are corrected and documented.

F. Procedures used to assure that the product arriving at the site is exactly as specified and approved.

G. Routines used for assuring that all site deficiencies related to vendor-supplied material or equipment are conducted as documented.

17A.1.3 DESIGN CONTROL

The SCS EPPM provides for control of engineering design and assures that technical and quality requirements are met.

General design criteria are developed from the current sections of applicable codes, standards, regulations, NRC Regulatory Guides, and safety analysis reports (SARs), including all appendixes, addenda, and references as contained in the design section of the preliminary safety analysis report (PSAR).

Functional design criteria are developed from basic plant capacity requirements determined by extensive studies involving load demand, location, timing, and overall economics. These inputs include:

A. Number of generating units.

B. Type of units.

C. Capacity.

D. Location.

E. Other physical and functional requirements.

Procedures provide for the independent review and checking of design documents, calculations, basic functional and physical criteria, drawings, flow sheets, applicability of materials, parts, and processes to the desired performance, and other engineering information. Engineering documents are prepared by personnel assigned to the project from the appropriate engineering department. The documents are given a comprehensive check and are reviewed by other personnel having technical qualifications comparable to those of the originator.

Identification and control of design interfaces are accomplished by use of document and correspondence handling procedures located in the Farley Project Procedure Manual. These procedures provide a routing and review system to assure that each document is reviewed and approved by the appropriate groups at the proper time. Periodic audits of the system by the Quality Assurance Department provide assurance that the system is operating properly.

Engineering group supervisors are responsible for review and approval of engineering documents. Dependent upon their nature, engineering documents may require approval by specialists, engineering managers, or other departments within SCS.

Control of changes and/or deviations from approved design practices are described in the SCS EPPM. Design changes are reviewed and approved in a manner similar to that used in the control of original design drawings and other documents. Final drawings will reflect all changes and provide an as-built set for retention.

Regular Farley Project meetings are held and problems, changes, and progress are discussed among all concerned groups within and outside of SCS. Design work and specifications originating within SCS are reviewed by Bechtel Engineering while work originating within

Bechtel is audited by SCS. Design work and specifications originating with a vendor are reviewed and/or audited by SCS and Bechtel.

17A.1.4 PROCUREMENT DOCUMENT CONTROL

SCS procedures include detailed information for implementing procurement document control measures, including controls over:

A. Vendor qualification.

B. Specifications, drawings, and instructions to bidders - preparation and review.

C. Inquiry preparation and distribution.

D. Bid analysis and recommendation of successful bidder.

E. Requisition preparation and issuance.

F. Inspection, test, and audit.

G. Vendor document review and storage.

The engineering departments have basic responsibility in the above activities. Other SCS departments involved in the procurement function are the Purchasing Department, and the Quality Assurance Department on nuclear-related items. Also involved are the Steam Projects Planning Department, operating companies in the Southern electric system, consulting firms under contract for specific projects, and certain government regulatory agencies.

The technical and design aspects of specifications, drawings, inquiries, purchase orders, and other procurement documents are developed by the appropriate engineering department. All quality assurance programs, inspection programs, and vendor documentation requirements are also included in procurement documents prepared by the responsible engineering department.

Vendor drawings, specifications, design information, quality program information, and other input supplied by the vendor are reviewed to assure that applicable requirements of 10 CFR 50, Appendix B; specification requirements; and other requirements are being met and are included in the procurement documents as appropriate. The engineering department responsible for the preparation of a particular procurement document consults with all appropriate departments, consultants, contractors, operating companies, and other groups to assure a complete package is prepared. Control of these documents is maintained through procedures which provide for review and approval by competent personnel other than the originator. Preaward, preproduction, and other meetings are scheduled as required with the vendor to assure that specifications are understood and met. Vendor performance is reviewed through monitoring

shop inspection reports, audit reports, and participation in audits, meetings, etc., as appropriate in order to assure compliance with specifications.

The SCS Quality Assurance Department performs periodic design audits of SCS, Bechtel, and other organizations with responsibilities for preparing design and procurement documents.

Internal review of documents among SCS departments is performed as appropriate. Each procurement document package is reviewed prior to release by each engineering department concerned, Bechtel, and Southern Nuclear Operating Company (SNC).

Procurement responsibility for certain items related to plant construction has been delegated to SNC. In these cases, the responsibility for procurement document control rests with them.

17A.1.5 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

Activities affecting quality are defined by instructions, procedures, drawings, and other documents found in:

A. Safety analysis reports.

B. Quality Assurance Department Policy and Procedures Manual.

C. SCS Engineering Policy and Procedures Manual.

D. SCS department manuals.

E. SCS Engineering Standards Manual.

F. Project procedures manual.

The preparation, review, and approval of the above manuals are the responsibility of the department having primary input. Distribution is made on the basis of need.

The SCS quality assurance program provides for the accomplishment of activities affecting quality in accordance with the above referenced instructions and procedures. Periodic audits of SCS, Bechtel, Westinghouse, and vendors by the Quality Assurance Department assure that the instructions and procedures are being followed.

17A.1.6 DOCUMENT CONTROL

Procedures to control the transmittal, review, comment, identification, changes, approval, storage, and current status of engineering documents are followed by SCS personnel. Technical

documents relating to design, including calculations; SCS, Bechtel, and vendor drawings; specifications; studies; and others are included in the document control procedures. The procedures provide for the review and approval of documents by qualified personnel other than those originating the work.

Control measures are taken to assure that drawings and design documents transmitted to and received at the construction site are properly identified and are current.

Periodic audits by the SCS Quality Assurance Department assist in maintaining the integrity of the system.

17A.1.7 CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

QA and engineering procedures provide means for assuring that a vendor is properly qualified and that he maintains control of his operation throughout the procurement and manufacturing process. The following phases are included:

A. The identification of potentially-acceptable vendors.

B. The preliminary evaluation prior to vendor qualification.

C. The qualification procedures.

D. Inquiry document issuance and control.

E. Bid analysis and recommendation of successful bidder selection.

F. Requisition preparation resulting in issuance of purchase order.

G. Vendor inspections and audits.

H. Vendor reports and QA documents.

I. Final product inspection.

The engineering department that prepared the requisition and bid analysis has primary responsibility in the above activities. Other SCS departments involved in the procurement function are the Purchasing Department, the Steam Projects Planning Department on major steam components, and the Quality Assurance Department.

In order to qualify as a bidder, a vendor must answer questions concerning his qualifications to produce a product(s) that will meet all specifications and other requirements imposed by the customer. Additionally, the prospective vendor must demonstrate that he has a financially sound

organization that has proper procedures and controls for manufacturing, quality assurance, testing, inspection, documentation, and scheduled delivery of all products.

Control over vendor evaluation and approval is maintained by a system that provides for review and check of vendor evaluation reports, audits, etc., by cognizant groups other than those preparing the reports.

The SCS Quality Assurance Department administers a vendor inspection program through which vendor job performance is monitored. This program includes:

A. Determining and defining inspection needs by the responsible engineering design department.

B. Inspection request, assignment, and scheduling.

C. Monitoring and auditing inspection reports.

D. Action by the responsible engineering department to solve problems, deviations, etc.

E. Conducting periodic vendor audits.

F. Reviewing and taking appropriate action on inspector's final shop inspection and release-for-shipment documentation.

G. Reviewing and acting as necessary on problems located during inspection and final acceptance by authorized jobsite inspectors.

H. Reviewing vendor final documentation at the vendor's shop.

Control over vendor performance and quality of the products is assured by audits of the vendor inspection program, vendor shops, and vendor documentation.

Control over design services is maintained by design audits performed by the SCS Quality Assurance Department on SCS design departments and design contractors. Participation in the audits by Bechtel, Southern Nuclear Operating Company, and others is included as appropriate.

In cases where procurement responsibility lies with the operating company or an outside contractor, the control of purchased material, equipment, and services also rests with the operating company or with the contractor.

17A.1.8 DENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS

SCS specifications contain procedures for the making, control, and traceability of applicable vendor products for which SCS has procurement responsibility.

These procedures include parts, components, subassemblies, equipment, partially-fabricated items, and final products. The type of identification depends upon the nature of the product and the manufacturing process, and may include strip marking, imprinted tape, color coding, tags, heat, batch, and log number.

Current status of the item(s) as it flows through the manufacturing process must be maintained by appropriate changes in marking. Deficient items must be distinctly marked and removed from regular product flow. The deficiency must be corrected and documented before the special marking is removed. Traceability, as required by codes, standards, or specifications, is included that permits the vendor to identify components, raw materials, subassemblies, and other items that went into the manufacture of each finished product unit that is shipped.

Control over these procedures is obtained through routine shop inspections, documentation reviews, and special program audits by the SCS Quality Assurance Department and other appropriate groups.

17A.1.9 CONTROL OF SPECIAL PROCESSES

SCS specifications include procedures for the control of special processes where required by codes, standards, and SCS requirements. These processes include welding, heat treating, and nondestructive testing.

The first-line control and implementation of special processes are the responsibility of vendors and subcontractors who must provide an adequate quality control program applicable to materials and personnel. Procedures, methods, and instructions must adequately describe the work to be performed for the qualification of equipment and personnel. The vendor is required to submit his procedures to SCS for review and verification of their acceptability. Specialists with SCS (or consultants) perform this review as required.

The vendor shop surveillance program includes checking on the vendor's performance in carrying out special processes during the manufacturing phase. Written surveillance reports document the vendor's activities and call out any deviations from acceptable operation. Surveillance reports are reviewed by the responsible SCS engineering department and the Quality Assurance Department. Periodic audits are conducted to evaluate the vendor and the surveillance programs. Appropriate action on deviations uncovered by surveillance or audits is taken by the responsible engineering department.

Vendor documentation packages are sent to the Farley site for retention after acceptance and release for shipment by the vendor shop inspector. These packages contain results of nondestructive testing and other special process testing as required by SCS specifications.

17A.1.10 INSPECTION

Inspection by vendors providing materials or equipment procured by SCS is assured through the inclusion of inspection requirements in the procurement specification which are appropriate and applicable to the item. The implementation of inspection requirements by the vendor is assured by shop survey, audit, and/or vendor shop surveillance assignment.

SCS specifications require a vendor shop inspection program on safety-related and certain other items in accordance with SCS and regulatory requirements. Vendor inspection activities are audited by Bechtel, SCS, and SNC personnel as appropriate. Inspection assignments are coordinated and administered by the SCS QA Department. Written inspection reports are prepared by the assigned inspector and contain inspection results, job progress, deviations, problems, and other pertinent information. These reports are reviewed and any problems are resolved. The responsible SCS engineering department uses the report as one means of assuring that the vendor is complying with specifications.

Periodic vendor audits and surveillance visits are conducted by the SCS Quality Assurance Department to monitor the inspection program and to assure compliance with specifications. In all cases, the group performing the inspection and the group auditing the inspection program are independent of the group performing the activity.

In certain cases where procurement responsibility is with the operating company or an outside contractor, vendor inspection program control also rests with the operating company or the contractor.

17A.1.11 TEST CONTROL

SCS specifications contain reference to required testing as described in applicable codes; they also contain written details of other test procedures required for use by the vendor. The vendor has the responsibility of submitting a detailed testing program as a part of the overall inspection program for review and approval by SCS engineering departments.

Compliance with the approved testing program is assured by routine surveillance of the vendor's activities during production and by periodic audits of the inspection program by the SCS Quality Assurance Department. Documentation is required of test data and witness points according to specifications. Inspection reports and test documentation are reviewed by the responsible engineering department to assure compliance with specifications. Any deviations are corrected before final approval and release of the item.

17A.1.12 CONTROL OF MEASURING AND TEST EQUIPMENT

SCS, vendors, and subcontractors are required to maintain adequate control, calibration, and storage of all measuring and test equipment so that material testing can be performed in accordance with specifications. Control of measuring and test equipment is assured by checking during surveillance and audits carried out by SCS and contracted inspection agencies. Documentation of findings are included in the surveillance reports and audit reports.

17A.1.13 HANDLING, STORAGE, AND SHIPPING

SCS specifications include requirements and procedures for the handling, storage, and shipping of vendor items. Compliance with the specifications is assured by implementation of the vendor shop surveillance program. Review and audit of the program by the SCS Quality Assurance Department provides assurance that materials are being shipped and handled according to specifications.

In certain cases where procurement responsibility is with the operating company or an outside contractor, control over handling, storage, and shipping also lies with the operating company or the contractor.

17A.1.14 INSPECTION, TEST, AND OPERATING STATUS

SCS specifications require that the vendor provide a system that identifies the status of items during manufacturing and item acceptance, with provisions for signoff inspections, tests, and traceability. A system of inspection using tags or other suitable marking to identify inprocess or completed status is required. Material and equipment shipped to the construction site must be accompanied by a certificate of conformance and supported by records of the vendor's inspections and the required test and operational documents. Records of vendor's actions and dispositions of nonconforming materials must be available for review.

SCS procedures provide for keeping records on the status of purchased items. The vendor shop inspection program provides regular documented review of vendor activities in this area and periodic audits by the SCS Quality Assurance Department provide review and control of the vendor's inspection, test, and operating status. Vendors providing products for which the

operating company or an outside contractor has procurement responsibility are monitored, inspected, and audited by the operating company or the contractor as required.

17A.1.15 NONCONFORMING MATERIAL, PARTS, AND COMPONENTS

SCS specifications require that vendors and subcontractors provide and use a system that will detect nonconformances, identify and segregate nonconforming material, conduct material reviews, assume the proper disposition of material, and provide adequate records. Deficient items corrected and returned to regular production must be accompanied by documentation that identifies the deficiency, corrective measures taken, and results of subsequent testing to establish adequate quality. Where required, final documentation will include deficiencies uncovered during the manufacturing process and the corrective action taken.

SCS procedures provide for the control of nonconforming materials. The vendor shop surveillance program provides for regular reviews and audits of vendor activities and for reports of any nonconforming items. The responsible engineering department reviews the surveillance reports, takes the necessary action to correct any problems, and notifies concerned groups. Periodic audits by the SCS Quality Assurance Department provide a check on the surveillance program and assure quality requirements are met.

In cases where procurement responsibility is with the operating company or an outside contractor, control responsibility over nonconforming material, parts, and components also lies with the operating company or the contractor.

17A.1.16 CORRECTIVE ACTION

SCS procedures assure that prompt, corrective action is taken when a discrepancy or deviation is discovered during the manufacture and procurement of materials. The responsible engineering department reviews shop surveillance reports and audit reports and takes whatever action is necessary to see that the vendor complies with SCS requirements. Access to corporate authority is provided as necessary to obtain prompt responses.

Reviews are made of drawings, calculations, specifications, inquiries, procedures, vendor drawings, and other documents relating to design and procurement. At any point during the project life, the responsible engineering department takes whatever action is required to correct a deficiency or deviation from the specification or procedure requirements.

Deviations and problems detected upon arrival at the site are also reviewed and resolved by the responsible engineering department. The SCS Quality Assurance Department reviews deviation reports and is developing a vendor quality file for future reference and vendor performance evaluation.

Periodic design and vendor audits are conducted by the SCS Quality Assurance Department with participation by appropriate SCS, Bechtel, and Southern Nuclear Operating Company personnel.

These audits provide a check on corrective measures taken by the vendor and assure that adequate testing and documentation is prepared by the vendor and verified by the authorized inspector prior to final release of the item for use in the plant.

The outside contractor or operating company has responsibility for assuring that proper corrective action is taken concerning items for which the contractor or operating company has procurement responsibility.

17A.1.17 QUALITY ASSURANCE RECORDS

SCS specifications require vendors to retain production quality records in a safe and readily-accessible system. This documentation includes traceability records that permit identifying components used to manufacture the finished product. Prior to disposal of any records, the vendor will notify Southern Nuclear Operating Company of his intention. Southern Nuclear Operating Company will retain records within its organization as appropriate. Additionally, the specifications require that the vendor provide certain quality documentation to the Alabama Power Company site at the time of final shipment. The material is reviewed, evaluated, and stored at the site in accordance with the requirements of ANSI N45.2.9.

Periodic audits conducted by the SCS Quality Assurance Department assure that the interim records retention system of SCS is functioning satisfactorily. Permanent record storage is the responsibility of the operating company.

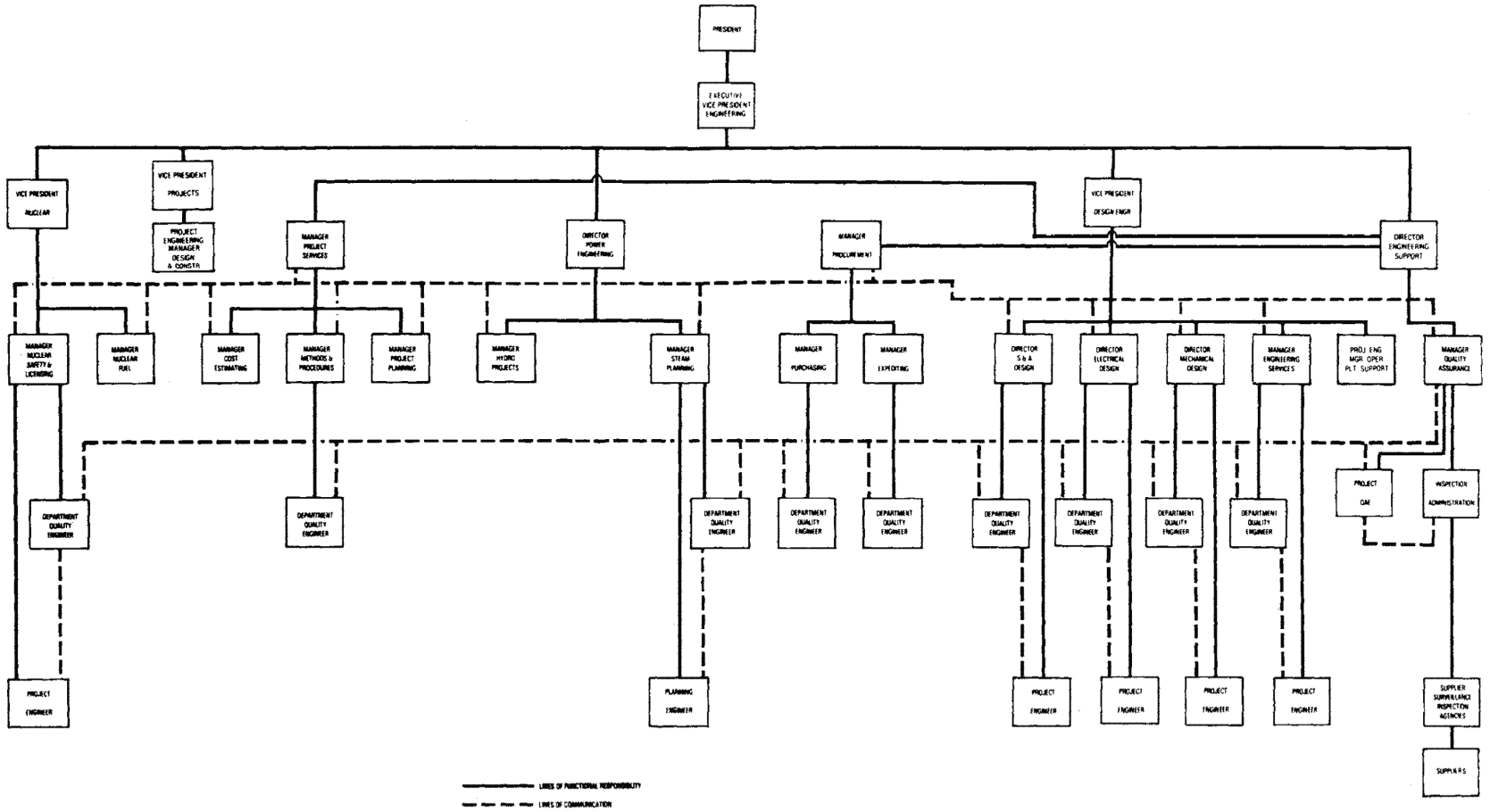
17A.1.18 AUDITS

The SCS Quality Assurance Department is responsible for conducting design audits of SCS, Bechtel, and Westinghouse. These audits are conducted on the average of once per year and can be called at anytime. An evaluation to determine the need for an audit is conducted according to procedures. Participation in the audits may include personnel from SCS engineering, the SCS QA Department, and the Southern Nuclear Operating Company SAER Group.

The audit results are written in formal reports and distributed to appropriate personnel at Southern Nuclear Operating Company, Bechtel, Westinghouse, and SCS for review, comment, and action as required. Procedures include provisions for prompt and efficient action to be taken by the concerned engineering department to resolve any problems and deficiencies uncovered by the audit. Followup audits and inspections are made as required to verify that all quality problems have been resolved in a satisfactory manner.

Audits of vendors for which SCS or Bechtel has procurement responsibility are so conducted to assure performance according to all specifications. The SCS Quality Assurance Department schedules and participates in the audits along with appropriate SCS, Bechtel, and Southern Nuclear Operating Company personnel. These audits are documented in formal reports and are reviewed by responsible engineering and management personnel. The responsible engineering department assures that appropriate action is taken to correct any discrepancy or deviation.]

SOUTHERN COMPANY SERVICES, INC.



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SOUTHERN COMPANY
Energy to Serve Your World®

JOSEPH M. FARLEY NUCLEAR PLANT UNIT 1 AND UNIT 2

[SOUTHERN COMPANY SERVICES, INC. QUALITY ORGANIZATION FOR JOSEPH M. FARLEY NUCLEAR PLANT

FIGURE 17A-1]

APPENDIX 17B

BECHTEL POWER CORPORATION QUALITY ASSURANCE PROGRAM

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BECHTEL POWER CORPORATION QUALITY ASSURANCE PROGRAM

Appendix 17B contains historical information implemented during design and construction of FNP. The current quality assurance policies are delineated in the Bechtel Nuclear Quality Assurance Manual.

Control of quality is the responsibility of the organization which performs the work operation. Quality verification is performed by individuals other than those directly responsible for the work operation; however, they may be members of the same organization.

Assurance of quality is a management function which includes coordination of the quality assurance (QA) program plus monitoring and auditing of the organizations performing the work.

17B.1.1 ORGANIZATION

The vice president and division manager - Bechtel Power Corporation, Gaithersburg Power Division is responsible for the total program and will promulgate the division policy and requirements for quality assurance. Formulation of quality assurance policy and technical direction of the quality assurance program is assigned to the quality assurance manager; the QA manager reports to the vice president and division manager.

The authority and duties of personnel and organizations involved in the quality assurance program are described in subsections 17B.1.1.1 through 17B.1.1.10. Figure 17B-1 is an organization chart showing Bechtel quality assurance program relationship.

17B.1.1.1 Division Quality Assurance Manager/QA Staff

Administrative supervision for quality assurance personnel, technical coordination, and project audits is the responsibility of the quality assurance manager. He is assisted in these functions by a quality assurance staff. The staff monitors and audits engineering activities to assure conformance with the overall quality assurance program.

17B.1.1.2 Division Manager of Engineering

The division manager of engineering establishes division engineering policy and provides overall direction of Engineering Department activities. He monitors project activity and

progress through an engineering manager and through periodic engineering management reviews.

17B.1.1.3 Supervisor of Quality Engineering

The supervisor of quality engineering is responsible for defining Engineering Department quality program procedures for the division and for providing technical direction for the project quality engineer. He reports to the division manager of engineering.

17B.1.1.4 Chief Engineers

The Bechtel organization provides a chief engineer for each discipline (civil, mechanical, electrical, control systems, nuclear, plant design, and architecture) to assign and provide technical support and coordination of group supervisors, engineers, and designers on the project.

The chief engineers provide independent, documented review of items on the design control checklists. In so doing, they coordinate and assure necessary technical review by specialists and consultants. Chief engineers may delegate review to qualified specialists on their staffs.

17B.1.1.5 Project Engineer

The project engineer is responsible for all matters relating to the performance of the project and is the primary point of contact for the owner. He establishes specific project requirements and conducts regular reviews of the project to ensure that it is proceeding as planned. When problems arise in the operation of the project, he secures necessary corrective action from the cognizant Bechtel groups. He directs the operation of the project engineering team, which has primary responsibility for the quality and technical adequacy of engineering. The team, under the supervision of group supervisors, prepares drawings, specifications, bid evaluations, procedures, and instructions in accordance with quality requirements. They prepare and implement the Q-List and design control checklist. The project quality engineer and individual discipline quality engineers provide verification that the quality control requirements are met and defined in engineering documents. The team also reviews QA documentation submitted by the vendor and shop inspection reports prepared by procurement supplier quality.

17B.1.1.6 Project Quality Engineer

The project quality engineer assists the project engineer in the planning and development of the project quality engineering program and performs routine surveillance of Engineering Design

Group activities to assure compliance with quality assurance requirements and quality control procedures. The project quality engineer is assigned by and receives technical and administrative supervision from the supervisor of quality engineering.

17B.1.1.7 Discipline Quality Engineer

The discipline quality engineer has the responsibility for the review of engineering design documents within his discipline for compliance with project procedures, instructions, and quality program requirements. He maintains administrative control of all requests for engineering changes. He receives technical direction from the project quality engineer and is assigned by the chief engineer through his respective group supervisor.

17B.1.1.8 Materials and Quality Services

The quality assurance aspects of special processes are coordinated by the Materials and Quality Services Group of the Scientific Development Division. Their function includes preparation of standards, procedures, and forms for materials, fabrication, coatings, and nondestructive examination, plus providing technical consultation and guidance for engineering and procurement personnel. In particular, they provide technical direction and service in response to requirements of ASME Section III, Boiler and Pressure Vessel Code for Nuclear Power Plant Components.

17B.1.1.9 Procurement Supplier Quality Manager

The procurement supplier quality manager assigns procurement supplier quality representatives and supervises their activities to assure that purchased material, equipment, and required documentation conforms to the quality requirements of the specifications, drawings, and codes.

17B.1.1.10 Procurement Supplier Quality Representatives

Procurement supplier quality representatives (PSQRs) are responsible for shop qualification audits, inprocess surveillance or inspection of work in vendor shops, checking of vendor documentation and inspection, and release of equipment for shipment. Activities are performed in accordance with the Procurement Supplier Quality Manual as supplemented by the drawings, specifications, and additional instructions provided by Project Engineering.

17B.1.2 QUALITY ASSURANCE PROGRAM

Appendix M of the Bechtel Joseph M. Farley Project Procedures Manual, reviewed and approved by the division QA manager, defines the quality assurance program for the Bechtel scope of work on the Farley Project. The requirements for implementing and maintaining the program are contained in that document and are supplemented by the Procurement Supplier Quality Manual. The program provides for indoctrination and training, as appropriate, of personnel affecting quality. The status and adequacy of the program is regularly reviewed by management.

The purpose of the Bechtel project quality assurance program is to assure that the design, materials, and equipment conform to high standards of quality consistent with the requirements of the owner, regulatory agency criteria, and Bechtel standards. Documentation is provided to confirm that the requirements are met.

The policies and procedures followed by Bechtel in implementing and maintaining an effective, documented quality assurance program during the design and procurement stages of the owner's plant are described in this subsection.[(a)]

The Bechtel project quality assurance program reflects the requirements of 10 CFR 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants, and applies to those safety-related structures, systems, and components for which Bechtel has the design and procurement responsibility.

The scope of the Bechtel project quality assurance program is defined by the Q-List prepared for the project. The Q-List is the master control document for identifying safety-related structures, systems, and components of the nuclear power plant. The Q-List is a working document and is therefore expanded during the design effort to maintain it current.

The following principles are applied in accomplishing the Bechtel project quality assurance program:

A. The requirements of 10 CFR 50, Appendix B are imposed in all phases of the program to the extent they are applicable.

B. The project engineering team has responsibility for quality in the design phase.

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a. The term procurement as used to describe Bechtel functions in chapter 17 refers only to the preparation of specifications, soliciting and analyzing bids, and recommending suppliers for those items falling within the scope of Bechtel responsibility. Actual placement of the order is the responsibility of the owner. Procurement supplier quality services are provided when contracted for by the owner.

C. Specifications assign vendors the responsibility for quality of materials, equipment, and services furnished by them and require them to provide a quality assurance program and organization consistent with the scope of their contract.

D. One or more levels of inspection or checks are provided within the organization having quality responsibilities.

The Bechtel project quality assurance program provides for at least one level of monitoring or auditing by individuals not under the direct control of the group having primary responsibility for quality; e.g., Quality Assurance monitors Engineering, Bechtel PSQRs survey vendors, etc. Quality assurance audits of Engineering and Procurement are performed under the direction of the division quality assurance manager.

17B.1.3 DESIGN CONTROL

Several levels of design review and approval are applied to the design of Bechtel work. These standard procedures include:

A. Check and review by design and engineering personnel within the project engineering team having technical qualifications comparable to those of the engineer or designer who originated the work.

B. Review and approval by the originating engineer's group supervisor.

C. Review and approval by the appropriate chief engineer of design drawings, specifications, and documents identified on design control checklists.

D. Review and approval by the project engineer.

E. Review and approval by the owner of selected design drawings, specifications, and procedures.

Design control checklists are prepared which identify drawings, specifications, and other data for review by chief engineers or technical specialists. When periodic design reviews are deemed necessary, chief engineers and the project engineer agree on appropriate schedules and procedures. When an item identified in the design control checklist has been completed, the cognizant chief engineer reviews and signs it, signifying that the necessary reviews have been performed. Specifications, design and interface information, and systems criteria developed by the supplier of the nuclear steam supply system (NSSS) are submitted to Bechtel for review. Interfaces with vendors are coordinated by Bechtel Project Engineering.

The project engineering team employs several documents to establish requirements for the project. These documents include or incorporate applicable NRC regulatory requirements and design bases, owner-furnished data defining plant requirements, basic engineering data, NSSS supplier-furnished criteria and data, project criteria, standard specifications, and data sheets. Testing of prototype units under the most adverse conditions is required when considered necessary to prove the adequacy of a design.

Design changes are subject to design control measures commensurate with those applied to the original design. Design changes are reviewed and approved by the person or organization that performed the original review and approval. If review and approval of design changes by the original person or organization are not practical, another equally qualified responsible person or organization is formally designated to perform such activities. Persons or organizations so designated are judged to have competence in the specific design area of interest and are given access to pertinent background information upon which to base their review and approval.

17B.1.4 PROCUREMENT DOCUMENT CONTROL

Technical aspects of procurement documents; i.e., specifications, drawings, etc., are prepared by the project engineering team. Owner-supplied vendor quality assurance program requirements are incorporated in the procurement documents. Provisions are made for periodic and shipment inspections in vendor shops. When contracted for by the owner, Bechtel PSQRs visit vendor shops to perform inspection functions employing specifications and quality assurance requirements established by the project engineering team.

Technical changes in procurement documents are subject to the same degree of design control as was exercised in the preparation of the original document.

A vendor print control register is maintained by Project Engineering and is regularly revised to show current status. Review of vendor documents is performed as required by Project Engineering, Quality Engineering, Materials and Quality Services, and the chief engineer's staff specialists. PSQRs are kept advised of the current status of approved vendor documents and drawings.

17B.1.5 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

The documented instructions and procedures used to implement the Bechtel quality assurance program and provide assurance that the activities affecting quality during the engineering and procurement phases of the project are contained in the following manuals and documents:

A. Joseph M. Farley Project Procedures Manual contains the detailed procedures for the project quality assurance program and general project operation. Appendix M

of the manual defines the specific requirements of the project quality assurance program.

B. Procurement Supplier Quality Manual contains PSQR instructions, guidelines, and procedures.

Approval and distribution of these instructions and procedures are controlled by the responsible department manager. Appendix M of the Bechtel Farley Project Procedures Manual is approved by the division QA manager. Other groups affected by these instructions and procedures review the applicable documents prior to their approval.

The Bechtel quality assurance program provides that activities affecting quality will be accomplished in accordance with documented instructions and procedures, and that appropriate means of verifying quality are satisfactorily accomplished and included.

17B.1.6 DOCUMENT CONTROL

The review and approval of Bechtel design documents are covered in Design Control, subsection 17.1.3. Approved drawings, specifications, and procedures are promptly distributed to organizations and individuals performing the work and to those responsible for inspection. Control of distribution and maintenance of current status and files is the responsibility of the recipient organization. Changes made to approved documents by the project engineering team or proposed by the field are reviewed and approved by the project engineering team in accordance with procedures for review of the initial issue. Proposed changes to the Q-list are reviewed by cognizant chief engineers and/or technical specialists.

17B.1.7 CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

The Bechtel project quality assurance program provides for preparation of procurement specifications which require an appropriate vendor quality assurance program and organization, procurement inspection when necessary, vendor preparation and maintenance of appropriate test and inspection records, certificates and other quality assurance documentation, and vendor submittal of quality records considered necessary to verify quality of completed work.

Recommendation of bidders to the owner and evaluation of bids by Bechtel is made by the Procurement Department and Project Engineering based on the potential vendor's previous performance and capability, information concerning the vendor's quality assurance program, results of shop surveys, and audits by Bechtel. The final decision on a bidders' list, the selection of a vendor, and the placement of a purchase order are the responsibilities of the owner.

As requested by the owner, Bechtel PSQRs review and verify vendor quality assurance records, prepare progressive surveillance inspection reports, witness tests, and identify discrepancies. Inspectors perform audits and document the results on audit checklists. Periodic inspection is performed in the vendor's shop prior to and including release for shipment. Release for shipment is not an indication of acceptance because final acceptance is always at the jobsite.

Files of currently qualified vendors are maintained by the Procurement Department.

17B.1.8 IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS

As it applies to vendors, appropriate requirements for identification and control of materials, parts, and components are established in specifications and through review of the vendor's quality assurance program and procedures.

17B.1.9 CONTROL OF SPECIAL PROCESSES

Use of qualified process procedures and application thereof, as required by established codes and standards, are prescribed in procurement specifications prepared by Bechtel. For other special processes identified by equipment suppliers or Bechtel Project Engineering, procedures are prepared by the equipment supplier or Bechtel Project Engineering and are approved by Project Engineering or chief engineer staff specialists.

The Bechtel Materials and Quality Services Group furnishes specialized evaluation of procedures covering metallurgy, corrosion control, metal fabrication techniques, welding, coating, and nondestructive testing.

17B.1.10 INSPECTION

When contracted for by the owner, Bechtel performs periodic and preshipment inspections of vendor work as described in subsection 17.1.7.3. This is performed by PSQRs; however, in special cases, engineering personnel may participate. Inspection practices include witnessing of tests or inspection at mandatory hold points where, in the opinion of Bechtel or the owner, work should not proceed without prior examination by the PSQR.

17B.1.11 TEST CONTROL

The Bechtel quality assurance program requires that vendors have a quality assurance program with requirements that the qualification, functional, proof, acceptance, and operational testing

be performed under controlled conditions in accordance with Bechtel-approved test procedures. These procedures are required to meet the requirements and acceptance limits contained in applicable regulatory specifications, codes, and standards. Bechtel PSQRs review vendor test procedures, including changes thereto, for verification of Project Engineering approval prior to and during the manufacturing process. Bechtel PSQRs and/or engineers are required to personally witness vendor shop tests when specified by the purchase order, specifications, or regulatory code. Checksheets are provided for use by the PSQR in his inspection surveillance and documentation functions.

17B.1.12 CONTROL OF MEASURING AND TEST EQUIPMENT

Vendor quality assurance programs are required to have procedures for control of measuring and test equipment. These procedures are reviewed during evaluation of their quality assurance program.

17B.1.13 HANDLING, STORAGE, AND SHIPPING

Special handling, storage, shipping, and preservation requirements are identified in procurement specifications for vendor work.

17B.1.14 INSPECTION, TEST, AND OPERATING STATUS

Vendors are required to provide a system that identifies the status of items during manufacture and test. Provisions for signing off inspections and tests are required. The system of inspection to identify inprocess or completed status is subject to review and approval by Project Engineering. Specifications require that material and equipment shipped to the jobsite be accompanied by documentary verification that the inspections, tests, and operations have been accomplished.

17B.1.15 NONCONFORMING MATERIALS, PARTS, OR COMPONENTS

Procurement specifications require vendors to maintain nonconformance procedures as part of their quality assurance program. Their procedures must provide for Project Engineering and/or owner review and concurrence of major nonconformance dispositions. Vendor programs for handling nonconforming material are reviewed and approved by Project Engineering.

17B.1.16 CORRECTIVE ACTION

The Bechtel quality assurance program incorporates corrective action procedures for identification, reporting, and correction to prevent recurrence of situations which are deemed adverse to quality.

The documents generated in these procedures are routed to appropriate levels of Bechtel management and affected organizations for their information and action. Documentation relating to nonconformances and corrective action is filed in project files. Procurement specifications prepared by Bechtel require vendors to have quality assurance programs that provide for similar corrective action programs appropriate to the work they perform.

Procedures for reporting deficiencies are required by 10 CFR 50.55(e) and are described in the Bechtel Farley Project Procedures Manual.

17B.1.17 QUALITY ASSURANCE RECORDS

Quality documentation prepared by Bechtel or obtained from vendors which is collected during the design and procurement phases of the project is identified, reviewed, and filed in project files.

These records are available for audit by the owner and regulatory agencies. The project will maintain these records in compliance with Bechtel practices regarding retention, location, duration, and responsibility until they are turned over to the owner at the completion of the project.

17B.1.18 AUDITS

The Bechtel quality assurance program includes three specific audit activities to verify compliance with the program and to determine the effectiveness of the program.

A. Audits of Project Engineering and Procurement activities and records by or under the direction of the division quality assurance manager.

B. Audits of vendor's quality assurance program and records by Bechtel's PSQR.

C. Informal monitoring of Project Engineering design activities by the project quality engineer.

These audits are conducted on a sampling basis during the design and procurement phases of the project.

The results of these audits are documented and distributed to affected management personnel within Bechtel and/or the appropriate vendor organization. Problems found during audits are noted in reports and corrective action is required. Followup audits are performed to assure effectiveness of the corrective action.]

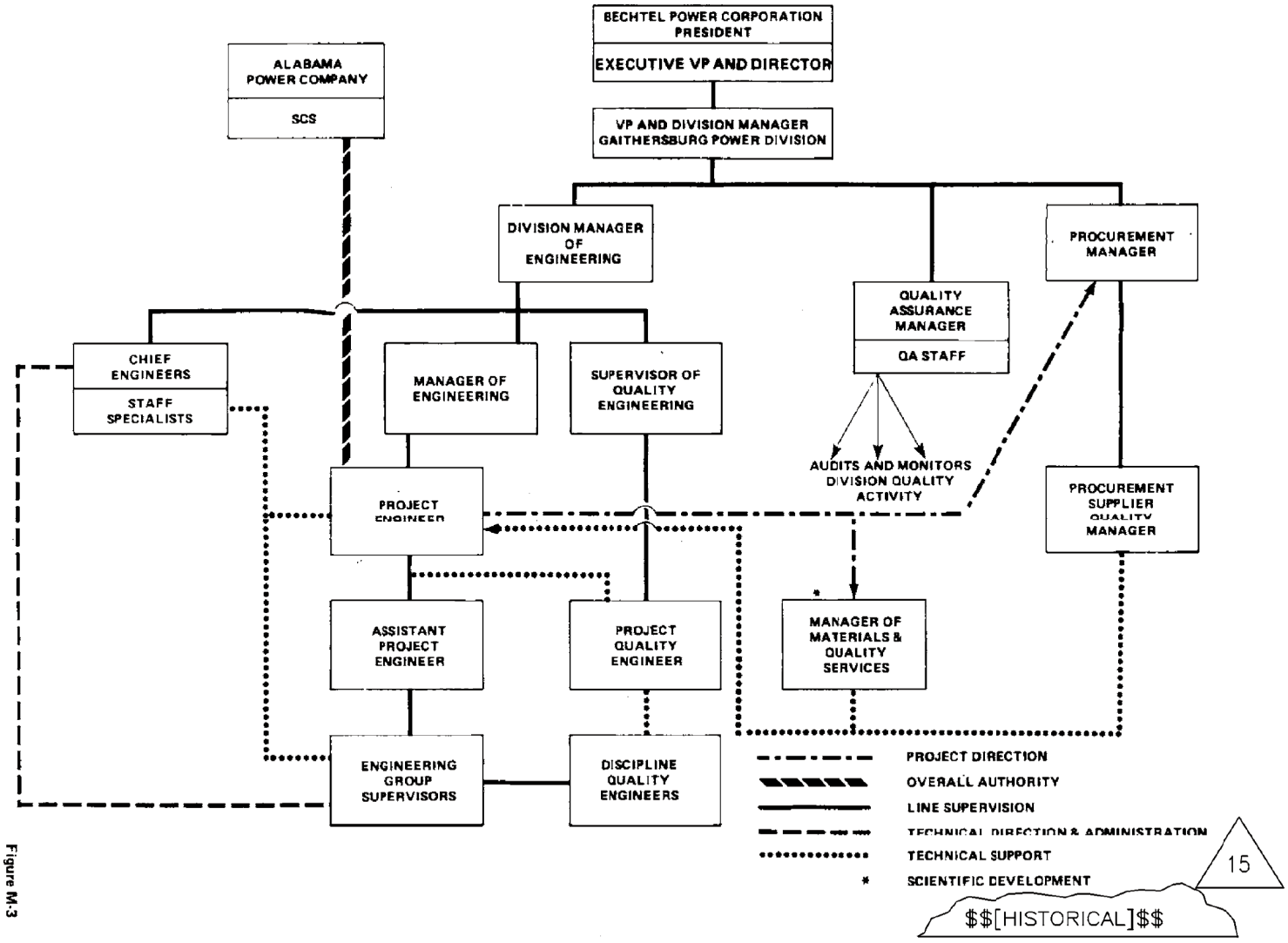

Figure M-3

REV 21 5/08

SOUTHERN COMPANY
Energy to Serve Your World®

JOSEPH M. FARLEY
NUCLEAR PLANT
UNIT 1 AND UNIT 2

[BECHTEL POWER CORPORATION
GAITHERSBURG POWER DIVISION
QUALITY ASSURANCE ORGANIZATION
JOSEPH M. FARLEY NUCLEAR PLANT

FIGURE 17B-1]

APPENDIX 17C

WESTINGHOUSE CORPORATION ASSURANCE PROGRAM

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WESTINGHOUSE CORPORATION QUALITY ASSURANCE PROGRAM

Appendix 17C contains historical information implemented during design and construction of FNP. The current quality assurance policies are delineated in the Westinghouse Quality Management Systems Manual.

17C.1 INTRODUCTION

This appendix is the Westinghouse Nuclear Energy Systems (NES) Division's quality plan. Its purpose is to describe the quality assurance (QA) program used by Westinghouse NES to assure that the design, materials, and workmanship on nuclear steam supply system (NSSS) equipment meet applicable safety requirements.

This Westinghouse NES Division's quality plan is a requirement for those NSSS components, systems, and structures having a vital role in the prevention or mitigation of the consequences of postulated accidents that could cause undue risk to the health and safety of the public. This plan complies with NRC quality assurance criteria, 10 CFR 50, Appendix B and with ANSI N45.2 to the extent that these criteria apply to the design and fabrication of safety-related NSSS equipment.

Several safety guides have been issued on acceptable methods of implementing portions of the NES quality assurance program.

Safety Guide 28, Quality Assurance Program Requirements (Design and Construction), recognizes ANSI N45.2-1971, Quality Assurance Program Requirements for Nuclear Power Plants, as an acceptable basis for complying with 10 CFR 50, Appendix B requirements.

The Westinghouse quality assurance plan for safety-related NSSS equipment described within complies with the requirements of ANSI N45.2 as those requirements apply to the design and fabrication of safety-related equipment, and therefore to the QA plan. The Westinghouse QA plan satisfies Safety Guide 28.

Safety Guide 30, QA Requirements for Installation, Inspection, and Testing o Instrumentation and Electric Equipment, recognizes ANSI 45.2.4-1972, Installation, Inspection, and Testing Requirements for Instrumentation and Electric Equipment During the Construction of Nuclear Power Generating Stations, as an adequate basis for complying with 10 CFR 50, Appendix B requirements. The guide also recognizes that ANSI 45.2.4 was approved by the IEEE Standards Committee as IEEE-336-1971.

The design criteria for Westinghouse instrumentation and controls, described in chapter 7 of the reference safety analysis report (RESAR), requires that safety-related systems comply with IEEE-336-1971 and therefore satisfies the safety guide.

Safety Guide 33, Quality Assurance Program Requirements (Operation), describes an acceptable method of complying with the Commission's regulations with regard to overall quality assurance program requirements for the operation of nuclear power plant structures, systems, and components.

The responsibility for operation rests with the applicant; however, Westinghouse, in an interface relationship, may perform activities affecting quality. The quality assurance plan for safety-related NSSS equipment described within establishes Westinghouse/applicant interface controls; the plan therefore satisfies Safety Guide 33 for any contracted services during plant operation. Specifically, the quality assurance plan described herein does not address any of these services.

The quality plan is structured to provide a statement of quality assurance philosophy followed by an overview of the NES quality assurance program. Subsections 17C.1.1 through 17C.1.18 address each of the NRC quality assurance criteria, 10 CFR 50, Appendix B. For each criterion, the measures employed are described in sufficient detail to allow the reader to understand the quality assurance program.

NES Quality Assurance Philosophy

Westinghouse Nuclear Energy Systems (NES) is an organizational group of operating divisions whose purpose is to provide nuclear power plant services and equipment. Figure 17C-1 depicts the organization. The Pressurized-Water Reactor Systems Division (PWRSD) is the lead division with respect to design and procurement. The other water reactor divisions, including the Nuclear Fuel Division (NFD), Pensacola Division (PD), and the Nuclear Service Division (NSD), together with the nuclear equipment divisions (NEDs), comprised of the Electro-Mechanical Division (EMD), Tampa Division (TD), and Specialty Metals Division (SMD), provide nuclear power plant equipment and services.

The NES philosophy of quality assurance is to provide reliable, high-quality products. This philosophy has existed since Westinghouse began furnishing nuclear power plant services and equipment. This philosophy is set forth in a policy statement by the general manager - PWRSD:

> *"The PWR Systems Division policy is to furnish nuclear power equipment and services that will provide an electric utility with a safe, reliable, efficient plant throughout its design life. Our quality assurance program must be designed to achieve this objective, starting from the conceptual design, supported by key research and development programs, and carrying through the specification of detailed engineering, manufacturing, inspection, and test requirements, to the installation and operation of the plant. Our program must be a coordinated, routine, in process effort of all the departments whose functions contribute to the quality and reliability of our equipment and services. It must be supported by adequate documentation to assure objective evidence that the program is effective.*
>
> *The Quality Assurance Department has the independence and authority to assure that the program is effective. On matters of quality and reliability, the department manager has direct access to the project managers, the engineering manager, and the division general manager.*
>
> *The Quality Assurance and Reliability Manual describes the PWRSD quality assurance program. All employees whose work contributes to carrying out the division's quality assurance policy should be familiar with it and follow its procedures."*

<u>NES Quality Assurance Program Summary</u>

The NES quality assurance program is designed and implemented to provide safe and reliable nuclear power plant equipment. The quality organization in each of the NES divisions provides the mechanism through which the quality assurance program is administered and monitored. The operation of the program is documented in written procedures and instructions.

The activities of NES are complex in that there are many disciplines involved. Table 17C-1 and figure 17C-2 describe the flow of information and the effort required to design and fabricate NSSS equipment. As shown, the process begins with the identification of technical requirements and ends with a description of the monitoring accomplished to assure process adequacy. The flow schedule simplifies many complex activities for the purpose of showing the overall design and fabrication process. An example is the flow schedule's treatment of equipment specifications, item 7 of table 17C-1. Equipment specifications are the basic method by which NES specifies technical requirements for NSSS equipment. Before an equipment specification can be prepared, functional engineering information is required from many sources. Preliminary specifications are reviewed by many groups. After issue, the specifications are further reviewed by the applicant and suppliers. For visibility, the generation of equipment specifications is shown as one entry on the flow schedule. Figure 17C-2 depicts a functional

rather than formal organizational structure. Like the flow schedule, the functional chart shows the communication network in brief form. On the chart, both horizontal and vertical lines show communication flow paths.

The quality assurance program provides for the control of design information. Contractual requirements from the applicant and the contents of safety analysis reports (SARs) are inputs to the design process and are reviewed at several points as the design progresses. Analyses of seismic calculations are, for example, accomplished in accordance with specified standards. Drawings and equipment specifications are independently reviewed prior to issue by knowledgeable groups within Westinghouse. Essential drawings and equipment specifications are reviewed by the applicant and his architect/engineer (A/E). Suppliers' detail designs and procedures are reviewed by cognizant NES personnel to assure compliance with equipment specifications and drawing requirements. Design changes which occur during design, fabrication, or installation are controlled in a manner similar to the initial design.

In addition to the above, independent design verification activities, formal in-depth design reviews, and environmental performance testing are performed on a selected basis to confirm that equipment will perform satisfactorily. All design control activities are documented. Interfaces between participating design organizations are defined. These interfaces include the supplier NES interface, the interfaces among NES divisions, and the interfaces among groups within the divisions. The philosophy is that an experienced design engineer is the focal point through which all other participating groups work. This concept provides for single-point responsibility and accountability. At the same time, each participating group has access to higher management for arbitration of unresolved issues.

The NES quality assurance program provides for the control of purchased material, systems, and services. Prospective suppliers are evaluated for quality system capability. Purchase orders are reviewed for technical and quality-related requirements. As applicable, source surveillance and receipt inspection are performed. Supplier documentation essential to demonstrating product quality is reviewed and retained by NES. Audits and feedback of discrepancy data are used by NES quality engineers to measure supplier performance.

All the NES divisions have systems which control the review, approval, distribution, and revision of instructions, procedures, specifications, and drawings. Because of the varying needs of the divisions, these systems differ in detail. The objective of each of the document control systems is to provide a means for controlling the use of documents so that NSSS equipment is designed and fabricated in accordance with the stated requirements.

NES manufacturing divisions operate under controlled systems. These systems require the performance of important operations in accordance with instructions and procedures. These instructions and procedures are substantiated prior to use by actual demonstration. The means for accomplishing the operation and the criteria for accepting the operation are included in instructions. Examples of operations covered include welding, heat treating, nondestructive testing, performance testing, welder qualifications, receipt inspection, final inspection, gage

control, material handling, and material identification. The manufacturing control systems provide for control of the overall manufacturing process. The control system indicates inspection and test status.

The NES quality assurance program controls nonconforming material by procedures which provide for documented results. All nonconforming material is segregated or, if segregation is physically impractical, clearly identified so that its inadvertent use is prevented. Data from nonconformances are collected and summarized for use in design changes to prevent recurrence of nonconformance.

The NES quality assurance program maintains sufficient records to clearly establish the quality of the product. A microfilmed copy of the fabrication and inspection records is provided to the applicant for permanent retention prior to plant acceptance. To document equipment acceptability prior to site installation, a copy of the purchase order, the applicable design specification, and the quality release are provided to the applicant.

A comprehensive audit program is part of the NES quality assurance program. This audit program provides NES management with information pertaining to the effectiveness of the quality program. Planned and scheduled audits are conducted with results reported to appropriate management levels and corrective action taken as necessary.

The applicant's need to assure himself of the adequacy of the NES quality assurance program is recognized by NES management. The NES QA program provides an extensive amount of design information for applicant review and use. On a typical nuclear power plant, 1000 equipment specifications and drawings, as well as various design installation, testing, and quality assurance manuals, are transmitted to the applicant for review. Audits by the applicant are performed on NES activities covering design, manufacturing, and documentation. The applicant also participates with NES quality assurance personnel in selectively performing supplier surveillance. Quality-related procedures and instructions, as well as the results of tests and inspections, are available to the applicant for his review to verify the operational adequacy of the quality assurance program.

17C.1.1 ORGANIZATION

NES is comprised of a number of operating divisions under an executive vice president, as shown in figure 17C-1. The authority and responsibility of each activity shown on this chart and subsequent charts is set forth in an approved, written statement of group responsibility. In addition, written position descriptions are prepared for each management and professional position. These descriptions specify the educational and experiential qualifications of the position.

The quality assurance aspects of NES activities are overseen and coordinated by the NES Quality Assurance Committee. This Committee, appointed by the NES executive vice president,

is made up of the quality assurance and reliability managers of the NES divisions. The Committee monitors activities throughout NES to provide assurance to NES management that requirements relating to quality assurance are effectively met. The Committee also considers matters of policy to improve and unify the divisions' quality assurance systems.

Overall contract responsibility for supplying the NSSS is assigned to a project manager within the PWRSD. He provides the focal point for communications among the NES divisions, the applicant, and the architect/engineer.

The following is a summary of design and manufacturing responsibilities of the NES divisions involved in furnishing NSSS equipment and service.

17C.1.1.1 PWR Systems Division

The PWR Systems Division, as shown on figure 17C-3, is the lead NES division with regard to the project management, design, and procurement of NSSS equipment.

The Project Department of PWR Systems Division, through a designated project manager, has the primary responsibility within NES for supplying the NSSS equipment and services to the applicant.

The Purchases and Traffic Department provides the PWRSD procurement interface with suppliers and with other NES divisions. This department is also responsible for administering the transportation of equipment from supplier's facilities to the construction site. Material and equipment is protected appropriately against the hazards of mechanical damage and weather during shipping. This includes such provisions as painting with suitable rust inhibitors, taking into account ease of removal of all protective substances during the chemical cleaning and preoperational periods, polyethylene or suitable wrapping, heavy boxes or crates, bolted wooden flange protectors, suitable barriers or blocks, resilient supports, inert gas purge, and other protective provisions.

Additionally, Westinghouse furnishes accelerometer instrumentation with shipments of certain critical equipment. All equipment furnished by Westinghouse is shipped, insofar as possible, completely assembled. Technical assistance for unloading, handling, and storage is furnished to the applicant through the Field and Technical Operations Departments of the Nuclear Service Division.

The Engineering Department of PWR Systems Division has responsibility for the overall design of the NSSS. This responsibility includes:

A. Fluid and electrical systems design by Systems Engineering.

B. Mechanical equipment design and materials support by Plant Apparatus.

C. Control and electrical equipment design by Control and Electrical Systems.

The Nuclear Safety Department is responsible for providing the nuclear steam supply system the safety system performance requirements, safety system criteria, safety analysis methods, and safety evaluations to provide the required analytical and statistical verification of postulated accidents. Further, the department is charged with providing the licensing activity to support the applicant in obtaining the construction permit and operating license for the nuclear steam supply system.

The quality program management performing QA-related activities (checking, auditing, inspecting, or verifying that an activity has been correctly performed) is structured as shown in figure 17C-4. Quality management exercises both technical direction and administrative control.

Quality management does not have prime responsibility for schedule or cost, but does have the authority to stop work pending resolution of quality matters. Quality management also has the freedom to:

A. Identify quality problems.

B. Initiate, recommend, or provide solutions through designated channels.

C. Verify implementation of solutions.

D. Control further processing, delivery, or installation of a nonconforming item, deficiency, or unsatisfactory condition until proper dispositioning has occurred.

Within PWRSD, responsibility for quality assurance activities is assigned to the Product Assurance Department. This includes having lead responsibility for developing the capabilities and demonstrating compliance with the 18 criteria of Appendix B. The manager of product assurance reports directly to the division general manager and is in parallel with the other major departments within the division as shown in figure 17C-3. Thus, matters pertaining to product and system quality can be related directly from the product assurance manager to the division general manager, independent of other functional activities.

The Product Assurance Department is divided into two groups, Product Assurance Systems and Quality Assurance. The efforts of each group are directed by a separate manager.

The Product Assurance Systems Group has five major functional responsibilities. These are:

A. The investigation and analyses of the PWRSD's procedures for compliance with the criteria of 10 CFR 50, Appendix B, as well as other industry and corporate quality standards.

B. Preparation and maintenance of division level policies and procedures.

C. Administration of centralized files and quality records.

D. Internal auditing for compliance with established procedures.

E. Design reviews. The Product Quality Assurance Group also compiles, audits, stores, and retrieves the various QA records associated with the NSSS equipment.

The Quality Assurance Department consists of five sections: Quality Engineering, Quality Assurance Surveillance Zone 1, Quality Assurance Surveillance Zone 2, Quality Assurance Electrical, and Reliability Engineering.

Quality Engineering provides the necessary QA input into engineering and procurement activities (e.g., drawings, specifications, purchase orders, etc.), develops QA plans for surveillance activities, participates with Engineering and Purchasing in the evaluation of proposed suppliers, and coordinates customer audits at PWRSD.

The two Quality Assurance Surveillance Sections monitor the activities of PWRSD suppliers and verify conformance to procurement quality requirements. This is done using both resident and itinerant QA representatives. To provide the most effective coverage of suppliers, each group is assigned responsibility for performing surveillance in a specified geographic area encompassing both domestic and international supplies. Zone 1 encompasses Pennsylvania and the states east and south of the Mississippi and Ohio Rivers. Zone 2 includes the New England states, New York, and the mid-west and western states. The surveillance representatives perform the in-process monitoring and release suppliers' equipment by issue of the PWRSD quality release document.

The Quality Assurance Electrical Section performs the combined function of the Quality Engineering and Surveillance Sections as it applies to electrical/electronic equipment. Since the nature and volume of electrical equipment is considerably different from the other NSSS equipment, the QA functions have been merged into this one section. However, the methods and procedures used by this section are the same as used for the other NSSS equipment.

The Reliability Engineering Section performs the product assessment functions, including formal design reviews and reliability analyses. In addition, this section conducts the internal audits of PWRSD systems and procedures related to product quality.

17C.1.1.2 Nuclear Fuel Division

The Nuclear Fuel Division is responsible for the detailed design of first cores based upon PWRSD equipment specifications and drawings, for manufacture of fuel assemblies and core components, and for all aspects of the design and manufacture of fuel assemblies for repeat cores. The organization of this division and a description of the Nuclear Fuel Division quality assurance program is contained in reference 1.

17C.1.1.3 Electro-Mechanical Division

The Electro-Mechanical Division designs, manufactures, and tests control rod drive mechanisms (CRDMs), reactor coolant pumps, loop stop gate, and check valves. Figure 17C-5 shows the organization for the Electro-Mechanical Division.

This division is a qualified manufacturer per requirements of ASME Section III, Boiler and Pressure Vessel Code for Nuclear Power Plant Components and Hold Certificates of Authorization for the Use of the "N" and "NPT" Symbol Stamps.

The Design Engineering Section develops the detailed design drawings and specifications, including those for procurement from contractual equipment specifications provided by PWR Systems Division. Formal design reviews precede the finalization and issuance of all new product designs.

The Manufacturing Systems Section is responsible for the control of manufacturing information designed by the Manufacturing Engineering Section.

The QA organization has total responsibility for assuring compliance to all contractual requirements. In addition, each department is responsible for applicable controls as outlined in the Quality Program Manual.

The overall responsibility for the implementation of the quality assurance program is vested in the quality assurance manager who also has the authority to enforce full compliance with all quality requirements relative to safety, reliability, operation, and maintenance.

Quality Assurance Engineering is responsible for planning controls to assure product quality. This includes: review of all contractual/governing specifications, engineering design drawings and specifications, purchasing information, and detailed manufacturing instructions.

This organization is responsible for the design and implementation of the inspection point programs, including non-destructive testing incorporated into manufacturing work instructions; qualification of nondestructive testing personnel; audits; compilation of documentation maintained as objective evidence of inspections performed; and attendant functions of analyses and preventive actions to eliminate problem areas.

Field Assurance Engineering is responsible for surveys and qualification of suppliers, design and control of quality programs for purchased material, in-process inspections, and tests, audits, final inspection, and release of supplied product.

Design/Test Engineering is responsible for test specifications, hydrostatic and performance tests, evaluation of test results, and issuance of the test release.

Quality Assurance Engineering is responsible for the final release and certification of all products prior to shipment.

17C.1.1.4 Tampa Division

The Tampa Division designs and manufactures steam generators and pressurizers. Figure 17C-6 shows the organization for the Tampa Division.

Tampa Engineering performs the detail design from equipment specifications provided by PWR Systems Division.

The manufacturing groups are responsible for the fabrication and testing.

The reliability manager directs the activities of the Reliability Engineering, Quality Assurance, and Metallurgy Departments.

The metallurgical organization is responsible for the quality-related functions of material specification, material source approval, welding process qualification, welder qualification, and resolution of shop metallurgical problems.

Overall responsibility for the implementation of the quality assurance program is vested in the quality assurance manager who has the authority and responsibility to stop any operation to assure compliance with the ASME Code, customer requirements, and Westinghouse requirements.

Responsibility for planning controls to assure product quality resides with Quality Assurance Engineering. Quality assurance planning includes preparation of the inspection point programs to assure compliance with drawings, specifications, and ASME Code requirements; the inspection point programs provide process and product verification and are also utilized as a permanent record of the inspection operations. The details of the inspection point programs

follow the manufacturing sequence of the operational lineup; the format delineates the applicable forms, charts, reports, and documentation required.

The responsibility for conducting internal audits resides with the manager - reliability engineering. The audit program provides management with a continuing overview of the compliance with the quality program. In addition, Reliability Engineering coordinates the Tampa efforts to resolve field discrepancies and affect corrective action. Reliability engineers participate in the design review function and provide additional engineering support in the area of failure modes and effects analyses.

17C.1.1.5 Pensacola Division

The Pensacola Division is responsible for the design and manufacture of reactor internals and other associated internals equipment. The organization is shown in figure 17C-7.

The Pensacola Quality Assurance Division provides measures to control the design, manufacture, purchase, inspection, test, packaging, shipment, and site installation of reactor internals.

The organization of Quality Assurance, Manufacturing Groups, and Manufacturing Planning permits the Quality Assurance Department direct access to responsible management. This permits the Quality Assurance Department to independently identify quality problems, and to initiate, recommend, and provide appropriate solutions. The Quality Assurance Department is vested with the authority and responsibility to stop production until acceptable solutions have been provided.

17C.1.1.6 Specialty Metals Division

The Specialty Metals Division (SMD) manufactures tubing used by the Tampa Division and the Nuclear Fuel Division (NFD). Figure 17C-8 shows the SMD organization. Manufacture is in accordance with the specifications provided by Tampa and the NFD.

Quality Assurance has direct control of the division gage calibration system, instrument service and calibration, quality engineering, and product verification and certification. Quality Assurance has the responsibility for the training and certification of inspectors in particular fields.

17C.1.1.7 Nuclear Service Division

The responsibility of NES at the plant site involves construction consultation to the applicant. This responsibility is within the Field Operations and Technical Operations Departments of the Nuclear Service Division. Figure 17C-9 shows the NSD organization.

Work on nuclear steam supply equipment, as performed by the construction contractor and subcontractors, is monitored by Westinghouse representatives assigned to the construction site. The necessary procedures and actions are coordinated with the construction contractor. Special processes, such as welding, cleaning, and nondestructive testing, are observed by qualified Westinghouse personnel to assure the work is performed in accordance with written procedures.

During component installation, Westinghouse NSD monitors work on nuclear steam supply and engineered safeguards equipment. Qualified personnel provide technical advice on various disciplines of construction such as welding, mechanical and electrical systems, instrumentation and control equipment, and preoperations and startup testing. Guidance documents are provided to the applicant detailing Westinghouse-recommended programs for site activities such as receiving, inspection, and storage; installed equipment inspection; cleaning and flushing; equipment checkout; initial operation and adjustment; integrity tests; system functional tests; and plant operational tests and measurements.

The construction site manager is responsible for overseeing that the Westinghouse nuclear steam supply equipment is in good condition when received and that it is stored, handled, and installed properly according to applicable specifications, procedures, and manufacturers' instructions.

A written procedure describes the system for identifying, reporting, and obtaining disposition of nonconforming material or equipment discovered at the site. NSD personnel fill out a field deficiency report to provide the cognizant engineering group with the information necessary for making proper and timely disposition of each problem. After the cognizant personnel make a disposition, it is noted on the field deficiency report and returned to the field for action. Files of these reports are maintained to record all field deficiencies and to provide for long-term corrective action.

The Service Operations Department provides optional services to the applicant, such as nuclear training services, renewal parts and components services, post-operational services, etc.

The Quality Assurance Department within the Technical Operations Department of NSD is responsible for conducting independent audits of Westinghouse personnel activities at the construction site. Additional quality assurance functions for NSD are provided as necessary by the quality organization within the PWRSD.

17C.1.1.8 Functional Responsibilities

The functional responsibilities of designing and fabricating NSSS equipment are shown in table 17C-2. The responsibilities are broken down into three categories: design criteria, detail design, and manufacture. For each category, the organization responsible for performing the particular function is identified. The table identifies the scope of the quality assurance program for both safety and nonsafety equipment. The identification of safety-related equipment is covered in other chapters of this report.

17C.1.2 QUALITY ASSURANCE PROGRAM

The NES policy is to provide nuclear power equipment and services that will provide an electric utility with a safe and reliable plant throughout its design life. To meet this policy, each NES division is committed to comply with quality assurance criteria of 10 CFR 50, Appendix B.

This plan is a description of the NES quality assurance program. The program is supported by written policies and procedures governing quality-related functions and activities from initiation of design through fabrication and shipment. Identification of the principal quality assurance documents is contained throughout this plan.

Table 17C-3 gives a typical and representative listing of the written procedures within NES for implementing the NES quality assurance program. Listed are the various manuals, the subjects covered, and a short description of their purpose. The manuals referenced each contain procedures dealing with other topics unrelated to the criteria of Appendix B. Only those procedures felt to be responsive to the requirements of 10 CFR 50, Appendix B are detailed in table 17C-3.

This plan demonstrates that the NES quality assurance program complies with the criteria of 10 CFR 50, Appendix B. In order to facilitate the presentation, measures established for the quality assurance program are described for each criterion.

The NES quality assurance program requires that contractors and suppliers of NSSS equipment have quality systems consistent with the requirements of Appendix B quality assurance criteria. A summary description of the NES quality assurance program is found on pages 17C-3 through 17C-6.

17C.1.3 DESIGN CONTROL

Each of the NES divisions involved in NSSS design provides measures to assure effective design control. Below is a description of the design control procedures which provide methods for controlling activities such as specifying quality standards, selection and review, design changes, design interfaces, and implementation of procedures.

17C.1.3.1 PWR Systems Division

The project manager is responsible for identifying to Engineering, Purchasing, Licensing, and Quality Assurance Groups the technical requirements of a nuclear power plant. This identification process is formal and documented. The distribution of this technical information is the start of the design activity on a nuclear power plant. Changes to distributed information are also issued by the project manager.

Nuclear Safety prepares safety analysis reports. Prior to the submittal of NSSS portions of safety analysis reports to the applicant, licensing engineers obtain engineering, projects, and quality assurance review and concurrence of technical content. The review process is formal and documented.

Based upon the identified technical parameters, Systems Engineering Groups design the nuclear power plant to meet functional, safety, and regulatory requirements. Mechanical and electrical design engineers participate in the functional design process by identifying equipment limitations and resolving functional requirements with equipment capabilities. The output of the Systems Engineering Groups are written functional parameter documents.

Control and electrical system engineers, plant apparatus mechanical design engineers, and nuclear service engineers are responsible for designing or specifying NSSS equipment. Equipment specifications are prepared by the electrical and mechanical design engineers. The term "equipment specification" as used in this plan includes drawings when they are used instead of equipment specifications. Detailed quality control requirements are specified in the equipment specification or its references. Examples of these specifications are nondestructive tests, acceptance standards, functional tests, and recording the measured values of key characteristics. In the few cases where equipment specifications or design drawings are not used, the specific quality control requirements, tests, and acceptance standards are identified in the purchase order. The design of equipment also provides for access to components for

inservice inspection and maintenance as required to assure continued integrity throughout the life of the plant.

Preliminary equipment specifications are reviewed within Westinghouse by systems engineers, materials and process engineers, licensing engineers, Quality Assurance, projects, and others as required. These independent reviews verify that equipment specifications meet system requirements; conform to established engineering standards; are adequate from a metallurgical and welding point of view; meet code requirements; satisfy safety requirements, including those specified in safety analysis reports; and contain necessary quality control requirements. Written engineering instructions prescribe preparation, review, and approval of equipment specifications.

Documented procedures control design changes. These procedures require appropriate groups to review and approve the changes according to written engineering instructions.

Westinghouse interprets as-built drawings and specifications to meet those documents which specify the functional parameters of an item for procurement, manufacturing, installation, and operational purposes. Whenever changes are necessary to these parameters, as identified by engineering, manufacturing organizations, or the applicant, Westinghouse Engineering reviews these proposed changes to the original design. Upon approval, Engineering initiates the required action to change the drawings and specifications to accurately reflect the design change. When approved for release, copies of the revised documents are provided to the applicant as well as other organizations needing the documents for subsequent work. As discussed in subsection 17C.1.6, this distribution system is controlled.

Aspects of the equipment design that have an effect on that part of the plant design performed by the applicant or architect/engineer are forwarded to them for their review. Applicant or architect/engineer drawings which have an effect on the NES scope of supply are likewise sent to NES engineers for their review.

The implementation of the design control system is audited by Product Assurance.

In addition to the verification of technical requirements discussed above, formal design reviews are conducted by Reliability Engineering on critical systems, subsystems, and components to improve their reliability and to reduce fabrication, installation, and maintenance costs. The design reviews are comprehensive, systematic studies by personnel representing a variety of disciplines not directly associated with the development of the product. Specialists from other Westinghouse divisions and outside consultants are used in the reviews as necessary. Information developed by the reviews is recorded for evaluation and action by the cognizant design engineer. The design review procedure requires the resolution of open items within specified periods. Reliability engineers verify completed action.

The design review program is projected over a substantial period of time because of the comprehensive nature of each review. Both the scheduling of the review and the selection of

specific equipment for review are based upon many considerations, including whether the equipment is of a new design, its importance to public health and safety, its importance to plant availability and performance, and previous experience with the equipment. In this priority scheme, some equipment of proven design may not receive a formal design review.

Verification calculations and performance testing are accomplished as necessary. A discussion of the means by which seismic requirements are satisfied describes the decision and control process involved. Seismic criteria are provided by the applicant. These criteria are forwarded by the project manager, as previously described, to the Mechanics and Materials Technology Group within Plant Apparatus. A seismic coordinator distributes the seismic criteria to equipment design engineers for inclusion in equipment specifications. These specifications, which are reviewed by Mechanics Technology personnel, require supplier submittal of either calculations or test data demonstrating that the equipment is seismically qualified. The design engineer reviews and checks the supplier submittals. Seismic calculations are forwarded to the Mechanics Technology Group for final review and certification. The final review process includes an independent recalculation when the seismic adequacy is doubted. The various events within this process (e.g., equipment specification review) are performed in accordance with procedures which require documented results.

17C.1.3.2 Electro-Mechanical Division

Upon receipt of an equipment specification from the PWR Systems Division, the lead design engineer is responsible for correct translation of reactor coolant pumps, control rod drive mechanisms, and loop stop valves into specifications, drawings, procedures, and instructions.

Engineering instructions specify that all designs be reviewed by a design review committee chaired by an individual who is not a direct supervisor of the lead design engineer or directly involved with the original design group. Technical reviews by Engineering personnel verify design adequacy for compliance with performance requirements. Subsequently, divisional design reviews, with participants from Engineering, Manufacturing, and Quality Control as a minimum, coordinate all departments to assure compatibility with code and quality requirements. In addition to the formal review process described above, drawings, equipment specifications, and manufacturing routings are reviewed by cognizant groups within the division, including Quality Engineering. Design changes and document revisions are released after a review for adequacy and approval for release by the same groups involved in the initial review. This includes deviations controlled under a nonconforming materials review system.

17C.1.3.3 Tampa Division

The Tampa Division is responsible for the design and manufacture of steam generators and pressurizers. The design effort is based upon an equipment specification from the PWR Systems Division. The Design Group is responsible for heat transfer, material evaluation,

hydraulic analysis, and operation. The Structural Analysis Group is responsible for vibration and shock analysis, experimental stress analysis, general stress analysis, and materials behavior.

Prior to releasing drawings for manufacture or purchase, Quality Assurance Engineering reviews drawing for conformance to the ASME Code. Included in the review is assurance that dimensions and tolerances are shown and requirements for special tools are established; that material specified is in accordance with ASME Code requirements; that welding specifications are compatible with material; that the correct nondestructive tests are specified; and that any special characteristics are clearly identified on the drawing. The quality assurance engineer signifies review by signing the drawing when the above points have been satisfied. All drawing revisions are reviewed and approved in a manner similar to the original drawings.

Planned and documented design reviews are conducted to assure that the product being designed and manufactured meets all contractual and code requirements. These reviews provide assurance that nuclear effects, mechanical, thermal, hydraulic, safety, and similar type studies are complete; and that research and development programs and test provide adequate substantiation of the design if necessary. Compatibility of materials and design interfaces is assured and maximum use of qualified, standard, or approved parts, materials, components, and processes are used where possible. Adequate accessibility for inservice inspection, maintenance, or repair is designed into the product as well as specifying acceptance criteria for inspections tests. Each design review is documented for permanent filing and includes coverage of significant problems, decisions, and the action taken or proposed.

17C.1.3.4 Pensacola Division

The Pensacola Division is responsible for the design of structural components for internals of the Westinghouse pressurized-water reactor (PWR). Prior to release of drawings and specifications at the Pensacola Division, Quality Engineering and Reliability reviews each drawing and specification to assure compliance with the contract and ASME Code requirements. This review shall include the following considerations as a minimum:

A. The material defined is code-approved.

B. Proper and adequate nondestructive tests are specified to assure compliance with the code and applicable specifications.

C. Any special processes specified are adequately defined and compatible with the material.

D. Dimensioning is clearly defined to permit manufacture and subsequent piece-part inspection.

To assure that each drawing and specification receives the above review, the cognizant quality engineer indicates approval for drawing release by signing each drawing. Subsequent revisions to the drawing are also reviewed by the quality engineer to assure continued compliance with the above stipulated considerations.

The Pensacola Division maintains a computer-controlled printout for identification and control of all drawings applicable to each product line. As revisions become applicable, the printout is updated and distributed to appropriate work areas.

17C.1.3.5 Specialty Metals Division

Detail design is not performed by the Specialty Metals Division.

17C.1.3.6 Interface Control

Written instructions define the interfaces among participating design organizations. Within the PWR Systems Division, shop-order logic flow diagrams document the relationships among the many design, procurement, control, and administrative activities required to conduct the business of the line organizations. Additionally, the flow diagrams serve to document and show by road map how PWRSD complies with Appendix B. The level of detail depicted on the flow diagram is intended to optimally portray management controls, provide an easy means of education, and facilitate the auditability of these controls.

PWRSD, as the lead division with NES, establishes the design criteria and parameters for systems, structures, and equipment. This information is transmitted in the form of equipment specifications or drawings to the manufacturer. In some cases, the manufacturer is responsible for providing a detail design or process procedure based upon the PWR criteria and parameters. These are submitted by the vendor to PWRSD where they are reviewed and approved prior to manufacture. Review and approval requirements are clearly stated in purchase orders, or in the case of other NES divisions, in written interface instructions.

One example of the latter is the PWRSD/NFD interface instruction. This instruction clearly defines the division of design responsibilities in terms of which groups originate review and distribute the design documents, deviation reports, and design change reports involved in the PWRSD/NFD interface.

Tables 17C-6 and 17C-7, which are two sheets extracted from a typical shop-order logic flow diagram, depict the above process for review and approval of vendor submittals, noting the specific interfaces, applicable documents for detailed instructions, and appropriate criteria of Appendix B. It is the responsibility of the cognizant manager for each shop order to maintain the currency of his particular logic flow diagram. Product Assurance Systems is responsible

for the distribution and control of these and for any support required in the updating of the diagrams.

In addition to the interface between PWRSD and manufacturers, there is an interface with the applicant and his design agents.

All PWRSD equipment specifications, flow diagrams, and procurement drawings that are outline or assembly drawings and are used in lieu of equipment specifications are transmitted to the applicant or his design agents for review. Each project manager has a written procedure defining the process for transmittal and resolution of comments.

17C.1.4 PROCUREMENT DOCUMENT CONTROL

In general, the procurement of components, systems, structures, and material within NES falls into three distinct areas:

A. Components procured by the PWRSD from other NES divisions.

B. Components, systems, and structures procured by PWRSD from suppliers and non-NES divisions.

C. Materials procured by Pensacola, Tampa, EMD, and SMD.

Relationships of the various NES divisions is discussed in detail in subsection 17C.1.1.

17C.1.4.1 PWR Systems Division

As described in subsection 17C.1.3, equipment specifications and drawings receive a detailed review prior to issue. Purchase orders reference equipment specifications and drawings as the technical basis of procurement. A quality assurance procedure requires quality engineers to review purchase orders. The review process assures that the purchase order defines the equipment being procured and clearly specifies technical and quality requirements. When discrepancies are noted, a written request for corrections is initiated.

Quality requirements that specifically apply to a component are contained in the equipment specification. Quality system requirements of a general nature are contained in two standard documents.

The first document is entitled, Administrative Specification for the Procurement of Nuclear Steam Supply System Components. This document is applied in all component purchase orders. The administrative specification requires that the supplier not only manufacture equipment that conforms to purchase order requirements, but to assure himself and

Westinghouse by means of appropriate inspections and tests that the equipment conforms to these requirements. The quality control section (QCS) of this specification contains specific requirements in areas such as:

A. Organization.

B. Purchasing control.

C. Receiving inspection.

D. Material control.

E. Control of drawings and procedures.

F. Calibration of measuring and test equipment.

G. Personnel qualifications.

H. Deviations from specifications.

I. Special process and test procedures.

J. Handling and storage procedures.

K. Inspection and manufacturing control.

L. Quality records.

M. Quality release.

N. Quality systems audits.

The second document that specifies quality requirements is QCS-1, Manufacturer's Quality Control Systems Requirements. This document is applied to orders for more critical safety equipment. This document requires the supplier to maintain an adequate quality control system. This specification meets NA4000 of Section III of the ASME Boiler and Pressure Vessel Code in the area of quality control system requirements. QCS-1 requires, among other things, the following:

A. Establishment and maintenance of a system for the control of quality that assures that all supplies and services meet all specification, drawing, and contract requirements.

B. Application of the system to subcontracted items.

C. Written procedures that implement the system.

D. Qualification of personnel.

E. Qualification and control of processes, including welding, heat treating, nondestructive testing, quality audits, and inspection techniques.

F. Operation under a controlled manufacturing system such as process sheets, travelers, etc.

G. Written inspection plans for in-process and final inspection.

H. Submittal of inspection checklists for approval.

I. Recording of results of inspection operations.

J. Written work and inspection instructions for handling, storage, shipping, preservation, and packaging.

As required, inspection hold points are specified in the equipment specification or elsewhere in the purchase order. These are points of witness or inspection by Westinghouse beyond which work may not proceed without approval by the PWRSD.

NSSS equipment ordered by the PWR Systems Division from other NES divisions is specified by equipment specifications or drawings. Quality assurance program requirements are satisfied by requiring NES divisions to perform their work in accordance with 10 CFR 50, Appendix B.

17C.1.4.2 Electro-Mechanical Division

Upon receipt of an order from the PWRSD, written procedures require that the overall quality requirements of the contract are reviewed by cognizant engineering personnel and action is initiated to assure that contractual quality requirements will be referenced in documents for procurement of material, equipment, and services and will be met during procurement, manufacturing, and shipment. Procurement documents delineate the quality assurance program requirements consistent with application of the material, component, or service being provided.

Quality engineers review purchase orders to assure that the supplier is furnished all applicable requirements affecting quality.

17C.1.4.3 Tampa Division

The Quality Assurance Department has developed an inspection code which is used in the determination of the supplier inspection requirement level for all purchased materials. The inspection code, Codes 1 through 4, is used on all purchase orders, with Code 4 being applied to items such as light bulbs, stationery, etc. All purchase orders for materials or parts having Code 1, Code 2, or Code 3 requirements are reviewed by Quality Engineering to determine that proper and essential quality requirements are specified.

17C.1.4.4 Pensacola Division

Prior to placement of a material purchase order, the purchase requisition is approved by the Quality Assurance Department. The purchase requisition review assures that applicable drawings and specifications are listed together with correct revision references, and that required destructive and nondestructive tests are specified.

An addendum form to the purchase order requisition titled, Purchase Order Supplementary Technical Requirement (POSTR), is used to delineate the specifics of the referenced requirements.

17C.1.4.5 Specialty Metals Division

The Manufacturing Department is responsible for initiating purchase requisitions in accordance with Tampa and NFD requirements. Purchase requisitions are approved by the Quality Assurance Department prior to issue. Applicable Quality System requirements are specified, as well as references to technical specifications.

17C.1.5 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

Within NES, written procedures and instructions are in use to implement the quality assurance program and to provide assurance that all activities affecting quality in the context of 10 CFR 50, Appendix B are documented (table 17C-3) and are in formats appropriate to their applications, such as:

A. Management responsibility statements.

B. Position descriptions of management and professional personnel.

C. Engineering instructions.

D. Quality assurance and reliability procedures.

E. Projects procedures.

F. Purchasing procedures.

G. Construction site procedures.

Each of the above contains detailed procedures and instructions relating to the functioning of the quality program. Approval and distribution of the procedures is controlled by the manager responsible. For example, engineering procedures within the PWRSD are approved by the engineering manager and distribution is controlled by his staff. Other groups affected by one department's procedures review the procedures prior to their approval.

Table 17C-3 relates the various NES manuals and written procedures in relation to the applicable NRC criteria.

Technical and contractual information necessary to assure effective implementation of these policies and procedures is developed, documented, and controlled through a standard Westinghouse system which consists in part of the establishment of:

A. System design parameters.

B. Equipment specifications.

C. Corporate process specifications.

D. Corporate material test specifications.

E. Corporate Purchasing Department specifications, including specifications for materials.

F. Component specifications.

G. Drawings, drawing lists, and bills of material.

H. Purchase orders.

I. Operating procedures.

J. Job and work orders.

K. Quality assurance procedures.

The quality assurance program provides that all activities affecting quality will be accomplished in accordance with documented instructions, procedures, and drawings and that appropriate quantitative and qualitative means of verifying quality are satisfactorily accomplished and included as appropriate.

17C.1.6 DOCUMENT CONTROL

Each of the NES divisions provides measures to assure effective document control. Below is a description of the document control procedures which provide methods for establishing control of instructions, drawings, and procedures related to quality and safety. In addition, these procedures provide a means to assure that obsolete documents are not used, that controls are exercised for document changes, and that review and approval of changes is performed by organizations originating the document.

17C.1.6.1 PWR Systems Division

Within the PWRSD, there are a variety of documents used in the design and procurement of the PWR plant equipment. In the paragraphs below, the controls in use to assure content adequacy and the correct distribution are discussed.

The various sources of PWRSD procedures relating to quality assurance are summarized in table 17C-3. Each of the manuals has written instructions describing the review, approval, distribution, and revision of procedures. Typically, the preparation of new or revised procedures are controlled by the department responsible for the manual. Prior to issue, proposed procedures are routed to affected groups. Written comments are received and resolved. Approval is the responsibility of the department manager, who assures the completeness and resolution of the review. Manuals are serialized and assigned to specific individuals. Distribution of new and revised procedures is made to each person assigned a manual. Manual holders are responsible for updating their manuals. Implementation of most procedures is at the date of issue and is clearly defined by the distribution letter. In exceptional instances, when implementation varies from the issue date, specific instructions are provided in the body of the procedure.

Since design information is provided by equipment specifications and drawings, both types of documents are controlled by specific instructions. For both new and revised equipment specifications, these transmittal forms designate which groups review each document and approval requirements are clearly established. The manager of the originating group is the person responsible for assuring that before approving the document, all steps required by instructions have been completed satisfactorily. This includes the proper review and resolution of written comments as well as the technical adequacy of the document. Both drawings and equipment specifications are distributed to central control groups from which formal and demand distributions are made.

Approved drawings are microfilmed and distributed to satellite files. Obsolete drawings are exchanged for revised drawings. Obsolete issues are returned to the central file and destroyed. Past revisions are available only from the central file. All full- and half-size copies of drawings are informational. Since more than one revision to a drawing is applicable to different plants, a computerized drawing control system defines applicability. When a new or revised drawing is sent to central files, it is accompanied by a applicability form which is the input to the computer system. Drawing lists are issued to all satellite files and project offices monthly; partial change lists are issued more frequently. The written drawing control system requires division personnel to determine applicability of a drawing by referral to the drawing lists.

Process specifications; i.e., specifications that detail fabrication, inspection, and testing requirements, are handled in a manner similar to equipment specifications except that their development, approval, and distribution is coordinated by the Mechanics and Materials Technology Group.

Procurement documents are controlled by the Purchasing Department. The purchasing manual contains written instructions which detail how purchase orders, purchase order change notices, and procurement advisory releases are originated, reviewed, approved, and distributed. The instructions specify that sequential unique numbers be applied to all procurement documents. A computerized system identifies the latest serial number used on each document within the purchase order. The PWRSD has no specific responsibility at the construction site. Documents at the site are transmitted through the applicant or are sent by PWRSD supplies. Written instructions define the requirements for transmittal of documents to the applicant. Prior to distribution, the applicability of each document is assured by the approval of the cognizant engineer and project manager. Quality releases are forwarded to the site by equipment manufacturers. The quality release system is described in subsection 17.1.7. Computerized reports are issued twice a month to identify the quality releases applicable to site-delivered PWR plant equipment.

17C.1.6.2 Electro-Mechanical Division

Manuals, as summarized in table 17C-3, are developed and maintained in the manner described for PWRSD manuals in subsection 17C.1.6.1. The quality manual is the responsibility of the quality assurance manager. Where action and responsibilities of the departments are affected, the managers of these departments shall also approve related sections. The manual is reviewed on a scheduled basis and revised as necessary. As revisions are approved, the quality assurance manager shall supply copies of changed sections to manual holders.

Maintenance or correlated documentation to material, component, and assembly processing, inspection, and test is determined during initial planning. Documentation instructions are incorporated directly into the manufacturing routing or are referenced in separate inspection and test instructions. All documents, including changes and revisions, are reviewed for adequacy and approved for release by authorized personnel as described in subsections 17C.1.3.2 and 17C.1.4.2.

Electronic data processing is utilized in preparing and maintaining drawing and specification lists showing the applicable revision. These lists are strategically located in the factory and office area. The drawing and specification distribution control system assures that current information is available to the user and that manufacturing information is upgraded.

17C.1.6.3 Tampa Division

Control is maintained over the issuance of all design, welding, nondestructive testing, and manufacturing documents affecting quality. Each drawing is reviewed and signed by Design Engineering, Metallurgy, Quality Assurance, and Manufacturing prior to release to the Drawing Control Center. Copies of the drawing are prepared from aperture cards for transmittal to the Production Planning Department, who in turn prepares a feeder package that includes the necessary drawing and distributes the complete package to the applicable manufacturing group. The Drawing Control Center issues a master engineering drawing list. This drawing list contains all drawing numbers in the active category, including the latest revision. Distribution of the list is made twice a month to appropriate department managers, including the quality assurance manager. Each department is responsible for maintaining only up-to-date drawings.

Procedures that include welding, nondestructive tests, and manufacturing are maintained and controlled through the Metallurgical Group.

Serialized Tampa Specifications Manuals are issued to appropriate individuals in each department. New and revised specifications are distributed to manual holders who are responsible for inserting the new specification and destroying the outdated specification. Each specification is identified by a specific number. This number is shown on the drawing and

dictates the procedure to be used for each specific operation; i.e. welding, nondestructive test, cleaning, etc.

Tampa quality control instructions (TQCIs) are issued to all QA personnel by quality assurance engineers or supervisors. The purpose of these instructions is to detail specific functions and responsibilities of QA personnel; i.e., N-1 form and data plate processing procedure, productive work station budget charges, inspection stamp issue, etc. These instructions are numbered and updated as necessary.

Tampa specifications are reviewed, approved, and signed similar to the drawings, with one notable exception; the division safety engineer also reviews and approves each Tampa process specification and manufacturing procedure. Additional discussions of document controls are contained in subsections 17C.1.3.3, 17C.1.4.3, 17C.1.9.3, and 17C.1.10.3.

17C.1.6.4 Pensacola Division

Within the Pensacola Division, operational and administrative procedures are developed and implemented as described within the PWRSD's subsection 17C.1.6.1.

The Quality Assurance Manual (QAM) is the responsibility of the Quality Assurance Department. This manual is approved by division management. Revisions are issued to holders of "controlled copies" as listed on records maintained by the Quality Assurance Department.

All drawings and product process specifications are controlled by Pensacola Division Design Engineering. Contract applicability is controlled through an engineering design release. The design release generates input to the business systems master drawing and specification list (computer listing). This computer master drawing/specification list is the contractual core internals configuration control document.

All material procurements, manufacturing, quality assurance plans, and inspection plans are completed and coordinated with the master drawing specification list.

All changes are keyed to the master drawing/specification list through design releases which trigger and control all implementations of manufacturing planning, quality, and inspection planning.

Additional discussions of document controls are contained in subsection 17C.1.3.4.

17C.1.6.5 Specialty Metals Division

The content and issuance of manufacturing, engineering, and quality information to the manufacturing, inspection, and test areas of the shop is controlled. An authorized change notice system controls process and/or inspection changes. Discussions of document controls are contained in subsections 17C.1.3.5, 17C.1.4.5, 17C.1.9.5, and 17C.1.10.5. Manuals are controlled as discussed for the PWRSD in subsection 17C.1.6.1.

17C.1.7 CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

Each of the NES divisions maintains its own system for control of purchased items. In general, the items purchased by the manufacturing divisions are in the raw materials category; therefore, the controls used are of a different nature than those used by the PWRSD. However, the principles of evaluation, selection, auditing, and documentation of quality are applied by all the NES divisions.

NES furnishes for each component at the construction site a copy of the purchase order (including changes), the design specification, and a quality release. These documents certify component quality and satisfy regulatory requirements pertaining to site documentation.

The quality release is a NES certification document which provides for:

A. The specific identification of the procured material by purchase order number.

B. Certification that the equipment meets all requirements of the purchase order, drawings, and specifications. Identification of those procurement requirements which have not been met. Requirements which have been deferred; i.e., to be accomplished at the site, are clearly stated. Contingent conditions; i.e., conditions that are to be corrected by the supplier, are identified and correction is documented by a certification by the supplier. The supplier's certification describes the action taken, is signed by a responsible member of the supplier's organization, and is attached to the quality release. In addition, the quality release identifies the deviation notices which have dispositioned nonconformances to purchase order requirements.

C. The authorizing signature on a quality release is that of a NES quality assurance representative, or in specifically authorized situations, a member of the supplier's quality organization.

Each NES division has a documented procedure which describes the requirements for completing, authorizing, issuing, distributing, and revising quality releases. Periodically, the PWRSD audits site releases from all NES divisions. These audits are performed in accordance with a written checklist. Audit reports are distributed to cognizant management for correction.

17C.1.7.1 PWR Systems Division

Prior to considering a new supplier for placement of a purchase order, a supplier evaluation is conducted. This is done in accordance with a written checklist. The results are documented in a report issued to management personnel of Purchasing, Engineering, Quality Assurance, and Projects. The evaluation is conducted by a team consisting of personnel from Purchasing, Engineering, and Quality Assurance. Other personnel, such as material and process personnel and manufacturing engineers, participate as required.

Considerations of the evaluation include all elements of the NRC's quality assurance criteria to the extent these criteria are applicable to the equipment being procured. Deficiencies in the supplier's organization or systems are resolved with the supplier's management prior to placing a purchase order. If an existing supplier does not maintain the required quality level on PWRSD orders, a similar team will review the supplier's problems and make recommendations to his management to correct the situation immediately. When problems arise, Westinghouse specialists aid the supplier in specific areas, such as welding, manufacturing, and nondestructive testing, to resolve the problem. In this manner, Westinghouse assures the continued high level of supplier performance necessary to obtain the quality level required by the contract.

PWRSD surveillance of suppliers during fabrication, inspection, testing, and shipment of components is planned in advance and performed in accordance with written quality plans. These plans are prepared by QA engineers and are based on the technical requirements of the purchase order. The plans are reviewed and approved by Quality Assurance Department management.

The purpose of a quality plan is to provide planned guidance to the QA field representative by identifying those characteristics which are most important to quality and reliability; providing specific instructions for the witnessing, documentation, and acceptance of the equipment; and providing a summary of quality releases issued for the specific purchase order. The plan identifies those supplier documents requiring approval and the points during manufacturing and test that Quality Assurance intends to witness. Special emphasis is placed on the aspects of manufacture and inspection that most directly affect performance of the equipment. Lead units of a new design get particular attention in the supplier's shop by both Quality Assurance and Engineering Department representatives.

When planning the surveillance activities, Quality Assurance develops a visit schedule. Visits are more frequent during the initial stages of manufacture, particularly to a new supplier, with frequency diminishing as the supplier demonstrates his capability. The purpose of PWRSD surveillance of suppliers is to provide Westinghouse management first-hand objective assurance of compliance with specified requirements. The principle followed is that the supplier is responsible for inspecting and testing his product. The PWRSD field representative assures that the supplier has done this, rather than attempting to perform the supplier's inspection for him or duplicate the work he has done.

The frequency and scope of surveillance varies with the degree of importance of equipment, supplier performance, complexity of the component, and other factors. This determination is made by Quality Assurance in conjunction with Engineering. Quality Assurance residents are established as necessary.

Surveillance is accomplished in accordance with the quality plans described above. During the surveillance visits, the field representative sees that written instructions and procedures are kept current, that corrective action is implemented, and that other necessary controls are effective. The QA representative informs, in writing, the supplier directly of problems he discovers and obtains commitments to correct them. He brings these problems to the attention of the supplier's management as required to obtain resolution. PWRSD management is made aware of the surveillance activities, including supplier discrepancies and audit results, by means of the trip report issued by the QA representative for each visit to a vendor.

When the QA representative is satisfied that the equipment can be released for shipment, he prepares a quality release form, and distributes copies of the form to the supplier and cognizant personnel within the PWRSD. The equipment can then be released through normal engineering purchasing channels for shipment. The supplier forwards the quality release with the equipment to the plant site.

The PWRSD has no direct responsibility for receipt inspection of equipment at the site. The applicant or his designated representative establishes the site-receiving activities. The PWRSD provides recommendations to the applicant for handling and storage of equipment and the documentation as described in subsection 17C.1.7 to assure quality.

In some instances, the supplier is authorized by the PWRSD to prepare a supplier quality release. This authorization is given only to those suppliers who have, over a period of time, demonstrated an effective quality system. PWRSD QA personnel periodically audit the supplier's system to assure continued performance.

17C.1.7.2 Electro-Mechanical Division

Prior to the award of purchase orders, Quality Assurance performs a survey to evaluate and approve all procurement sources for purchased material or services covered by the quality assurance program.

Based upon the type of component to be manufactured, the vendor may be required to submit process outlines and procedures (covering nondestructive testing, manufacturing, and/or inspection) to EMD for information or approval prior to manufacture. Such submittals, when specified, are reviewed by cognizant engineering personnel to assure adequate material control and conformance to drawing, specification, and purchase order requirements. In addition, EMD maintains a comprehensive supplier surveillance program. Suppliers are visited on a scheduled basis and audit reports formulated, evaluated, and maintained on file for future

reference. On complex purchase items, a QA field representative may visit the supplier's facility to witness nondestructive or destructive testing or to perform verification of dimensional inspection. As required by applicable purchase orders, Quality Assurance releases material for shipment. The QA field representative, after acceptance, documents the results of source inspections and releases by means of the quality control field release report. This report, along with other specified supplier documentation, accompanies shipments of material to EMD receiving inspection.

Upon the receipt of supplier-furnished material, certified reports and related documents are reviewed and components inspected by the Receiving Inspection Section for compliance with the purchase order and related ordering data in accordance with instructions prepared and issued by Quality Assurance. After acceptance, the received material is forwarded to controlled stores or released directly to manufacturing. Nonconforming material is identified and held in quarantine until proper disposition is made.

17C.1.7.3 Tampa Division

Established controls assure that all purchased materials conform to purchase order requirements, including material and drawing specifications. It is the Tampa Division's policy to formally release to the Manufacturing Department all materials and parts that are to be used in NSSS equipment.

A Tampa Division team, consisting of two or more selected personnel, audits a new supplier's operation to determine acceptability as a supplier. For pressure-boundary or safety-related components, this supplier survey is conducted prior to procurement. The auditors are selected from the Quality Assurance, Metallurgy, Purchasing, Manufacturing, Planning, or Production Departments. The Quality Assurance Department conducts surveillance inspection and audits as necessary to assure acceptable quality products.

Source inspection is performed on all pressure-boundary material, plates, forgings, castings, and tubes. Prior to shipment, the Tampa quality representative will inspect, complete a source inspection form, and identify the material with the assigned test number and purchase order number.

A copy of the purchase order's applicable specifications, drawings, and prior source inspection data is furnished to the Receiving Inspection Section. Inspection of incoming material, not subject to source quality assurance but requiring in-house inspection, is accomplished by the Quality Assurance Department.

17C.1.7.4 Pensacola Division

Various techniques are used to monitor supplier performance. Prior to considering a supplier acceptable, a supplier evaluation is performed and results reported. After purchase order award, a quality history is maintained based on inspection results, and reevaluations are conducted as necessary. When necessary, a request is issued to the supplier by the Pensacola Division for corrective action to maintain product quality and to request a statement of the specific corrective action initiated by the supplier. Source inspection and surveillance ratings are used to determine supplier quality qualification.

Upon receipt of supplier-furnished material, the following quality assurance actions are initiated:

A. Verification that all certified test reports, letters of compliance, dimensional data, welding records, heat treat charts, etc., required by the purchase order have been supplied by the vendor and are complete and correct.

B. Inspection of the product or material to determine acceptability according to instructions issued by the cognizant quality engineer.

C. If the product is accepted and released by Quality Assurance, the material, component, or assembly is forwarded to a controlled storage area to await future use, or is released directly to Manufacturing Operations.

D. If the product is rejected, the defective product is held in a controlled area until proper evaluation and disposition is made.

17C.1.7.5 Specialty Metals Division

Subcontractors are limited to those which have demonstrated their capabilities. They are formally evaluated and selected on the basis of the capability of their quality system. Suppliers are classified in three categories for the purposes of quality acceptance because of the marked differences in the types of suppliers used by the Specialty Metals Division (SMD). Class I, Raw Material Suppliers, and Class II, Conversion Suppliers of SMD Material, are both surveyed by questionnaires to determine their acceptability. Then, all incoming lots from new vendors are checked chemically and by sampling techniques to verify supplier test reports and certifications. Class III, Conversion Suppliers Subcontracted Work, are surveyed to an audit format to assure that the supplier has procedures and processes that will meet the requirements of the intended purchase order. The Quality Assurance Department maintains records of the quality performance of each supplier. These records are maintained to rate suppliers as to their performance and to aid in developing and improving the suppliers' quality program.

When required, Quality Assurance Department personnel make surveillance visits of quality organizations of suppliers to assure continuous quality of purchased material and to assure that objective evidence of quality is maintained. Information obtained through these visits and through suppliers' audits provides data for determining the continuing acceptability of a supplier.

Suppliers are classified into categories for purposes of surveillance because of the marked difference in the type of vendors used by SMD. The first category applies to raw material suppliers whose products are evaluated by receipt inspection sampling techniques. The second category applies to new suppliers. All incoming lots from new suppliers are checked chemically for required elements and compared to suppliers' certifications. Any discrepancies are resolved by investigation; comparison of analysis techniques are used. When these have been resolved as evidenced by five lots received with no discrepancies, material is accepted on the sampling of subsequent lots. Suppliers performing more critical fabrication comprise the third category. These suppliers are subject to periodic surveillance by Quality Assurance Department personnel in addition to confirmation at receipt inspection.

17C.1.8 IDENTIFICATION AND CONTROL OF MATERIAL, PARTS, AND COMPONENTS

Within each of the NES divisions, procedures exist establishing measures which assure that identification and traceability of items are maintained during the production of components for delivery to the nuclear power plant site.

17C.1.8.1 PWR Systems Division

QCS-1 and the administrative specification contain requirements that a supplier have measures to maintain identification and control of material, parts, and components. The procedures used to establish these measures and the application of the procedures are reviewed for adequacy during supplier selection and monitored for compliance during the surveillance activities.

17C.1.8.2 Electro-Mechanical Division

To assure that unacceptable items are not used, identification in the form of a pre-assigned sequential serial number is placed on material at the supplier's plant or at EMD, depending on part-end use and processing. This identification remains with the material throughout subsequent manufacturing operations as a control number enabling tracing to the supplier's heat, slab or lot, and test data.

Serialization requirements are determined during the initial planning stages and fall into the following general categories:

A. Specification, contract, material, and equipment requirements.

B. Critical components.

C. Nondestructive test control.

D. Manufacturing control.

The minimum level of identification is shown on the detail subassembly or assembly drawing, including marking location and method, and takes into consideration that the location and method do not effect function or quality. This identification is also reflected in the manufacturing routing. Sequential serial numbers are issued by the Production Department and assurance against repetition is maintained through serialization log books. Serial numbers are pre-assigned to certain purchased items and included as part of the purchase order requirements.

Heat identity is maintained through all operations when required by contract, material, equipment, or code specifications. This identity is maintained by transfer of the heat number from operation to operation and/or by appropriate documentation through the use of sequential serial numbering and serial number log books.

17C.1.8.3 Tampa Division

A test number system is used as positive and permanent identification of materials and items purchased. The number identifies the supplier's heat number, slab or lot number, and the physical and chemical property records. In instances of multi-piece orders, subnumbers are utilized in the event a common melt was used for all items. One major exception is the tube bundle material. In this application, the heat number is used and recorded for each specified tube location in the bundle from definite orientation reference points.

The test numbers consist of a letter and a five-digit number assigned and affixed or stamped on each piece of material, component, assembly, or set of materials and parts which are for use in the manufactured product. The test number is also recorded as a permanent record in the inspection point program.

Nonconforming material and components are properly identified until corrective action has been taken. Materials that require additional tests are tagged and held until tests have been accomplished and results evaluated.

17C.1.8.4 Pensacola Division

Control identification is maintained of all materials and products to insure traceability to heat number. Major components and/or assemblies are normally serialized. All components rejected in-house have a permanent serial number assigned and marked on them. Material supplied to the Pensacola Division for product use is identified in a manner traceable to the original heat identity and/or purchase order as applicable. This identity is maintained when material is placed in the storage area prior to assignment for specific product fabrication.

Prior to the issuance of any material or component to fabrication, verification is made that the item issued satisfies the related drawing requirement. Routing information specifies material identity and the type of identification required on the components to be fabricated.

17C.1.8.5 Specialty Metals Division

Permanent identification and marking methods are used for control of materials throughout the manufacturing area. An identifying number is applied or attached to the material as it enters the plant by the receiving inspector. This number is modified as the material is processed; however, the basic number is used for identification in both processing and storing of the material. When a shipment is received, the receiving checker identifies the material and notifies the receiving inspector. After inspection, the receiving report is stamped according to the determined disposition (accept, reject, repair). Traceability to heat number is maintained.

17C.1.9 CONTROL OF SPECIAL PROCESSES

All NES divisions have established measures and procedures which maintain control over special processes. These include the qualification of processes and personnel for welding and inspection in accordance with ASME requirements, nondestructive inspection in accordance with SNT-TC-1A (1980) standards, and other processes as may be necessary for adequate control.

Recognizing the importance that valve bodies and other cast components may have to nuclear safety, the PWRSD as the lead division employs the following program to demonstrate that these items meet design requirements.

For valves, the PWRSD has included in its procurement requirements by an addendum to QCS-1 the following actions to be performed by the valve manufacturer.

A recorded dimensional survey shall be made by the seller of both the body and bonnet as follows:

A. The first piece of each style as patterned in the "as-cast" or "wrought" condition to ensure that final valve assembly tolerances can be achieved.

B. The first piece, every multiple of 10, and the last piece of the finished machined body and bonnet shall be inspected for wall thickness at the location of the minimum wall by design. Three wall thickness readings shall be recorded on the dimensional survey. In addition, the weld preparation configuration and the maximum envelope dimension in the x, y, and z plane shall be inspected and recorded as a checkmark on the dimensional survey provided they are within the design tolerances.

These requirements are applicable to valves larger than 2-inch nominal pipe size.

The intent of this requirement is not to provide an inspection survey on each valve, but to impose process controls during manufacturing to ensure that the process starts out in control and is sampled to verify that continued control is maintained. The dimensional surveys give documented evidence that the controls are operative, and additional requirements are implemented where required to meet expended applicant commitment.

For other cast components, such as pump casings, piping, fittings, etc., similar controls as noted above are contained in purchase orders, equipment specifications, or drawings. The degree of these controls depends on the component type, configuration, and application. The various controls include, as appropriate, checks of thickness as a part of receiving inspection, checks after machining, hydrostatic "proof" tests, and checks during final inspection. Surveillance representatives perform system and process audits of vendors to ensure continued control of the various cast components. These quality control and assurance techniques are designed to demonstrate that the components meet design requirements.

Other special processes, such as welding, nondestructive testing, electrochemical machining explosive forming, cleaning, and painting, are prescribed by means of documented procedures. For example, paint applications are detailed in documents known as process specifications. These specifications, similar to the equipment specifications discussed in subsection 17C.1.3, are process-oriented and contain requirements such as scope of paint application, selection of paint, surface preparation and condition, method of application, curving, repair of coating, methods of removal, etc. Quality provisions provide for monitoring the process, criteria for visual examination, and checks of paint characteristics such as adhesion, flexibility, and thickness.

17C.1.9.1 PWR Systems Division

QCS-1 and the administrative specification contain requirements that a supplier have measures for control of special processes. The procedures used to implement these measures and the application of the procedures are reviewed for adequacy and monitored for compliance during

the surveillance activities. In addition, equipment specifications or purchase orders identify certain processes or personnel qualifications which require PWRSD review and/or approval. Special process procedures and personnel qualifications are maintained under the document control and records retention systems.

PWRSD personnel are qualified in accordance with a nondestructive testing certification program which conforms to SNT-TC-1A (1980).

Supplier procedures for special processes must be approved by PWRSD. The QA surveillance representative monitors the supplier's activities to ensure that all special processes are performed by properly qualified personnel using approved procedures.

17C.1.9.2 Electro-Mechanical Division

Recognizing the need to control special processes, the EMD has established departmental responsibilities for developing, reviewing, implementing, and controlling special processes, including the requirements for associated personnel qualifications. Special processes, including welding, heat treatment, and nondestructive testing procedures, are reviewed by Quality Assurance to assure compliance to applicable codes, standards, specifications, and criteria.

Welder procedure qualification is conducted in accordance with the ASME Boiler and Pressure Vessel Code Section IX. In addition, the welding process includes a program of weld electrode control. Manufacturing penetrant operators (Level I) and quality control nondestructive test inspectors (Level II) are qualified to SNT-TC-1A (1980)standards. Heat treatment processes are controlled through EMD's calibration program. Special process procedures and credentials of qualified personnel are maintained under document control and records keeping systems.

17C.1.9.3 Tampa Division

Definite departmental responsibilities are established to identify the need for documentation and review of special process procedures, as well as any associated personnel qualifications. The Metallurgical Department writes all welding and associated procedures, including preheat and heat treatment. The Quality Assurance Department writes all nondestructive test specifications, such as radiography, ultrasonics, magnetic particle, and liquid penetrant. These process specifications are in accordance with ASME Sections III and IX. Each process specifically defines the personnel qualification required by the applicable code. Welding qualification procedures and the required documentation are in accordance with the applicable code requirement. All process documents are subject to the controls and reviews noted in subsection 17C.1.6.

Lists of qualified welders and nondestructive personnel are issued to departmental supervisors and the quality assurance technicians; welding records and nondestructive reports indicate the individual that performed the welding and the technician that performed the nondestructive test. Credentials of qualified personnel are maintained under the records program described in subsection 17.1.17.3.

17C.1.9.4 Pensacola Division

The Quality Assurance Department, in conjunction with the Manufacturing Engineering Department, identifies, defines, and establishes special processes and process controls. Advanced quality planning includes identification of the need for qualification programs for special processes, equipment, and personnel. Prior to issuing manufacturing information for the processing of the product, all such documents are to be forwarded to the Quality Assurance Department for review. This information includes all drawings, specifications, routings, and other documents directly involved in processing the products.

Review of these documents by the Quality Assurance Department consists of verification that special tooling, fixturing, or gauging used to determine product quality is indicated at the correct operation/sequence, and verification that special testing together with acceptance criteria is in compliance with ordering information.

Upon completion of this review and determination that the required information is complete, correct, and adequate, the Quality Assurance Department completes the document by adding inspection operations to the routing at the applicable phase in processing, inspection methods and procedures, inspection forms to be completed, and sampling plans to be applied if applicable. Special emphasis is focused on control of heat treating and welding processes. Qualification of personnel, conformance of process to applicable requirements, and records of process data are constantly evaluated. Special process procedures and qualification records of personnel are maintained under document control and records retention programs.

17C.1.9.5 Specialty Metals Division

Responsibilities have been established to assure that special processes, such as heat treatment, pickling, cleaning, etc., are specified and defined in manufacturing specifications. Procedure responsibilities, controls, and qualifications, as necessary, are outlined in the documents. Inspectors are used by the Quality Control Department for maintaining a uniform quality level, controlling manufacturing processes, and for overall product quality assurance. Several techniques of nondestructive testing are used by the Quality Control Department and are required by process and quality specifications. These are ultrasonic inspection, fluorescent magnetic particle, and liquid penetrant. Special process specifications and credentials of personnel qualifications are maintained under document control and records retention programs.

17C.1.10 INSPECTION

Each NES division, in order to ensure that attributes affecting quality are controlled, has established measures by which inspections are performed. As noted earlier, adequate independence exists between inspection groups and manufacturing functions to allow effective, overall controlled conditions.

Physical examinations, measurements, and tests are conducted as appropriate to demonstrate product quality. Various job positions within the quality organizations are detailed by written position descriptions to assure that qualified personnel, with specialized training as necessary, are utilized in the inspection and quality assurance function.

17C.1.10.1 PWR Systems Division

Since the PWRSD does not manufacture anything directly, emphasis is placed on supplier surveillance. The principle followed is that the supplier is responsible for inspecting his product and PWR QA personnel verify his controls to assure the adequacy of inspection. As such, inspection as PWR is more appropriately described as supplier surveillance. Details of the PWR surveillance program are contained in the description of Control of Purchased Material, Equipment, and Services, subsection 17C.1.7.

17C.1.10.2 Electro-Mechanical Division

The quality program provides for assurance that all fabrication, welding, machining, and other operations are performed under controlled conditions. Features include verification of documented work instructions (routings), preparation of procedures for monitoring product quality (inspection point program), and the physical examination and testing at significant points during the manufacturing cycle. Criteria for approval or rejection is established by Quality Assurance in accordance with engineering drawings and specifications.

In-process, final inspection, and test operations are incorporated into manufacturing routings, which are approved and signed by Quality Assurance Engineering in accordance with internal requirements. The need for special inspection tools, fixtures, and gages; inclusion of all inspections; and adequacy and completeness of the routing information are considered by Quality Assurance Engineering during their review.

Before an in-process or final inspection operation is performed, reference is made to appropriate document control lists to assure the use of proper revisions of drawings, specifications, and procedures. Measuring and testing equipment is checked before use to assure proper inspection and calibration status by making reference to the calibration sticker. After a manufacturing sequence is inspected and prior to proceeding to the next operation, the acceptance of the operation is recorded by Inspection on the inspection control card. Each

inspector verifies that all prior operations are listed and signed off on the card. Upon performing all inspection operations as required by the manufacturing routing or other approved internal instruction, Inspection is responsible for documenting the inspection utilizing inspection forms, checklists, suitable log book, etc. Prior to functional testing or to shipment of completed parts or components, suitable releases are obtained, as required, from the Quality Assurance Department records center.

Nonconforming conditions noted during inspections are documented and processed in accordance with documented procedures. Sampling inspection by attributes and/or variables is used. Normally, appropriate government sampling references are used; however, sampling plans may be developed from recognized texts and techniques to suit EMD needs. The sampling and quality levels are based on the function of the component and/or characteristics. Records of sampling inspection are maintained on appropriate documentation and filed in the Quality Assurance Department records center or in the receiving inspection area per internal instructions.

17C.1.10.3 Tampa Division

To provide process and product verification, a detailed inspection point program is generated for each manufactured unit. The inspection point program parallels the manufacturing operation sequence prepared by the Industrial Engineering Section and approved by the Quality Assurance Department. The quality assurance engineer reviews the operational lineup for compliance with ASME Code Section III, drawings, and applicable Westinghouse specifications. The pertinent inspection points are inserted by the quality assurance engineer. These points specify the type of inspection, applicable nondestructive tests, data to be recorded, and charts or forms to be completed for documentation of inspection operations. As discussed in subsection 17C.1.3.3, the need for special inspection tools, fixtures, and gages is determined during Quality Assurance Engineering reviews prior to the release of drawings for manufacture or purchase.

The applicable inspection point program is distributed to the quality assurance technician in the applicable manufacturing area for the specific component. The QA technician initials or stamps the inspection points upon completion of inspection, signifying acceptance. All operations within a manufacturing section are detailed and accepted on the inspection checklist. Quality assurance technicians verify the completeness of the checklist to assure that all operations are complete within the section. Any deviation from the specified routing between manufacturing groups requires documentation and Quality Assurance concurrence. The program and its applicable data forms, charts, and logs become a permanent Quality Control Department record to provide objective evidence of the inspection operations.

Inspection point programs are audited by Quality Assurance personnel, customer representatives, and the authorized code inspector. Specific mandatory notification points

which require witnessing or inspection by the customer representative are established and are so designated in appropriate documents.

17C.1.10.4 Pensacola Division

The Quality Assurance Department maintains inspection planning to obtain assurance of the following:

A. Inspection instructions are clear, concise, and adequately definitive.

B. Inspection operations are referenced and applied at the most effective points in the process to monitor product quality.

C. Relatively complex inspection procedures are reviewed with inspection supervisors for concurrence with the information reflected.

D. Inspection methods requiring training of personnel are issued prior to production and a training program is initiated on a timely basis so that personnel involved will be qualified for production inspection processing.

E. Special tooling, fixturing, and gaging equipment required for product quality evaluation are designed, built, evaluated, and released for inspection use.

F. All documentation formats which will report inspection results are prepared and issued.

Required inspections and tests are displayed by the shop routing and inspection instructions referenced. Within the Pensacola Division, the movement of hardware from cost center to cost center is controlled by means of a document known as the "routing." This document is a brief description of the fabrication sequence, including inspection operations distributed throughout the manufacturing cycles at those points which will verify the quality of the product. It is related to a particular engineering release to manufacturing. Each operation must be signed off prior to proceeding to the next operation. Documentation is evaluated by Quality Assurance to assure that all operations, inspections, and tests have been performed and are acceptable. Objective evidence of the inspection performed is documented on nondestructive testing reports and detailed dimensional inspection reports. After manufacture and inspection, the components/assembly must be released by Quality Assurance before utilization on the next assembly. Major components are evaluated by Quality Assurance to assure that all inspection tests have been performed and are acceptable.

17C.1.10.5 Specialty Metals Division

The primary function of the Quality Control Group is to provide assurance that processing capability requirements are being met. This includes the observation and evaluation of operator's adherence to manufacturing instructions, written procedures, and other control documents. In process Inspection inspects the product at designated stages of manufacture, including first-piece and patrol where appropriate, to assure compliance with the intermediate and final product specifications.

Procedures for inspection points are preplanned and are prepared by the quality assurance engineer in the form of quality specification cards or they are incorporated as part of manufacturing instructions. The need for special inspection tools, fixtures, and gages is considered by both Quality Assurance and Manufacturing Engineering during the development and review of these instructions. These specifications indicate that the inspection be performed during the process so that it can be determined that the product has met specifications. These are reviewed prior to issue by Manufacturing Engineering. If the inspections indicated are acceptable, the material is released by inspection and may continue on to the next process or operation. Results of inspections are posted on the designated quality form by the inspector. He also applies his numbered stamp opposite the inspection step on the manufacturing or process specification follow card.

17C.1.11 TEST CONTROL

Means are established at each of the NES divisions to control testing. These measures provide for the development of procedures, a means of assessing adequacy of the tested items, and designation of the responsibility for performing the various phases of the testing activities.

17C.1.11.1 PWR Systems Division

QCS-1 details that tests required by a contract be described by clear and current written procedures which assure that tests are performed as specified. The criteria for acceptance or rejection shall be included. The procedures for meeting the above are a part of the supplier quality plan submitted to the PWRSD for approval. The administrative specification contains similar requirements. These two documents also require that the supplier maintain records showing the results of the tests. These records are reviewed for acceptability by the PWRSD. Tests are conducted by groups within the supplier organization considered acceptable during supplier selection; they are monitored during PWRSD surveillance.

The Quality Assurance Department also participates in the PWRSD development test program for critical new equipment designs. Test plans and specifications are drawn to clearly define the number of units to be tested, the conditions under which tests should be conducted, and the types of data to be collected and analyzed. Development tests are designed through the use of

statistical theory and engineering judgment to obtain the optimum relevant information to assure that performance, life, and cost requirements are met. Quality Assurance reviews the test plans, monitors the setup and conduct of the test, and reviews the test reports. Assistance is also provided from independent laboratories and testing agencies in following test programs.

17C.1.11.2 Electro-Mechanical Division

In order to assure that desired product quality is maintained by clear and complete instructions of a type appropriate to the circumstances, Test Engineering prepares and maintains test work instructions and monitors their application. These instructions are contained in routings, drawings, and test specifications with the support of auxiliary test procedures.

Initial application of new test instructions is jointly performed by Test Engineering and the tester to ensure their feasibility and adequacy. Test results are validated by Test Engineering and the tester and evaluated by cognizant engineering personnel.

17C.1.11.3 Tampa Division

The quality assurance program provides for assurance that tests are performed under controlled conditions. Features include verification of documented work instructions, preparation of procedures for monitoring product quality, and testing at significant points during the manufacture cycle. Criteria for acceptance or rejection is established by Quality Assurance in accordance with engineering drawings and specifications.

17C.1.11.4 Pensacola Division

Quality Assurance prepares detailed procedures to implement required nondestructive techniques. The methods and techniques used, as a minimum, meet the requirements of the ASME Boiler and Pressure Vessel Code. All nondestructive tests are performed per drawing requirements, and substitute methods are utilized to substantiate questionable data. Nondestructive test (NDT) personnel are qualified to applicable standards, and a current qualification status is maintained for all NDT technicians.

17C.1.11.5 Specialty Metals Division

The SMD performs chemical, physical, and metallographic tests to assure that its products conform to required specifications.

Testing is performed in accordance with written procedures. The details of testing are recorded in log books in the individual labs and results are formally reported to the Quality Assurance office where they become part of the order and heat data system.

17C.1.12 CONTROL OF MEASURING AND TEST EQUIPMENT

The NES divisions maintain a separate means of controlling measuring and test equipment. Each division has developed and maintains a separate basis for its own program, considering such attributes as inherent stability of their equipment, purpose or use, desired accuracy, and degree of usage. All measuring and test equipment used for the acceptance and verification of product quality are maintained under control systems. Such specifications as Mil-C-45662 and handbook Mil-MDBK-52 serve as a basis and provide guidance in the determination of an effective program for the control of test and measuring equipment. Typical of this equipment are micrometers, plug gages, height gages, dial verniers, voltmeters, temperature recorders, pressure gages, hardness testers, etc. Documented procedures detail the requirements for the calibration of measuring and test equipment and the use of appropriately traceable measurement standards.

17C.1.12.1 PWR Systems Division

The requirement for a supplier to maintain a system for calibration of all examination, measuring, and test equipment is contained in the administrative specification and in QCS-1. All calibration must be traceable to national standards. PWRSD verifies the acceptability of the system during the supplier selection and monitors for compliance during the surveillance activities.

17C.1.12.2 Electro-Mechanical Division

The EMD, under the direction of the Quality Assurance Department, maintains an extensive tool and gage control program utilizing electronic data processing. All tools and gages used in the manufacture and inspection of completed products are inspected and calibrated in accordance with established procedures. Control of the use of measuring and test equipment is maintained by the tool crib approach where equipment is logged out to individuals or assigned to specific areas. The program requires that any equipment which becomes damaged or out of calibration be forwarded for repair or recalibration as required. Under this program, precision tools and gages are inspected and calibrated at specified intervals based on their stability, purpose, and degree of usage. All tool and gage inspection and calibration is performed in a controlled environment. Calibration stickers are affixed to all equipment, excluding personal tools which have been found acceptable under the program. Personal tools are identified by name with the calibration status maintained by the gage inspector. Reference

standards used are certified and traceable to the National Institute of Standards and Technology.

17C.1.12.3 Tampa Division

Formalized procedures defining calibration frequency and maintenance of gages and test equipment used for inspections are in effect and implemented by the Quality Assurance Department. Quality control tools and gages are identified by quality control serial numbers which are color coded to indicate calibration status, and are controlled by a tool crib card index system. Established calibration schedules for each type of tool or gage used for inspection purposes are implemented. Frequency of calibration is based on engineering judgment and verified by Quality Assurance review of calibration records. Damaged or inaccurate measuring and test equipment is removed from the cycle until repaired, recalibrated, or replaced. Master measuring standards are maintained and calibrated on a frequency cycle by a qualified laboratory with standards traceable to the National Institute of Standards and Technology.

Electrical test equipment such as magnetic particle equipment is on a scheduled calibration cycle. The Works Engineering Department is responsible for maintenance and calibration. This effort is audited by the Quality Assurance Department.

Pressure test gages used for hydrostatic and gas leak tests are checked and calibrated on a frequency schedule; deadweight test equipment is used to verify calibration. The procedures are designed to assure accuracies within established standards and include disposition and/or corrective measures when discrepancies are noted.

17C.1.12.4 Pensacola Division

All decisions on the acceptance of any product or quality characteristic are made by utilizing inspection and test equipment under calibration by the Quality Assurance Department; this calibration is traceable to the National Institute of Standards and Technology. Each gage is identified with a unique identifying serial number. For each individual gage, there is a gage inspection record card used to record the results of periodic inspections.

Calibration frequencies are initially established by an engineered estimate of the total useful life of the gage and the frequency of recalibration at one-fifth of this estimated time.

Calibration frequencies are adjusted based on an evaluation comparison of the gage usage versus the wear recorded on the gage inspection record card. Any gage which passes through three calibration cycles without being used is placed in an inactive status until needed at future time.

All gaging and testing equipment is tagged with a sticky label which identifies the date calibrated, the date of next calibration, and an identifying stamp of the gage inspector who performed the calibration. Calibration control is maintained by advancing the gage calibration record card in a pigeonhole filing system where each pigeonhole represents one workweek within the 52 workweek year. Gage record cards which appear in the current workweek slot are calibrated within the current workweek.

The area supervisor, whether manufacturing or inspection, has the responsibility to promptly report any gage in his area known to be functioning improperly. Defective equipment is red tagged and scheduled for repair or replacement.

17C.1.12.5 Specialty Metals Division

Measuring instruments, gages, fixtures, standards, masters, and any item needed to facilitate precise measurement are under the jurisdiction of the Quality Assurance Department. Quality Assurance is responsible for the control of gaging equipment used by Quality Control and Manufacturing personnel. Quality Assurance Engineering checks and maintains all gages and fixtures assigned to Quality Control for use in accepting products. The gage calibration lab is under the supervision of Quality Assurance and has written procedures for the periodic recall, inspection, and calibration of gages. When calibration is complete, proper notation is made on each gage or instrument in addition to recording calibration results on the tool inspection master card. To assure continued accuracy, a safety check is made when a gage is dropped, mishandled, or the calibration status is questionable. Calibration frequencies established by Quality Assurance and based on experience are verified periodically by a review of the tool inspection master card.

17C.1.13 HANDLING, STORAGE, AND SHIPPING

Measures to establish control over handling, storage, and shipping are in documented procedures in use at each of the NES divisions.

17C.1.13.1 PWR Systems Division

Since the PWRSD does not manufacture equipment, emphasis is placed on controlling the supplier's handling, storage, and shipping activities. QCS-1 and the administrative specification specify that a supplier's quality program require the use of handling procedures and handling equipment inspection procedures to prevent damage to a product. The vendor must have adequate written work and inspection instructions for storage, preservation, packaging, and shipping to protect the products from damage, loss, deterioration, or substitution. As required by the equipment specification, these procedures may be subject to approval by the PWRSD.

A supplier's procedures and systems for handling, storage, and shipping are evaluated during source selection and monitored for compliance during PWRSD quality assurance surveillance.

17C.1.13.2 Electro-Mechanical Division

The EMD has established procedures defining a system of inspection and usage control for all lifting fixtures and devices used in the factory in accordance with existing specifications and applicable industrial safety standards. In addition, a review committee has the responsibility to review lifting and handling fixtures and equipment and to arrange for marking their identification and limits. The review committee also has the responsibility to determine necessary corrective action when noncompliance to a required standard is found.

In process movement and storage of material, components, subassemblies, and assemblies is defined by manufacturing procedures that provide the instructions necessary to maintain identity and protect finished attributes and surfaces from damage.

Packaging and shipping requirements required by contract are reviewed and appropriate manufacturing routing prepared. Specific packaging instructions are referenced within manufacturing routing; they include pertinent inspections to assure that preservation, packaging, and packing is accomplished to protect the products and/or supplies from damage, loss, deterioration, degradation, or substitution.

17C.1.13.3 Tampa Division

Established procedures and training is provided for materials-handling personnel. A procedure book on safe practices in rigging and crane operation, including sketches and handling methods for all major production lifts, is supplied to the riggers and crane operators. The guidelines set forth in the procedure book are established by the Tampa Division Lifting Committee and includes requirements for inspection of chain slings, wire rope slings, shackles, eye bolts, plate clamps, and hoisting ropes. In addition to visual examination, all hooks are periodically nondestructively tested.

Protective covers are used on nozzles after final machining to protect weld preparations, preserve cleanliness, and minimize damage.

Design Engineering generates shipping drawings that detail arrangements for barge or car shipments, cradles to be used, and size and number of tiedown straps and rods. In conjunction with the drawing, a formal engineering procedure is issued that specifies strap and tiedown locations, welding to be performed, special reinforcement, etc., plus liquid envelope protection application instructions.

17C.1.13.4 Pensacola Division

Handling, storing, and shipping methods are defined by written procedures. Quality Assurance reviews all procedures, makes recommendations for improvements, and audits the procedures for compliance. Special frames, jigs, and containers are used for in process handling and storage to protect the dimensional and finished attributes of component parts.

17C.1.13.5 Specialty Metals Division

Facilities are available and procedures are written for crating, packaging, preserving, and identifying products for overseas and domestic shipments in accordance with various commercial and federal specifications.

The material is handled and stored according to procedures which describe the manner of storage, protection of finishes, and control of limited life supplies. Quality Assurance conducts periodic audits of storage areas to assure conformance to applicable storage procedures and requirements.

17C.1.14 INSPECTION, TEST, AND OPERATING STATUS

Each of the NES divisions has established procedures to indicate the inspection, test, and operating status of materials, parts, and components. The purpose of these procedures is to preclude inadvertent bypassing of inspection and tests.

17C.1.14.1 PWR Systems Division

QCS-1 and the administrative specification contain requirements that a supplier have measures to indicate an inspection, test, and operating status of an item. The procedures used to establish these measures and the application of the procedures are reviewed for adequacy during supplier selection and monitored for compliance during the surveillance activities.

17C.1.14.2 Electro-Mechanical Division

The positive identification of inspection status for each product is accomplished by the inspection control card (ICC) which travels with the product from one manufacturing section to the next. The quality control inspection stamps on the ICC indicate acceptance of the product at specific checkpoints. The inspection stamp system maintains control of each stamp symbol and the individual to whom it is issued.

17C.1.14.3 Tampa Division

Procedures are used to maintain identity of all material and manufactured components, beginning with receipt inspection and through final shipment of the product. Material is identified by use of a Tampa test number as described in subsection 17C.1.8. Test numbers are not changed when material is transferred to another order. These numbers are recorded in the applicable inspection point program. The required test reports can be identified by the master test number log.

The inspection point program readily identifies the completed manufacturing operations as well as the completed inspection and/or nondestructive tests. Also, the Production Planning Department keeps an up-to-date status report on each component for all orders.

Nonconforming material is identified by use of tags as described in the error appraisal notice procedure (subsection 17C.1.15).

The inspection documents identify the technician that performed the inspection or test; the individuals qualifications are in accordance with SNT-TC-1A (1980) as required by Section III of the ASME Code.

17C.1.14.4 Pensacola Division

All manufactured material is identified by a route sheet throughout the manufacturing operation. The route sheet is stamped at all inspection, NDT, and manufacturing steps. If an item is discrepant, the number of the rejection document is entered on the route sheet; therefore, the status of each item is always available. Control and use of stamp issuance is maintained by the Quality Assurance Department.

17C.1.14.5 Specialty Metals Division

A formal record system is followed to identify the stage of manufacture of a product at the SMD. Manufacturing instructions indicate inspection and test points in the sequence of operations and require formal release to proceed. An identifying number is applied to the material as it enters the plant by the receiving inspector. This number is modified as the material is processed; however, the basic number is used for identification. Process follow cards readily identify the status of the manufacturing operations as well as inspection and test status. Because of the nature of the operations, these cards are frequently damaged or obliterated; therefore, the cards do not represent the official status of materials. Verification of the status indicated can be made from records maintained by Production Control, from manufacturing reports, and from Quality Control releases.

Nonconforming materials are identified and held for disposition. Actions become part of the records and data system.

17C.1.15 NONCONFORMING MATERIAL, PARTS, OR COMPONENTS

Each NES division has documented procedures to control nonconforming material, parts, and components which prevent their inadvertent use and provide for their identification, segregation, and disposition. Normally, each NES division makes disposition of these nonconforming material reports which vary from specifications and standards established within the division. Nonconformances of PWRSD equipment specification requirements are controlled by the PWRSD. All approved nonconformance reports are identified on the final quality release. In addition, nonconformances which affect site installation, test, maintenance, or operation are submitted to the applicant. Additionally, Westinghouse will notify the applicant of each significant deficiency found in the process of design, manufacture, fabrication, installation, construction, and testing and inspection, which:

A. If left uncorrected, could adversely affect the safety of operations of the nuclear power plant at any time throughout the expected lifetime of the plant.

B. Represents either,

1. A significant breakdown in any portion of the quality assurance program. Deficiencies found during the normal operation of the quality assurance program, such as inspection, test, audits, design reviews, etc., are not considered as indication of a breakdown.

2. A significant deficiency in final designs approved and released for construction.

3. A significant deficiency in the construction of or significant damage to a structure, system, or component requiring corrective action involving extensive effort.

4. A significant deviation from performance specifications requiring corrective action involving extensive effort.

Notification by Westinghouse will be as defined in 10 CFR 50, 55(e).

17C.1.15.1 PWR Systems Division

17C.1.15.1.1 Deficiencies at Suppliers' Plants

QCS-1 and the administrative specification described above contain specific contractual requirements for controlling nonconforming material or workmanship.

Suppliers are required to provide a system for the identification, documentation, and evaluation of discrepancies, and for alerting the supplier cognizant management to the need for corrective action. A Westinghouse deviation form is initiated at the supplier's and completed per instructions on the back of the form. Upon receipt at the PWRSD, the deviation is processed in accordance with documented instructions to assure proper review and disposition by Design Engineering and Quality Assurance, with concurrence of Materials and/or System Engineering as appropriate. Possible dispositions are accept, repair, scrap, and hold and resubmit.

When repair is indicated, acceptance of the repaired item upon completion of the repair is noted by a QA signature on the deviation form. A permanent file of the deviation records is maintained by the PWRSD.

17C.1.15.1.2 Deficiencies at the Construction Site

A written procedure provides for documented reporting of deficiencies on NSSS equipment found during plant construction by Westinghouse personnel. These reports are submitted by Westinghouse site engineering personnel to the cognizant engineering department. Like reports from suppliers' plants, these reports are reviewed for necessary action, formally approved by the cognizant engineer, and permanently filed. Summary reports are developed to alert appropriate levels of management of the deficiencies found and the actions taken.

17C.1.15.2 Electro-Mechanical Division

Nonconforming material is identified and held in quarantine until disposition is received. All deviations are reviewed and disposition is made by engineering personnel. The nonconforming material control and evaluation program provides for review and evaluation of cause and corrective action to prevent recurrence.

Data concerning nonconforming material is categorized to type of deviation and component. Appropriate reports are formulated under the program for evaluation and management action toward reduction in costly defectives and toward quality improvement.

The EMD utilizes a multicopy material review report (MRR) with nonrepetitive sequential numbers. These numbers are applied to nonconforming components, subassemblies, or assemblies depending on marking restrictions. In addition, the EMD utilizes electronic data processing to summarize material review reports by order, part, serial, or lot number. This summary provides convenient quality history trace back.

The MRR system provides:

A. Identification of nonconforming materials and their status.

B. Segregation of nonconforming materials from production material by physical means where possible or by positive identification where not possible by physical means.

C. Formal disposition of the nonconforming materials from Engineering and Quality Assurance Departments.

D. Verification of rework or repair to correct the nonconforming material by inspection personnel in the form of a stamp or authorized signature on appropriate documentation.

E. Correction of the causes of nonconforming materials to prevent recurrence during all phases of procurement and fabrication.

17C.1.15.3 Tampa Division

Materials, parts, or components which do not meet design drawings or specifications, process specifications, or quality standards are considered defective material. All deviations are documented by the error appraisal notice (EAN) system. An EAN is issued upon discovery of nonconforming or defective work produced by any department, and a caution tag is attached to the material signifying a discrepant condition. Upon issuance of an EAN by the quality assurance technician, the quality assurance engineer verifies the technician's findings. The quality assurance or manufacturing engineer recommends corrective repair when applicable. The EAN is then transmitted to Metallurgical Engineering for all discrepancies that involve welding and related functions, such as heat treatment, preheat, etc., and/or Design Engineering for all other conditions. Design or Metallurgical Engineering agrees with the recommended repair or issues further instructions. The answered EAN is returned to Quality Assurance who then initiates an attachment that details the manufacturing operations and inspections required to conform to the specified engineering instructions. The EAN with attachment is distributed to Manufacturing, Production, Quality Assurance, and other departments involved. Upon completion of the repair, the EAN attachment is signed off by the area supervisor and the quality assurance technician and is added to the inspection records for that particular component or part; the caution tag is removed from the piece by the QA technician.

The system provides identification of discrepant material, a formal notification to individuals involved, and the formal signature signifying repair and acceptance of the material. In the event that material or parts are not repairable and are to be scrapped, the piece is removed from the manufacturing area to prevent inadvertent use.

17C.1.15.4 Pensacola Division

The Pensacola Division maintains systematic control of the identification, segregation, and disposition of all nonconforming materials, components, subassemblies, and equipment. A specific form is assigned for each type of rejection that could occur in the processing of all material and the subsequently fabricated product. These forms provide for the specific delineation of existing conditions resulting in a "reject" disposition.

The issuance, processing, and dispositioning of this documentation is under the control of the Quality Assurance Department. When the determination is made that a discrepancy exists, the material or product involved is immediately tagged and segregated, if feasible, until disposition is made on the governing document.

Disposition of nonconforming material is defined by formal procedures. All dispositions must be approved by the pertinent quality engineer before any rework, repair, scrap, or vendor return action is taken. All dispositions are formally documented; files are kept for future reference and management evaluation.

The Inspection Department is responsible for performing the routed inspection operations and tests, signing off the rework/repair routing, and repairing required nondestructive reports and detailed dimensional reports.

17C.1.15.5 Specialty Metals Division

A formal procedure is used in identifying and controlling all defective material detected at receiving, in any stage of processing, or at final inspection. It is the responsibility of the Quality Control Department to identify any production material that varies from contract, drawings, specifications, procedures, process, or quality standards. Quality Control then informs the proper personnel, determines or obtains disposition, approves and signs off the corrections or modifications, maintains records of the occurrence, and assures that fundamental corrective action is taken.

Deviations from product or process contractual requirements are reported to the NFD or Tampa in accordance with their instructions for their disposition.

17C.1.16 CORRECTIVE ACTION

Each NES division has a corrective action program which has a means for determining the need for corrective action, documenting the need and the action taken, and reporting the need and action taken to appropriate levels of management.

17C.1.16.1 PWR Systems Division

QCS-1 requires that the supplier's quality system provides for the identification and evaluation of significant or recurring discrepancies and for alerting supplier's cognizant management of the need for corrective action. The supplier must review corrective action for effectiveness and the need for further action. The supplier's corrective action program is reviewed for adequacy during supplier selection and monitored for compliance during the surveillance activities.

Through a computerized coding system, Quality Assurance receives deficiency data on Westinghouse-supplied equipment from suppliers and construction sites to determine patterns of occurrence by supplier, by component, or by process. With this as a guide, Quality Assurance and cognizant engineers determine corrective actions needed to prevent recurrence. This action is in addition to assuring that the supplier or site personnel take corrective action on the individual deficiencies reported. Through periodic reports, management is informed of the need for action and the action taken. Several of the reports are trip reports, field discrepancies report summaries, and audit reports.

17C.1.16.2 Electro-Mechanical Division

The EMD's quality program provides, through a computer system, for the early detection of nonconforming material, summarization of recurring or significant quality problems, analysis of trends, and diagnosis of causes. Appropriate levels of management are notified of significant failures, malfunctions, and nonconformances. The corrective action program covers vendor quality performance, in-plant operations, and field installation problems.

17C.1.16.3 Tampa Division

The quality assurance engineer is responsible for reviewing all EANs and other data relating to the quality of products and operations under his cognizance. As a result of this review, the engineer is responsible for initiating positive corrective action when a quality problem of significant magnitude is indicated on the basis of safety, cost, or possibility of shipping undetected discrepancies. Recurring discrepancies indicate a need for correction of design, process, or method.

Systems have been established to identify and document trends in specific operations, such as tube welding, inspection and test, and in all major pressure welds. Reports are issued to cognizant management personnel for action when deemed necessary.

17C.1.16.4 Pensacola Division

The cause of deficiencies and action taken by the responsible group to prevent the recurrence of discrepancies are documented. Recurring deficiencies are analyzed by cognizant quality and manufacturing engineers and appropriate action is taken to prevent reoccurrence. A quality costs program permits computer tabulation of specific quality costs so that problem areas may be readily identified, investigated, and corrected.

17C.1.16.5 Specialty Metals Division

Formal procedures require the documented reporting of all material and manufacturing deficiencies. The documentation includes a complete description of the deficiencies, the specification or requirement involved, and the disposition. These conditions require formal review by appropriate levels of management. Recurring deficiencies are analyzed by Quality Assurance and cognizant engineers for corrective action taken to prevent recurrence. The recommended action requires the review and approval of responsible Manufacturing, Engineering, and Quality Assurance Department managers.

In addition to corrective action covering deficiencies, standard statistical evaluations are performed on current manufacturing data to determine manufacturing trends to prevent the manufacture of defective material.

17C.1.17 QUALITY ASSURANCE RECORDS

The NES quality assurance program requires the retention of those fabrication, inspection, and surveillance records essential to demonstrating product quality. Records are reviewed by Westinghouse QA personnel, microfilmed, and submitted to the applicant prior to plant acceptance. Records relating to the design and fabrication of NSSS equipment are available for review.

17C.1.17.1 PWR Systems Division

The administrative specification previously described requires suppliers to maintain records for each test (nondestructive, electrical, performance) specified in the purchase order. The administrative specification and equipment specification also require maintenance of other records, as required, such as material test reports, welder qualifications, inspection records,

etc. Records such as trip reports, deviation notices, and other quality-related documents form a part of the records maintained by the PWRSD.

All suppliers are required to maintain these records for specified periods, after which they notify the PWRSD for disposition. Copies of records covering significant inspections on critical portions of the component are transmitted to the PWRSD. These inspection records, along with quality-related documents generated by PWRSD QA personnel, comprise the permanent quality file for each component; these records will be maintained for the life of the plant.

Table 17C-4 is a typical listing of the documents and records kept as a part of the NES quality assurance program. The eighth item, fourth listing shows the supplier and NES having a retention responsibility; the supplier retains all data relative to the component, and NES obtains copies of significant data to maintain as a part of the NES history file. Table 17C-5 lists some typical components and details the data retained by NES for each.

Records generated at the construction site are filed and maintained there.

17C.1.17.2 Electro-Mechanical Division

The EMD maintains sufficient product-related records to furnish documentary evidence of activities affecting quality. The documentation and data requirements are determined during the initial quality planning stage for each contract, and appropriate instructions and documentation checklists are prepared for internal records audits to assure that required records are generated. Records include results of technical and divisional reviews, inspections, audits, material analyses, data on work performance, operation logs, and test results. Closely-related data such as qualifications of personnel, procedures, and equipment are also retained.

All records are not necessarily maintained by Quality Assurance. Retention is determined by the respective department which conducts the review, test, qualification, etc.

17C.1.17.3 Tampa Division

Documentary evidence and records of inspection and other related manufacturing information are maintained. The records include materials test reports, nondestructive test reports and radiographic film, heat treatment logs and charts, inspection point programs, and all related documents including the EANs. The records will identify the inspector, the results, and the action taken to correct deficiencies.

17C.1.17.4 Pensacola Division

A records system is maintained by Quality Assurance to furnish documentary evidence of all results affecting quality. This system includes but is not limited to logging and filing of material certifications, inspection results, discrepancy documentation, test results, audit results, and other closely-related data such as qualification of personnel, procedures, and equipment.

17C.1.17.5 Specialty Metals Division

Objective evidence and records of the various inspection operations during the manufacturing cycle are shipped with the material and maintained by Quality Control. Records of in process inspection are maintained in Quality Assurance Department files for six months after contract shipment. Records related to source or receiving inspection are accumulated in the receiving inspection files. A permanent record of the results of calibration and checking of gages is maintained in the Quality Assurance files in line with the established gage control procedure.

17C.1.18 AUDITS

To verify the effectiveness of the quality assurance program, NES has a comprehensive system of audits. Planned and scheduled audits are conducted by:

A. The corporate quality staff of the NES divisions.

B. The NES QA Committee of the NES divisions.

C. NES divisions of other NES divisions for intra-NES purchases.

D. NES divisions of their suppliers.

E. NSD of Westinghouse site activities.

F. Each NES division of its own internal programs.

Quality Assurance audits are conducted in accordance with defined audit procedures. As required by these procedures, checklists are utilized in many cases. As a minimum, a documented audit report detailing discrepant areas with needs for corrective measures and records of resolution are maintained. The NES quality assurance program requires the originator of an audit report to follow an open item until action is taken to satisfy an audit action item. Areas subject to audit include all procedures and operations within each of the divisions which affect or have an active part in the total quality program as defined by 10 CFR 50, Appendix B. The schedule and sequence of operations to be audited is planned in advance.

For example, PWRSD audits of NES divisions furnishing equipment to the PWRSD are established on a calendar year basis by mutual agreement between the PWRSD and the particular division. The calendar year schedule identifies the operations to be audited.

A description of the various audits within NES is found in subsections 17C.1.18.1 through 17C.1.18.8.

17C.1.18.1 Westinghouse Corporate Audits

The Westinghouse Corporate Headquarters Quality Control staff has a formal audit program which applies to all divisions in Westinghouse, including divisions furnishing equipment or services to the nuclear industry.

The purpose of the audits is to provide an independent verification that the quality assurance programs of the Westinghouse divisions are effectively assuring that the product quality complies with the requirements of their customers and that the programs include the most effective approaches to prevent the manufacture of defective products.

Audits are performed of each division's quality assurance effort by a two-man team, consisting of a member of the Corporate Headquarters Quality Control staff and the quality assurance manager of another division in the same product group as the division audited. The audit normally takes five days. The Corporate Headquarters Quality Control audit of each Westinghouse division is held on the average of once every three years.

The quality assurance systems and procedures that have been established by the division are reviewed to determine if these systems and procedures are sufficient to provide an effective program. Observations are then made to assure that the established systems and procedures are being correctly followed.

An oral presentation of the findings and conclusions of the audit is made to the division general manager, quality assurance manager, and other personnel affected by the audit findings. The items recommended for improvement in the quality assurance program are presented as well as recommendations of approaches for accomplishing these improvements.

Following the audit, a written report containing the findings and recommendations reviewed in the oral report is prepared and sent to the responsible division personnel. In addition, a copy of the report is sent to the executive vice president to whom the division reports and to the corporate vice president -manufacturing.

17C.1.18.2 NES Quality Assurance Committee Audits

The Westinghouse Nuclear Energy Systems Quality Assurance Committee has established an audit program which applies to all NES Westinghouse divisions engaged in nuclear supply system design or manufacture of PWR equipment. The purpose of the audits is to provide in-depth evaluation of the quality assurance policies and processes of the various Westinghouse NES divisions in order to verify that they result in products and services which meet safety and reliability requirements. Particular emphasis during the audit of the quality assurance programs is placed on compliance with the requirements of 10 CFR 50, Appendix B.

In addition to carrying out audits, the Committee serves as a forum to communicate quality and reliability activities, and to establish improved and consistent division policies of quality assurance in light of nuclear industry requirements.

Annual quality assurance system audits are conducted of each Westinghouse NES division by an audit team composed of representatives from the Committee. Typical team membership is three men. Each audit normally takes three days. The Corporate Headquarters Quality Control audit of the Westinghouse NES division described above substitutes for the annual Westinghouse NES audit the year it is held.

At the conclusion of each audit, an oral presentation is made by the audit team to the division general manager and quality assurance manager of the division which has been audited. Following the audit, a written report containing the findings of the audit and recommendations for improvement in the quality assurance program and its implementation is sent to the responsible division personnel, to the committee members, and to the Westinghouse NES executive vice president. This procedure assures high-level management attention to actions needed to carry out recommendations of the audit.

17C.1.18.3 PWR Systems Division

17C.1.18.3.1 Suppliers' Plants

The Westinghouse PWRSD's audit function of suppliers is described in subsection 17C.1.7, Control of Purchased Material, Equipment, and Services. The NES manufacturing divisions are also considered as suppliers to PWRSD and scheduled audits of the divisions are conducted by PWRSD Quality Assurance.

17C.1.18.3.2 Internal

The Quality Assurance Department performs audits within the PWRSD. These audits cover procedures and implementation of the procedures. The audits are performed periodically by a

team headed by QA personnel and selected from appropriate engineering groups of the PWRSD and from outside divisions as necessary. Audit findings are documented and sent to management for review and corrective action, where necessary.

Additional audits of the PWRSD are conducted by the NES Quality Assurance Committee and the Westinghouse Corporate Headquarters Quality Control staff.

17C.1.18.4 Electro-Mechanical Division

The EMD maintains comprehensive internal audit programs to assure that established systems are being followed and that systems adjustments are made. Audit programs also provide management with a continuing overview of quality trends, methods, and functions. Informal audits are performed by various functions within their areas of responsibility; they report findings and corrective actions in writing as required. Formal audits are conducted by a team consisting of members from Engineering, Manufacturing, Quality Assurance, and other functions as required. Deviations noted during the audit are corrected and appropriate action taken to assure against recurrence. Audit reports are formulated for review and action by management.

Surveillance audits involve reinspection of previously-accepted work, verification of required documentation, and reviews of failure analysis and corrective action methods.

Additional audits of EMD are conducted by the NES Quality Assurance Committee, the Westinghouse Corporate Headquarters Quality Control staff, and by PWR QA personnel.

17C.1.18.5 Tampa Division

A continuing program of surveillance audits is conducted to assure conformance to standards, procedures, and methods for all activities affecting product quality. The program includes reinspection of previously accepted work, verification of required documentation, and reviews of error appraisal notice data and corrective action methods. The audit program also provides management with a continuing overview of quality trends, methods, and functions.

The Reliability Engineering Department also has a formal internal audit program. The internal audit program is designed as a cooperative effort by all activities performing quality-related functions for the purpose of assuming compliance with requirements and identifying and resolving problem areas. Audit teams consisting of two members from outside Quality Assurance and a Quality Assurance Department advisor conduct approximately six scheduled audits per year. The results of each audit are discussed with the manager of the area audited and documented in a audit report issued by the Reliability Engineering Department to designated management. As necessary, the reliability engineering manager assigns personnel to initiate and follow-up on required corrective action. When re-audits are deemed necessary,

they are performed by the Quality Assurance Department to provide assurance that corrective action has been effective in resolving problem areas.

Additional audits are conducted by the NES Quality Assurance Committee, the Westinghouse Corporate Headquarters Quality Control staff, and by PWR QA personnel.

*17C.1.18.6 **Pensacola Division***

Periodic internal audits are conducted by Quality Assurance Engineering to assure compliance with applicable procedures. These audits cover general manufacturing practices and adherence to quality procedures. A request for corrective action is issued to document adverse audit results. This document is sent to management for appropriate action. Follow-up reviews are made to ascertain that the stipulated corrective action has been instituted.

Additional audits of the Pensacola Division are conducted by the NES Quality Assurance Committee, the Westinghouse Headquarters Quality Control staff, and by PWR QA personnel.

*17C.1.18.7 **Specialty Metals Division***

Internal quality audits are held to determine the adequacy of established procedures for controlling quality and to evaluate the degree of compliance with the procedures.

The Quality Assurance audit team, performing as a management audit function, is responsible for the following:

A. Investigating potential and actual problem areas which directly or indirectly affect the quality and performance of the SMD's products.

B. Reporting favorable and unfavorable conditions to supervision directly responsible for corrective action.

C. Reviewing and re-auditing corrective action measures taken and the conditions that caused them to assure that such conditions have been eliminated.

Subjects of primary concern to the team are documentation, procedure follow, process conformance, product quality, and housekeeping functions. Correction of discrepancies noted by the audit team rests with the supervisor of the area affected, but solution and permanent elimination of the basic problem remain the responsibility of the manager to whom that supervisor reports.

Additional audits of the SMD are made by the NES QA Committee, the Westinghouse Headquarters Quality Control staff, and by Tampa and NFD Quality Assurance personnel. The PWRSD does not audit the SMD.

17C.1.18.8 Nuclear Services Division

Quality Assurance conducts independent audits of Westinghouse personnel activities at the construction site to assure that proper procedures and instructions are available and in use, and that adequate controls exist and are effective. Reports of audits are sent to top management of the PWR Systems Division. Additional audits of NSD are made by the NES Quality Assurance Committee and the Westinghouse Corporate Headquarters Quality Control staff.

REFERENCES

1. Dollard, W. J., "Nuclear Fuel Reliability and Quality Assurance Program Plan," WCAP-7800, Revision 4-A, April 1975.]

[HISTORICAL] [TABLE 17C-1 (SHEET 1 OF 3)

NSSS FUNCTIONAL RELATIONSHIP FLOW SCHEDULE[(a)]

Item	*Function*	*Originating Group*	*Participating Group*	*Subsequent Action*
1	*Dissemination of contractual requirements*	*Project manager*		*Nuclear safety, quality assurance and reliability, and functional engineering groups, PWRSD equipment design groups, field operation group, and purchasing*
2	*Identification of regulatory requirements*	*Nuclear safety*	*Projects and functional design groups*	*PWRSD equipment design groups, functional design groups, and quality assurance and reliability*
3	*NES quality assurance program*	*NES quality assurance groups (through the NES Quality Assurance Committee)*	*NES equipment design and manufacturing groups, projects, purchasing, and safety and licensing*	*Applicant and NES quality assurance groups*
4	*Quality assurance and reliability procedures*	*NES quality assurance and reliability groups*	*NES equipment design and manufacturing groups, projects, NES purchasing groups, and safety and licensing*	*NES quality assurance and reliability groups and applicant*
5	*Design control procedures*	*NES equipment design groups, functional design, and NES reliability groups*	*NES quality assurance, manufacturing, and purchasing groups, projects, and safety and licensing*	*NES equipment design and reliability groups and applicant*
6	*Specification of system and equipment functional requirements*	*Functional design groups*	*Projects, safety and licensing, and applicant*	*PWRSD equipment design groups, architect/engineer, and applicant*

TABLE 17C-1 (SHEET 2 OF 3)

Item	*Function*	*Originating Group*	*Participating Group*	*Subsequent Action*
7	*Equipment specifications or drawings*	*NES equipment design*	*Functional design groups, NES equipment design groups, quality assurance and reliability, projects, safety and licensing, applicant, and architect/engineer*	*Applicant, architect/engineer, constructor, purchasing, NES quality assurance and manufacturing groups, field operations group, and suppliers*
8	*NES manufacture*	*NES manufacturing groups*	*NES equipment design, and quality control and quality assurance groups*	*Constructor, applicant, and field operations group*
9	*Supplier selection and approval*	*NES quality assurance, equipment design, and purchasing groups*	*Projects and NES manufacturing groups*	*Supplier and purchasing*
10	*Supplier detail design, fabrication, and inspection documents*	*Supplier design, manufacturing, and quality control groups*	*NES equipment design groups, and NES quality assurance and reliability groups*	*Supplier and NES quality assurance groups*
11	*Product surveillance and process audits*	*NES quality assurance groups*	*Applicant and purchasing*	*Projects, NES equipment design groups, and supplier or*
12	*Quality release*	*Supplier and NES quality assurance groups*	*NES equipment design and purchasing groups and projects*	*Applicant, constructor, and field operations group*
13	*System layout drawings*	*Architect/engineer*	*Functional design groups and PWRSD equipment design groups*	*Applicant and constructor*
14	*Receipt inspection and erection of NSSS equipment at nuclear power plant site*	*Constructor*	*Applicant and field operations group*	*NES equipment design and quality assurance groups and projects*
15	*Plant testing and acceptance*	*Applicant*	*Architect/engineer, safety and licensing, field operations group, functional engineering groups, and NES equipment design groups*	*Applicant*

TABLE 17C-1 (SHEET 3 OF 3)

Item	*Function*	*Originating Group*	*Participating Group*	*Subsequent Action*
16	*Audits of*			
	a. NSSS quality assurance program	*Applicant, headquarter QC staff, and NES Quality Assurance Committee*	*NES quality assurance and reliability groups*	*All NES groups*
	b. NSSS design and fabrication	*Applicant and NES quality assurance groups*	*Architect/engineer and all NES groups*	*All NES groups*
	c. NSSS site work	*NSD quality assurance*	*Projects*	*Field operations group*

a. The groups identified on this table relate to the functional chart depicted in figure 17C-2.]

[HISTORICAL] [TABLE 17C-2 (SHEET 1 OF 9)

NSSS FUNCTIONAL RESPONSIBILITIES

	Design Criteria		*Detail Design*		*Manufacture*		
Component	*Responsible*	*QA*	*Responsible*	*QA*	*Responsible*	*QC*	*QA*
Reactor Coolant System (RCS)							
Reactor vessel	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Reactor vessel support shoes and shims	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Reactor vessel insulation	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Full-length control rod drive mechanism (CRDM) housing	*PWRSD*	*A and PWRSD*	*EMD*	*PWRSD*	*EMD*	*EMD*	*PWRSD*
Part-length CRDM housing	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Reactor coolant pump casing	*PWRSD*	*A and PWRSD*	*EMD*	*PWRSD*	*S*	*S*	*EMD*
Reactor coolant pump internals	*PWRSD*	*A and PWRSD*	*EMD*	*PWRSD*	*END*	*E*	*PWRSD*
Reactor coolant pump motor	*PWRSD*	*A and PWRSD*	*EMD*	*PWRSD*	*S*	*S*	*EMD*
Reactor coolant loop isolation valves	*PWRSD*	*A and PWRSD*	*EMD*	*PWRSD*	*EMD*	*EMD*	*PWRSD*
Steam generator (tube side)	*PWRSD*	*A and PWRSD*	*TD*	*PWRSD*	*TD*	*TD*	*PWRSD*
Steam generator (shell side)	*PWRSD*	*A and PWRSD*	*TD*	*PWRSD*	*TD*	*TD*	*PWRSD*
Pressurizer	*PWRSD*	*A and PWRSD*	*TD*	*PWRSD*	*TD*	*TD*	*PWRSD*
Reactor coolant piping	*PWRSD*	*A and PWRSD*	*PWRSD*	*A and PWRSD*	*S*	*S*	*PWRSD*
Reactor vessel internals	*PWRSD*	*A and PWRSD*	*PC*	*PWRSD*	*PD*	*PD*	*PWRSD*
Primary and secondary sources	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
CRDM seismic support structure	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*

TABLE 17C-2 (SHEET 2 OF 9)

	Design Criteria		*Detail Design*		*Manufacture*		
Component	*Responsible*	*QA*	*Responsible*	*QA*	*Responsible*	*QC*	*QA*
CRDM dummy baffle cans	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
CRDM cooling shroud assembly	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Bypass manifold	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Safety valves	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Relief valves	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Valves to reactor coolant system boundary	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Piping to reactor coolant system boundary	*PWRSD*	*A and PWRSD*	*A/E*	*A and PWRSD*	*C*	*C*	*A*
Reactor coolant pump seal bypass orifice	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Pressurizer relief tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Seal table assembly	*PWRSD*	*A and PWRSD*	*PD*	*PWRSD*	*PD*	*PD*	*PWRSD*
Instrumentation tubing and fittings	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Control rod clusters	*PWRSD*	*A and PWRSD*	*NFD*	*PWRSD*	*NFD*	*NFD*	*PWRSD*
Rod cluster control (RCC) thimble plug	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSDc*
Control rod drive mechanism head adapter plugs	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Chemical and Volume Control System (CVCS)							
Regenerative heat exchanger	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Letdown heat exchanger	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Mixed bed demineralizer	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Cation bed demineralizer	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*

TABLE 17C-2 (SHEET 3 OF 9)

	Design Criteria		*Detail Design*		*Manufacture*		
Component	*Responsible*	*QA*	*Responsible*	*QA*	*Responsible*	*QC*	*QA*
Reactor coolant filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Volume control tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Centrifugal charging pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Seal water injection filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Letdown orifice	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Excess letdown heat exchanger	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Seal water return filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Seal water heat exchanger	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Boric acid tanks	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Boric acid filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Boric acid transfer pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Boric acid blender	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Resin fill tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Boric acid batching tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Chemical mixing tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
System piping	*PWRSD*	*A and PWRSD*	*A/E*	*A and PWRSD*	*C*	*C*	*A*
System valves	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Boron Thermal Regeneration Subsystem							
Moderating heat exchanger	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*

TABLE 17C-2 (SHEET 4 OF 9)

	Design Criteria		*Detail Design*		*Manufacture*		
Component	*Responsible*	*QA*	*Responsible*	*QA*	*Responsible*	*QC*	*QA*
Letdown chiller heat exchanger	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Thermal regeneration demineralizer	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Letdown reheat heat exchanger	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Boron Recycle System							
Recycle holdup tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Recycle evaporator feed pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Recycle evaporator feed demineralizer	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Recycle evaporator feed filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Recycle evaporator	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Recycle evaporator condensate demineralizer	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Recycle evaporator condensate filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Recycle evaporator concentrate filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Reactor coolant drain tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Reactor coolant drain pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Reactor coolant drain tank heat exchanger	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Liquid Waste Processing System							
Waste holdup tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Waste evaporator feed pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Waste evaporator feed filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*

TABLE 17C-2 (SHEET 5 OF 9)

	Design Criteria		*Detail Design*		*Manufacture*		
Component	*Responsible*	*QA*	*Responsible*	*QA*	*Responsible*	*QC*	*QA*
Waste evaporator	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Waste evaporator condensate demineralizer	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Waste evaporator condensate filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Waste evaporator condensate tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Waste evaporator condensate tank pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Chemical drain tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Spent-resin storage tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Spent-resin sluice pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Spent-resin sluice filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Laundry and hot shower tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Laundry and hot shower tank pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Laundry and hot shower filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Floor drain tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Waste monitor tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Waste monitor tank pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Waste monitor tank demineralizer	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Waste monitor tank filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Floor drain tank pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*

TABLE 17C-2 (SHEET 6 OF 9)

	Design Criteria		*Detail Design*		*Manufacture*		
Component	*Responsible*	*QA*	*Responsible*	*QA*	*Responsible*	*QC*	*QA*
Floor drain tank filter	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Gaseous Waste Processing System							
Gas compressor	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Gas decay tanks	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Hydrogen recombiner	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Safety Injection System (SIS)							
Refueling water storage tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Accumulator	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Safety injection pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Boron injection tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Boron injection tank recirculation pump	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Boron injection tank surge tank	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
System piping	*PWRSD*	*A and PWRSD*	*A/E*	*PWRSD*	*C*	*C*	*A*
System valves	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Residual Heat Removal (RHR) System							
Residual heat removal pump	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Residual heat exchanger	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
System piping	*PWRSD*	*A and PWRSD*	*A/E*	*A and PWRSD*	*C*	*C*	*A*
System valves	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*

TABLE 17C-2 (SHEET 7 OF 9)

	Design Criteria		*Detail Design*		*Manufacture*		
Component	*Responsible*	*QA*	*Responsible*	*QA*	*Responsible*	*QC*	*QA*
Refueling Equipment							
RCC changing fixture	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Control rod drive shaft handling fixture	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
New fuel storage racks	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Spent-fuel storage racks	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Control rod drive shaft storage racks	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Guide tube cover handling tool	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
New fuel elevator	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Spent-fuel pit bridge and hoist	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Vessel head lifting device	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Upper internals storage stand	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Lower internals storage stand	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Reactor vessel internals handling device	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Reactor cavity manipulator crane	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
RCC thimble plug handling tool	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Spent-fuel assembly handling tool	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Fuel Transfer System							
Fuel transfer tube and flange	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Fuel transfer components	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*

TABLE 17C-2 (SHEET 8 OF 9)

	Design Criteria		*Detail Design*		*Manufacture*		
Component	*Responsible*	*QA*	*Responsible*	*QA*	*Responsible*	*QC*	*QA*
Nuclear Instrumentation Power Range							
Detectors	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Rack-mounted equipment	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Balance of system	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Rod Control Systems/Rod Position Indication System	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Radiation Monitors	*PWRSD*	*A and PWRSD*	*PWRSD*	*PWRSD*	*S*	*S*	*PWRSD*
Solid-State Shutdown System							
Input relay cabinet	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Logic cabinet	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Output relay cabinet	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Balance of equipment	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Reactor Trip Switchgear							
Switchgear and cabinets	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Bus duct	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Process Control Systems - Reactor Coolant Flow							
Rack-mounted equipment	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Field-mounted equipment	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*
Flow elements	*PWRSD*	*A and PWRSD*	*S*	*PWRSD*	*S*	*S*	*PWRSD*

TABLE 17C-2 (SHEET 9 OF 9)

	Design Criteria		*Detail Design*		*Manufacture*		
Component	*Responsible*	*QA*	*Responsible*	*QA*	*Responsible*	*QC*	*QA*

Legend

A = *Applicant or designated representative*
A/E = *Architect/engineer*
C = *Constructor*
EMD = *Electro-Mechanical Division*
NFD = *Nuclear Fuel Division*
NSSS = *Nuclear steam supply system*
PD = *Pensacola Division*
PWRSD = *Pressurized-Water Reactor Systems Division*
S = *Supplier to Nuclear Energy Systems*
TD = *Tampa Division*
QA = *Quality assurance*
QC = *Quality control*

[HISTORICAL] [TABLE 17C-3 (SHEET 1 OF 15)

WRITTEN PROCEDURES WITHIN NES FOR IMPLEMENTING QUALITY ASSURANCE

Procedure	*I*	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*	*X*	*XI*	*XII*	*XIII*	*XIV*	*XV*	*XVI*	*XVII*	*XVIII*
PWRSD Policy and Procedures Manual	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*
PWRSD Quality Assurance and Reliability Manual	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*
PWRSD Engineering Policies and Procedures Manual	*X*	*X*	*X*	*X*	*X*	*X*	*X*		*X*									
PWRSD Purchasing Manual			*X*	*X*	*X*		*X*						*X*	*X*	*X*			
PWRSD Project Manual			*X*	*X*	*X*	*X*	*X*											*X*
Safety and Licensing Manual		*X*	*X*		*X*	*X*												
EMD Quality Assurance Manual	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*
EMD Purchasing Department Manual						*X*												
EMD Engineering Department Instructions			*X*															
Pensacola Quality Program Manual	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*(a)*	*X*	*X*	*X*	*X*	*X*
Tampa Standard Division Procedure			*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*					*X*			
Tampa Product Control and Design Procedure			*X*															
Tampa Quality Assurance Manual	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*
SMD Quality Assurance Manual	*X*	*X*		*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*(a)*	*X*	*X*	*X*	*X*	*X*

a. Handled by specific instructions on shop travelers or in individual component specifications.

TABLE 17C-3 (SHEET 2 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
PWRSD Policy and Procedures Manual (PPM)	*To set forth and define division policies and procedures*	
Organization charts, charters, and personnel rosters	*To set forth policy and procedural instructions for establishing and maintaining organization charts, organization charters, departmental personnel rosters, and documentation of the authorities and duties of personnel and organizations for all PWRSD functions and activities that affect the quality of safety-related structures, systems, components, and services*	*I*
Quality assurance program	*To set forth policy and procedural instruction for establishing and maintaining a quality assurance program that ensures and demonstrates PWRSD compliance with applicable regulatory, industry, and Westinghouse quality assurance requirements for PWR nuclear power plants*	*II and V*
Classification of safety-related PWR plant components and services	*To set forth policy and procedure requirements covering the identification and classification of all safety-related structures, systems, components, and and services*	*II*
Design verification and design reviews	*To set forth PWRSD policy, procedural instruction, and design review guidelines to be followed in verifying designs at all significant design stages of structures, systems, and components involved in the nuclear steam supply system (NSSS) and appropriate system auxiliaries to the NSSS*	*III*
Quality requirements and standards	*To set forth policy and procedural instructions for specifying quality requirements and quality standards in design documents, such as specifications, drawings, etc., in such a manner that manufacturers and the plant constructor can demonstrate through inspection or testing that the structures, systems, and components meet the specified requirements*	*III*
Design change control	*To set forth policy and procedural instructions to control changes to PWRSD design documents in order to know and control the configuration of the facility, structure, system, or component throughout design, construction, and operation of the PWRSD plant*	*III*
Interface control	*To set forth PWRSD policy and procedural instructions necessary to assure that adequate information on quality, safety, and reliability requirements are included or referenced in procurement documents for items and services*	*IV*

TABLE 17C-3 (SHEET 3 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
Procurement document control	*To set forth PWRSD policy and procedural instructions necessary to assure that adequate information on quality, safety, and reliability requirements are included or referenced in procurement documents for items and services*	*IV*
Document control	*To set forth PWRSD policy and procedural instructions to assure effective control (review, comment resolution, approval, issue, change, and disposition) of documents which prescribe all activities affecting quality, safety, reliability, and performance of safety-related PWRSD structures, systems, and components*	*VI*
Supplier quality assurance program surveys	*To set forth policy and procedural instructions for performing surveys of prospective and current suppliers' quality assurance programs to determine their acceptability and to ensure the required quality of purchased materials, items, and services essential to the overall effectiveness of the PWRSD quality assurance program*	*VII*
Handling, storage, shipping, and receiving	*To set forth policy and procedural instructions for the control of handling, storage, shipping, and receiving, including cleaning, packaging, and preservation of material structures, systems, and components for PWR plants to prevent damage, deterioration, and loss*	*XIII*
Control of nonconformances, reporting deficiencies, and corrective actions	*To set forth policy and procedural instructions for controlling nonconformances in material and equipment, reporting significant deficiencies, and exercising necessary corrective actions*	*XV and XVI*
Documentation and records	*To set forth policy and procedural requirements regarding control, maintenance, and disposition of records associated with the documentation of PWRSD activities relative to the assurance of quality, safety, and reliability of Westinghouse nuclear power plants*	*XVI*
Quality assurance audits	*To set forth policy and procedural instructions for establishing and executing a comprehensive system of planned and documented audits to verify compliance with all aspects of the PWRSD quality assurance program and to assess program performance*	*XVIII*
Qualification of personnel	*To set forth policy and procedural instructions for establishing and maintaining the qualification of personnel associated with the quality, safety, and reliability of structures, systems, components, and services provided directly by PWRSD or by suppliers for PWR plants*	*IX*

TABLE 17C-3 (SHEET 4 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
Safety analysis report (SAR) control	*To set forth policy and procedural instructions for ensuring that the requirements specified in design documents for a particular PWR plant technically support all the functional design and safety system performance requirements specified in the SAR for the particular plant*	*II, III, and VI*
PWRSD Quality Assurance and Reliability Manual	*To set forth specific quality instructions for implementing the policies prescribed in the PWRSD Policy and Procedures Manuals*	
PWR quality assurance plan	*To describe the procedures and actions used by Westinghouse to assure that the design, materials, and workmanship employed in the fabrication and construction of systems, components, and installations within the Westinghouse scope of responsibility in a nuclear power plant are control led and meet all applicable requirements of safety, reliability, operation, and maintenance*	*I and II*
Equipment specification and drawing review	*To assure, through independent review of these documents, the adequacy of specifications and drawings prepared for equipment. The PWRSD method of review is explained in this procedure. The term "E-spec" refers to equipment specifications or drawings when' they are used in lieu of equipment specifications*	*III*
Purchase order review	*To describe Quality Assurance review of purchase orders for clarity and for adequacy of quality requirements*	*IV*
Quality control plans	*To define the procedure followed in developing quality control plans*	*V, VII, and XIV*
Drawing control	*To briefly describe how satellite files are controlled and what steps are to be taken by Quality Assurance and Reliability personnel to assure the validity of drawings used or referenced in the performance of their work*	*VI*
Control of nonconforming material	*To define an instruction for controlling, reviewing, and disposing of nonconforming materials through the use of the deviation notice. This procedure describes how nonconforming materials are documented, reported, and disposed of for discrepancies in equipment at suppliers' plants reactor internals assembly*	*XV*
Customer audits or PWRSD documentation	*This procedure deals with customer audit of the quality control documentation maintained by the PWRSD Quality Assurance Department*	*XVIII*

TABLE 17C-3 (SHEET 5 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
Surveillance techniques	*To describe the method used in surveying suppliers' facilities to provide for control of quality of equipment delivered to PWRSD. Supplier surveillance is divided into two categories: audits that monitor the suppliers' operating systems and process procedures, and product verification in specific areas to exercise control over critical fabrication and test points. These two surveillance categories are taken into account in the quality control plan*	*VIII, VII, X, XI, XII, XIII, and XIV*
Quality control levels	*PWRSD applies three levels of quality control to procured materials. This procedure defines these levels and describes how they are assigned*	*II*
Preaward surveys and postaward audits	*Formal evaluations of new, prospective, or existing suppliers are necessary to determine and record their ability to meet Westinghouse Nuclear Energy Systems requirements for the manufacture of NSSS equipment. This procedure describes the means used by Quality Assurance for these evaluations*	*VII*
Customer participation in surveillance	*In fulfillment of contractual and regulatory requirements, customers' quality assurance representatives periodically visit Westinghouse and its suppliers' fabricating facilities to observe the Westinghouse Quality Assurance surveillance effort and to assure that supplier fabrication is control led; this procedure describes how this activity is coordinated*	*II, VII, and XVII*
Quality releases	*To describe the use of quality releases*	*VII*
Corporate audits	*To describe the audit program which is under the direction of the corporate direction of reliability control which is organizationally independent from the operating divisions of the corporation*	*XVIII*
Product documentation files	*To define the responsibilities and method of processing and maintaining the product documentation files*	*XVII*
Long-range file retention	*To clearly define the retention responsibilities for equipment design and fabrication records*	*XVII*
Training and certification of nondestructive testing (NDT) personnel	*To provide a uniform system for training, qualifying, and certifying personnel who need to utilize NDT methods and techniques and to assure they have optimum knowledge of the current state of the art commensurate with their specific job function*	*IX*
Design review	*To provide guidelines for conducting a design*	*III*

TABLE 17C-3 (SHEET 6 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
Reliability analysis	*To describe the approach used in applying reliability analysis to component, subsystem, or system design*	*II*
Data feedback and analysis system	*To define the methods and responsibilities for acquiring, classifying, filing, retrieving, and analyzing empirical data on Westinghouse NSSS*	*XVI*
Equipment deficiency analysis	*To identify equipment defects through a systematic review of the deficiency data file*	*XVI*
PWRSD Engineering Policies and Procedures Manual (EPPM)	*To set forth specific engineering instructions for implementing the policies prescribed in the PWRSD PPM*	
Objectives and policies	*To state overall objectives and policies of Engineering within the scope defined by division policy*	*I and II*
Technical policies and procedures	*To set forth policy and procedural instruction governing the areas of position papers; preparation of E-specs; control of design changes; and control and distribution of licensing reports, SARs, reports supporting licensing applications, and drawings*	*III, V, and VI*
Quality assurance	*To define a procedure for stipulating the quality requirements of equipment designed or specified by PWRSD. In addition, key sections of the Quality Assurance Manual are referenced*	*All*
Administration	*To set forth policy and procedural instructions for such areas as supplier evaluation, purchase order submittals, and documentation and storage*	*IV, VII, and IX*
PWR Purchasing Manual	*To set forth specific purchasing instructions for implementing the policies prescribed in the PWRSD PPM*	
Selection of suppliers	*To set forth the policy on selection of suppliers*	*VII, XIII, and XV*
Order preparation and administration	*To set forth the instructions for the preparation and administration of an order (including requisitions, purchase orders, and change notices), procurement advisory releases, and acknowledgment*	*IV and V*
Coordination with other activities	*To set forth instructions for interface relationships with other groups*	*III, and XV*

TABLE 17C-3 (SHEET 7 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
General procurement considerations	*To set forth specific instructions on the evaluation of suppliers, visits, terms and conditions, proposal evaluation, and order review*	*VII, XIII, and XV*
PWRSD Project Manual	*To set forth specific project instructions for implementing the policies prescribed in the PWRSD PPM*	
Communications	*To set forth procedures for drawing transmittal, projects communications, communication with other NES divisions, review of engineering specifications, and the specification control system*	*III, V, and VI*
Engineering	*To set forth procedures for the interfacing relationships dealing with customer quality assurance, surveillance, and visitations*	*XVIII*
Procurement	*To set forth procedures for project activities associated with procurement*	*IV and VII*
Safety and Licensing Manual	*To set forth specific instructions for the Safety and Licensing Group on implementing the policies prescribed in the PWRSD PPM*	
Process assurance plan	*To address each of the 18 criteria applicable to Safety and Licensing and give an overview of means of compliance*	*II*
SARs	*To set forth instructions for the preparation, review, issuance, and revision of SARs. In addition, the means of handling questions is detailed*	*III, V, and VI*
Open licensing issues (OLIs)	*To set forth instructions for identifying, assessing, and communicating the the status of open licensing issues to achieve problem resolution*	
Regulations, codes, and industrial standards	*To identify responsibility for preparation of fundamental safety criteria to assist in the design process by assuring conformance with NRC Safety and Licensing requirements*	*III*
Review of designs	*To set forth instructions for review of design by Safety and Licensing Groups*	*III*
WCAP preparation	*To establish guidelines within Safety and Licensing for the handling of topical reports*	*VI*
EMD Quality Assurance Manual	*To set forth specific quality instruction for implementing the quality program*	

TABLE 17C-3 (SHEET 8 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
Manual and administration	*To define the Quality Program Manual and its administration; e.g., scope and format of the manual itself; the provisions for issuance, distribution, and maintenance; approval; and applicability*	*II*
Quality organization and organization charts	*To describe the organizational position of the Quality Assurance Department within the Electro-Mechanical Division and the manner in which the responsibilities and authority of the Quality Assurance Department are implemented by its internal organization*	*I*
Quality planning	*To identify total contract quality requirements as early as possible after order receipt and to assure that actions are undertaken in a timely and organized manner*	*III, IV, and V*
Integrated manufacturing and quality planning instructions	*To describe the program to assure that the desired product quality is maintained by clear and complete instructions of a type appropriate to the circumstances*	*V*
Quality control records	*To outline the system implemented to generate, compile, and store those records necessary to be maintained as objective evidence of compliance*	*XVII*
Equipment control and calibration	*To establish necessary controls for the periodic inspection and calibration of all measuring and testing equipment used for the acceptance of quality*	
Control of purchases	*To define the procedures for controlling the quality of vendor-furnished deliverable materials*	*IV and VII*
Inprocess and final inspection and testing	*To establish necessary controls covering inprocess inspection of materials, parts, and components, including final inspection and testing of complete products*	*X and XI*
Corrective action for nonconforming material	*To establish a procedure for insuring timely corrective action for nonconforming material*	*XVI*

TABLE 17C-3 (SHEET 9 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
Control of documents and changes	*To define the procedure for release and control of drawings and specifications and document status reporting; to assure that proper document revisions are used by manufacturing and inspection and provided to the authorized inspector; to provide and effectively maintain shop order documents; to establish a uniform method of processing engineering changes and supplementary information in order to evaluate and control technical aspects; and to provide availability of previous and current revisions of documents compatible to Westinghouse EMD product lines*	*VI*
Handling, storage, and delivery	*To provide the work and inspection instructions for handling, storage preservation, packaging, and shipping to protect the quality of products and prevent damage, loss, deterioration, degradation, or substitution of products*	*XIII*
Control of nonconforming material	*To establish a procedure for the identification, segregation, and disposition of material that does not conform to the requirements; to provide a means of analyzing the causes of nonconformance so that corrective action can be taken to prevent recurrence; and to provide immediate solutions to problems generated by manufacturing processes during the course of manufacture*	*XV*
Inspection status indicator	*To define the methods used to show the inspection status of products*	*XIV*
Personnel certification for nondestructive testing	*To establish the practice for certifying personnel to perform nondestructive testing duties at Westinghouse Electro-Mechanical Division*	*IX*
Design control	*To outline the control system implemented for review involving designing, design engineering development, and design interface activities*	*III*
Manufacturing control (identification of materials, parts, and components)	*To describe the methods for identification, control, and traceability of materials, parts, and components through all stages of processing*	*VIII*
Audits	*To establish the procedure for audits to insure compliance with all aspects of the quality assurance program and to determine effectiveness of the program*	*XVIII*
EMD Purchasing Department Manual	*To detail responsibilities, policies, and procedures of the Purchasing Department for the control of purchased materials, equipment, and services*	*VII*

TABLE 17C-3 (SHEET 10 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
EMD Engineering Department Instructions	*To establish procedures for design control, including such elements as reviews, verifications of adequacy, tests, approvals, releases, and control of changes*	*III*
Pensacola Quality Program Manual	*To set forth specific instructions for implementing the quality program*	
General	*To provide a comprehensive overview of the quality system utilized at Westinghouse Pensacola Division, defining organization, responsibilities, and authority*	*I, II, and V*
Contract control	*To describe the system utilized for dissemination of current contractual information to all affected internal departments*	*III and VI*
Design drawing and design specification control system	*To define the system for release and control of design drawing and specifications to provide the proper document revisions to the authorized inspector*	*III, V, and VI*
Control of purchase	*To define the activities associated with control of purchase, including requisition review, supplier evaluation, approval requests, quality release, material rejection, and corrective action*	*IV, VII, XV, and XVI*
Manufacturing and quality assurance planning	*To define the routine actions of manufacturing and quality engineering in planning for the acquisition, manufacture, and inspection of material, components, or assemblies*	*II, V, VIII, XI, X, and XIV*
Manufacture control	*To define the system for control of the manufacturing process*	*VIII, IX, X, and XIV*
Inspection	*To define the activities required to inspect and evaluate results, and to document and release manufactured items of further processing or assembly*	*X and XVI*
Welding	*To define the procedure to be used to assure that all welds made on products in process of manufacture are made per qualified procedures by qualified welders using properly controlled and traceable filler metal*	*IX*
Nondestructive examination, qualification, and control	*To define the methods for qualifying, certifying, and controlling nondestructive examination personnel, equipment, and procedures*	*IX and XI*

TABLE 17C-3 (SHEET 11 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
Gauge and instrument control	*To provide "off-the-shelf" availability of reliable calibrated inspection instruments and gages, and to maintain records of gage location and calibration status*	*XII*
Special process control and heat treating	*To describe control of special processes*	*IX*
Nonconforming material control	*To describe the nonconforming review and documentation system*	*XV*
Corrective action	*To define the corrective action program*	*XVI*
Internal quality audits	*To describe the system for audit of conformance to internal procedures and processes*	*XVIII*
Quality documentation	*To define the product documentation necessary and the method of data retrieval*	*XVII*
Customer witness points	*To describe the system utilized to assure customer notification prior to occurrence of contracted witness points*	*II and X*
Tampa Standard Division Procedure	*To set forth standard division procedures*	
Drawing control	*To control the release and distribution of drawings and corresponding change notices prior to and during the manufacturing cycle*	*III, V, and VI*
Material, finish, and process specification handling	*To request new and/or revised specifications for material, finish, process, and manufacturing procedures. Procedure includes the control for issuance and distribution*	*III, V, and VI*
Preparing manufacturing lineups	*To prepare and review new and revised manufacturing lineups*	*V, VI, and X*
Procedure for ordering feeders	*To control and release manufacturing operational lineups from which inspection point programs are generated*	*V and VI*
Preparation of emergency manufacturing information	*To prepare and control manufacturing information released to Manufacturing for one-time job activities*	*V*
Welder qualification procedure	*To control recording and reviewing welder qualifications for code compliance*	*V and IX*

TABLE 17C-3 (SHEET 12 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
Error appraisal notification (EAN) procedure	*To control nonconforming material*	*III, V, VI, VII, and XV*
Receiving and inspection procedure	*To control receipt and inspection of material*	*IV, V, VII, VIII, and X*
Contingency EANs	*To control open EANs at the time of shipment on quality release forms that must be satisfied and cleared at the field sites*	*V and IX*
Purchase order procedure	*To prepare and issue instructions for material and services*	*IV and V*
G-letter procedure	*To expedite drawing changes for a specific customer order only and to incorporate drawings into units when time does not permit waiting for drawing change and release by the standard procedure*	*III, V, VI, and XV*
Equipment specifications	*To maintain design control of requirements specified in the equipment specification and to insure that all design requirements are incorporated into the product*	*III*
Design codes and addenda	*To maintain design control of all requirements in ASME Code Section III and to assure that all design requirements are incorporated into the product design drawings and documents within six months after issue date*	*III*
Design reviews and checklists	*To conduct design reviews*	*III*
Stress report compliance with hardware	*To insure that the final stress report is reviewed by the product design section in which design originated and wherein all changes and variations are recorded*	*III*
Tampa Quality Assurance Manual	*This manual has been prepared for the Nuclear Energy Systems, Large Components Division, Tampa Division by the Quality Assurance Section; it provides information on procedures, systems, and activities performed by Quality Assurance personnel*	
Quality assurance control program	*To provide a positive system for controlling the quality of nuclear vessel products supplied by the Tampa Division of Westinghouse Electric Corporation*	*II*
Applicability	*To establish applicability of the Quality Assurance Manual*	*II*

TABLE 17C-3 (SHEET 13 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
Design control	*To define the Quality Assurance function in design and design change control*	*III*
Quality assurance authority and administration of manual	*To set forth the authority and responsibility for administration of the manual*	*I and VI*
Organization and responsibilities	*To define the responsibilities and functions of the Quality Assurance Department*	*I*
Quality assurance planning	*To establish the preplanning requirements for specification review and inspection point plan development by Quality Assurance*	*VI, X, and XIV*
Control of purchased material	*To establish Quality Assurance requirements associated with ordering information, purchase order (PO) inspection codes, Quality Assurance review of POs, supplier evaluations and audits, source inspection, and receiving inspection*	*IV, VI, VII, and VIII*
Inspections, examinations, nondestructive examinations, and process verification	*To set forth instruction for in-process inspection, patrol inspection, final inspection, shipping inspection, nondestructive examination, post-weld heat-treat verification, and the development of quality assurance instructions*	*IX, X, XI, and XIII*
Control of nonconforming operations and/or material	*To establish the guidelines for writing and handling EANs that were initiated by Westinghouse Tampa personnel performing in-house inspections and by Westinghouse field representatives performing either source inspections at supplier's plant or assembly and test inspections at customer's plant sites*	*XV*
Corrective action program	*To set forth the procedure and responsibility for initiating positive corrective action*	*XVI*
Control of specifications and drawings	*To establish procedures to assure that specifications and drawings used are current and that outdated, nonapplicable specifications are removed and destroyed*	*V*
Welding and weld rod control	*To define welding controls which are established to provide assurance and objective evidence that all welding operations performed during the manufacturing cycle adhere to and conform with engineering drawings, process specifications, and customer and and code requirements*	*IX and XIII*

TABLE 17C-3 (SHEET 14 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
Personnel qualification	*To establish the Tampa program for qualification of nondestructive testing and examination personnel*	*X, XIV, VIII, and XVIII*
Technician's stamp control	*To specify the method of assurance that all rubber stamps used by Quality Assurance personnel are recorded and identified to specific individuals*	*X, XIV, and XVII*
Material handling	*To define the material handling program and inspection of lifting equipment*	*XII*
Tool and gauge control	*To define the calibration frequency and maintenance for gauges and equipment used by the Quality Assurance Department and to establish responsibility for compliance to the procedure*	*XII*
Objective evidence of quality	*To define the records program*	*VIII and XVII*
Quality auditing	*To set forth the instructions for the quality auditing program*	*XVIII*
SMD Quality Assurance Manual		
Organization	*To define the functions of the various components of the quality control organization*	*I*
Administration of product quality control	*To establish the quality planning and order processing procedure*	*II*
Inspection and test philosophy	*To establish responsibility for all phases of inspection and test*	*X and XI*
Supplier and material quality assurance	*To establish procedures for purchase requisition control and vendor evaluations*	*IV, V, and VII*
Material identification	*To describe the system used by Quality Control in identifying and controlling material throughout the entire manufacturing cycle*	*VIII*
Process control and inprocess inspection	*To set forth instructions for process control and inprocess inspection*	*X*
Special processes	*To establish special process controls and nondestructive test requirements and qualifications*	*IX*

TABLE 17C-3 (SHEET 15 OF 15)

Procedure	*Purpose*	*10 CFR 50, Appendix B Criteria*
Statistical planning and application	*To define statistical methods and techniques utilized for sampling inspection*	*X*
Records and data system	*To set forth the records program for maintaining objective evidence of quality*	*XVII*
Drawing, specification, change review, and control system	*To define the measure for document control including changes*	*V and VI*
Control of nonconforming material	*To describe the procedure used in identifying and controlling all defective material detected at receiving, or in any stage of processing, and to assure that corrective action is taken*	*XV and XVI*
Quality audit system	*To establish responsibilities and instructions for audits*	*XVIII*
Use and control of Inspection stamps	*To set forth instructions for the use and control of inspection stamps*	*XIV*
Control laboratories	*To establish responsibilities and instructions for performing tests on raw materials and intermediate and final product*	*XI*
Gauge control	*To establish measures for control of measuring and test equipment*	*XII*

[HISTORICAL] [TABLE 17C-4

RECORDS RETENTION

All documents and records to be kept as a part of the Westinghouse program for all safety-related and additional selected major components are listed in this table.

Document Description	*Primary Retention Responsibility*
Equipment specifications	*Engineering*
Process specifications	*Engineering*
Instrumentation and control standards	*Engineering*
Drawings	*Central files, Drafting, and Reproduction*
Design review documentation	*Quality Assurance*
Purchase order, change notices, and procurement advisory releases	*Purchasing*
Equipment prototype test data, design calculations, and stress reports	*Engineering*
Supplier-fabricated equipment	
Supplier fabricating, testing, and nondestructive testing procedures	*Engineering when NES approval is required; supplier when NES approval is not required[(a)]*
Radiographs	*Supplier[(a)]*
Testing equipment calibration records and personnel qualifications	*Supplier[(a)]*
Mill test reports, final acceptance inspection records, special process records, and performance test records	*Supplier[(a)] and Quality Assurance*
Quality releases, code forms, inspection plans, and nameplate rub-offs	*Quality Assurance*
QA trip reports, QC plans, deviation notices, and supplier survey reports	*Quality Assurance*
Technical manual, instruction book, and spare-part forms	*Engineering*
Field deficiency reports	*Construction and Services*

a. Quality Assurance has the responsibility for reviewing documentation maintained by the supplier and assuring that the supplier has adequate facilities for long-term retention. Purchasing has the responsibility for enforcing the contractual retention and retrieval requirements.]

[HISTORICAL] [TABLE 17C-5

TYPICAL DATA (RETAINED BY WESTINGHOUSE) FOR REPRESENTATIVE COMPONENTS

Data Type	*Steam Generator*	*R.C. Piping*	*R.C.Fittings*	*Letdown Hx*	*Seal Water Injection Filter*	*Accumulator*	*Safety Injection Pump*	*Boron Injection Tank*	*R.C. Loop Stop Valve*	*Pressurizer Relief Valve*	*Waste Evaporator Feed Pump*	*HD Adapter Plugs*
Quality release	X	X	X	X	X	X	X	X	X	X	X	X
Inspection checklist	X	X	X	X	X	X	X	X	X			
Pressure envelope material certifications	X	X	X	X	X	X	X	X	X	X	X	X
RT records	X	X	X	X	X	X	X	X	X	X		
PT/MT records	X	X	X	X	X	X	X	X	X	X	X	X
UT records	X	X				X		X	X	X		X
Dimensional records	X	X	X	X	X	X	X	X	X			X
Performance test data							X		X	X	X	
Code form	X	X		X	X	X		X				
Heat-treat records	X	X	X			X	X	X	X			
Trip report summary sheet		X	X	X	X	X	X	X	X			
Nameplate rub-off	X			X	X	X		X				
Supplier certificate of compliance				X	X	X			X			
Pressure test certificate				X	X	X		X	X	X	X]	

[HISTORICAL] [TABLE 17C-6

EXAMPLE FROM TYPICAL SHOP ORDER LOGIC FLOW DIAGRAM

Shop Order Standard — *Page 7 of 14*

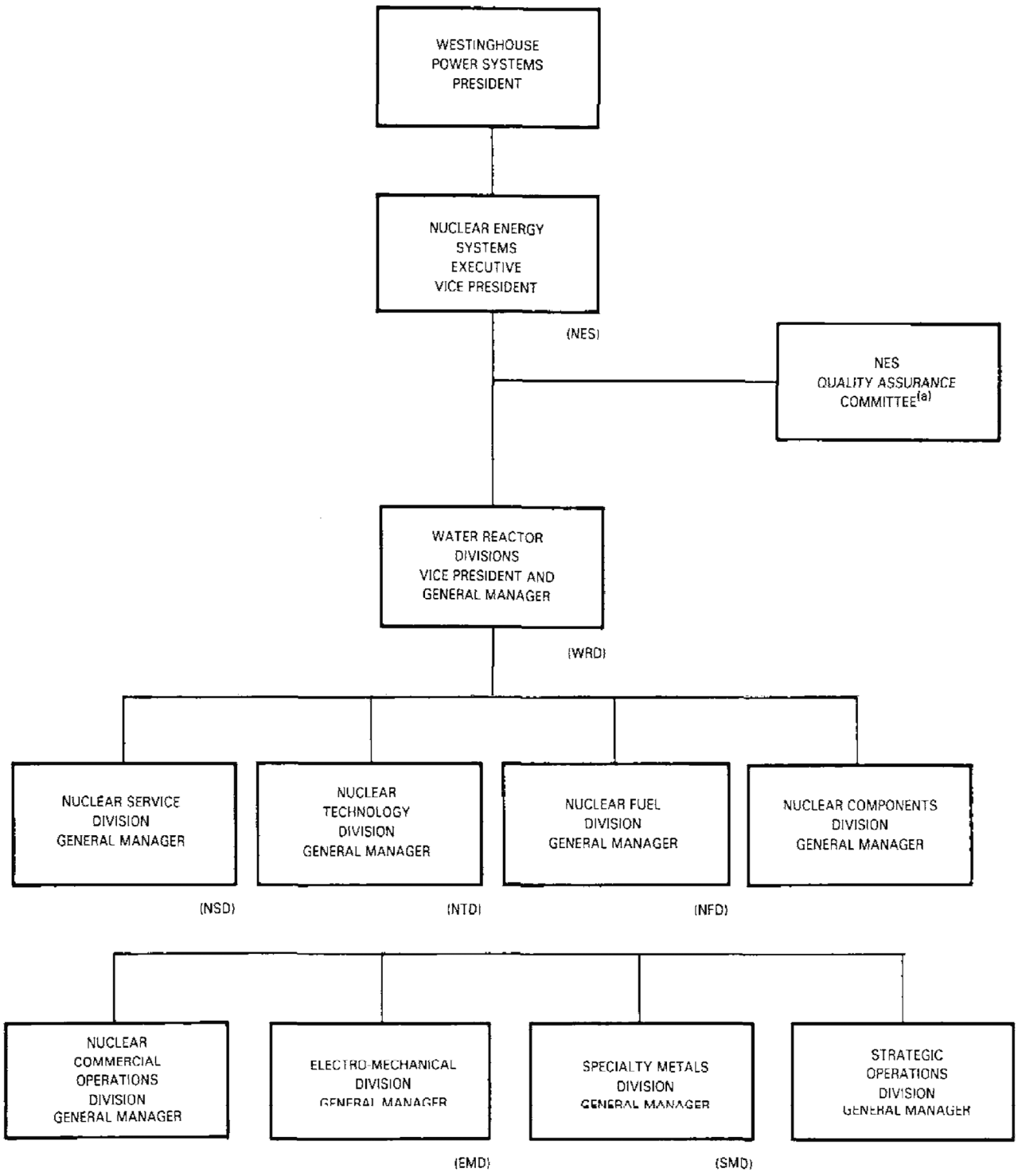
ACTIVITY DESCRIPTION	*CUSTOMER*	*PROJECTS*	*OTHER DEPTS & FUNCTIONS*	*SHOP ORDER DEPARTMENT*	*PURCHASING*	*SUPPLIER*	*QUALITY ASSURANCE*		*FILE*	*10CFR50-B CRITERIA*	*APPLICABLE DOCUMENT*
49. Supplier submits drawings, procedures, calculations and other submittals as required						*49. Issue Submittals*				*III -DSGN Control* *IV -Procurement Doc. Control* *V -Instructions, Proc. & DWGS* *VI -Doc. Control* *VII -Control of Purch. Atl., Equipment & Services*	
50. Purchasing processes supplier submittals					*50. Process Submittals*					*IV -Procurement Doc. Control*	*Purchasing Procedure C.2.8 -Submittals & Distribution of Vendor DWGS & Documents*
51. Purchasing forwards drawings to Drawing Control & other submittals to Engineering.					*51. Issue Submittals to ENG*					*IV -Procurement Doc. Control* *VII -Control of Pur. Mtl., Equipment & Services*	*Purchasing Procedure C.2.8 -Submittals & Distribution of Vendor Drawings & Documents*
52. Engineering Shop Order Department reviews submittals				*52. Review Submittals*						*III -DSGN Control* *IV -Procurement Doc. Control*	*EI 23: Processing APRVL Req. Forms – Vendor Doc. Submittals* *EI 29: DSGN Control & Documentation*
53. Engineering Shop Order Department issues submittals for review by applicable departments.				*53. Issue Submittals for Review*						*III -DSGN Control* *IV -Procurement Doc. Control*	*EI 23: Processing APRVL Req. Forms – Vendor Doc. Submittals* *EI 29: DSGN Control & Documentation*
54. Applicable departments review submittals.			*54. Review Submittals*				*54. Review Submittals*			*III -DSGN Control* *IV -Procurement Doc. Control*	*EI 23: Processing APRVL Req. Forms – Vendor Doc. Submittals* *EI 29: DSGN Control & Documentation*
55. Applicable departments issue comments on submittals to Engineering Shop Order Department.			*55. Issue Comments*				*55. Issue Comments*			*III -DSGN Control* *IV -Procurement Doc. Control*	*EI 23: Processing APRVL Req. Forms – Vendor Doc. Submittals* *EI 29: DSGN Control & Documentation*
56. Engineering Shop Order Department resolves comments.				*56. Resolve Comments*						*III -DSGN Control* *IV -Procurement Doc. Control*	*EI 23: Processing APRVL Req. Forms – Vendor Doc. Submittals*
57. Engineering Shop Order Department documents resolution, distributes resolution and files.				*57. Issue Resolution of Comments*					*57. PA*	*III -DSGN Control* *IV -Procurement Doc. Control*	*EI 23: APRVL Req. Forms – Vendor Doc. Submittals*
58 Engineering Shop Order Department reviews and signs off submittals.			*57. ENG Use*	*58. Review & Signoff*			*57. QA Use*			*III -DSGN Control* *IV -Procurement Doc. Control*	*EI 23: APRVL Req. Forms – Vendor Doc. Submittals]*

[HISTORICAL] [TABLE 17C-7

[EXAMPLE FROM TYPICAL SHOP ORDER LOGIC FLOW DIAGRAM

Shop Order Standard

ACTIVITY DESCRIPTION	*CUSTOMER*	*PROJECTS*	*OTHER DEPTS & FUNCTIONS*	*SHOP ORDER DEPARTMENT*	*PURCHASING*	*SUPPLIER*	*QUALITY ASSURANCE*		*FILE*	*10CFR50-B CRITERIA*	*APPLICABLE DOCUMENT*
59. Engineering Shop Order Department issues PO/CN or PAR to purchasing as required.				*59. Issue PAR*					*59. PA*	*III -DSGN Control* *IV -Procurement Doc. Control*	*Purchasing Procedure* *2.2: Writing PO & CN's* *2.3: Completing general order & GO/CN* *2.4: Multiplant purchase orders* *2.6: Procurement advisory release* *EI 17:* *ENGG processing of purchase reqs & change notices*
60. Purchasing issues PO/CN to supplier. Supplier acknowledges, revises, and resubmits as required. Recycle to step 49 as necessary.					*60. Prepare PAR* *60. Issue PAR*	*60. Supp. Use*				*III -DSGN Control* *IV -Procurement Doc. Control*	*Purchasing Procedure* *2.2: Writing PO & CN's* *2.3: Completing general order & GO/CN* *2.4: Multiplant purchase orders* *2.6: Procurement advisory release* *2.7: Acknowledgements*
61. Engineering Shop Order Department prepares release to fabricate via PAR.				*61. Prepare PAR to Fabricate*						*IV -Procurement Doc. Control* *VI -Document CTRL* *VII -Control of Purchased Materials, Equipment & Services*	*Purchasing Procedure* *2.6: Procurement advisory release*
62. Engineering Shop Order Department issues PAR to purchasing.				*62. Issue PAR to Purchasing*					*62. PA*	*IV -Procurement Doc. Control* *VI -Document CTRL* *VII -Control of Purchased Materials, Equipment & Services*	*Purchasing Procedure* *2.6: Procurement advisory release*
63. Purchasing processes PAR.					*63. Process PAR*					*IV -Procurement Doc. Control* *VI -Document CTRL* *VII -Control of Purchased Materials & Services*	*Purchasing Procedure* *2.6: Procurement advisory release*
64. Purchasing issues PAR to supplier.					*64. Issue PAR to Supplier*	*64. Supp. Use*				*IV -Procurement Doc. Control* *VI -Document CTRL* *VII -Control of Purchased Materia, & Services*	*Purchasing Procedure* *2.6: Procurement advisory release*
65. Engineering Shop Order Department issues approved vendor data, as applicable, to customer via projects.		*65. CUST Use*	*65. Issue Data to Customer*	*65. Issue Data to Projects*						*III -DSGN Control* *VI -Document CNTRL*	*EI 29:* *DSGN Control & Documentation]*



a) THE NES QUALITY ASSURANCE COMMITTEE IS COMPOSED OF THE QUALITY ASSURANCE AND RELIABILITY MANAGERS FROM EACH OF THE NES DIVISIONS. THE COMMITTEE'S CHAIRMAN IS THE NTD PRODUCT ASSURANCE MANAGER.

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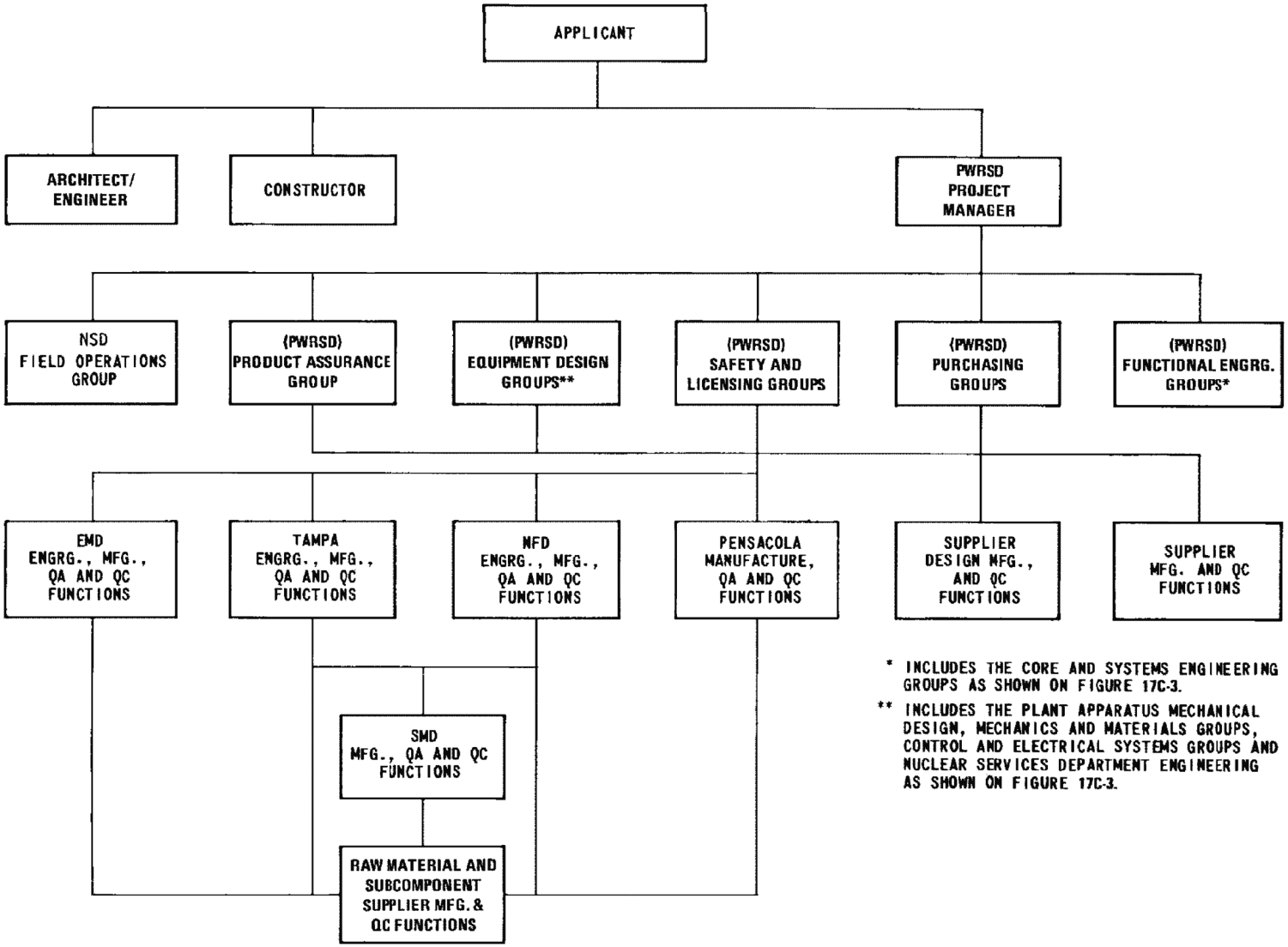
NUCLEAR PLANT
UNIT 1 AND UNIT 2

[NUCLEAR ENERGY SYSTEMS ORGANIZATION

FIGURE 17C-1]



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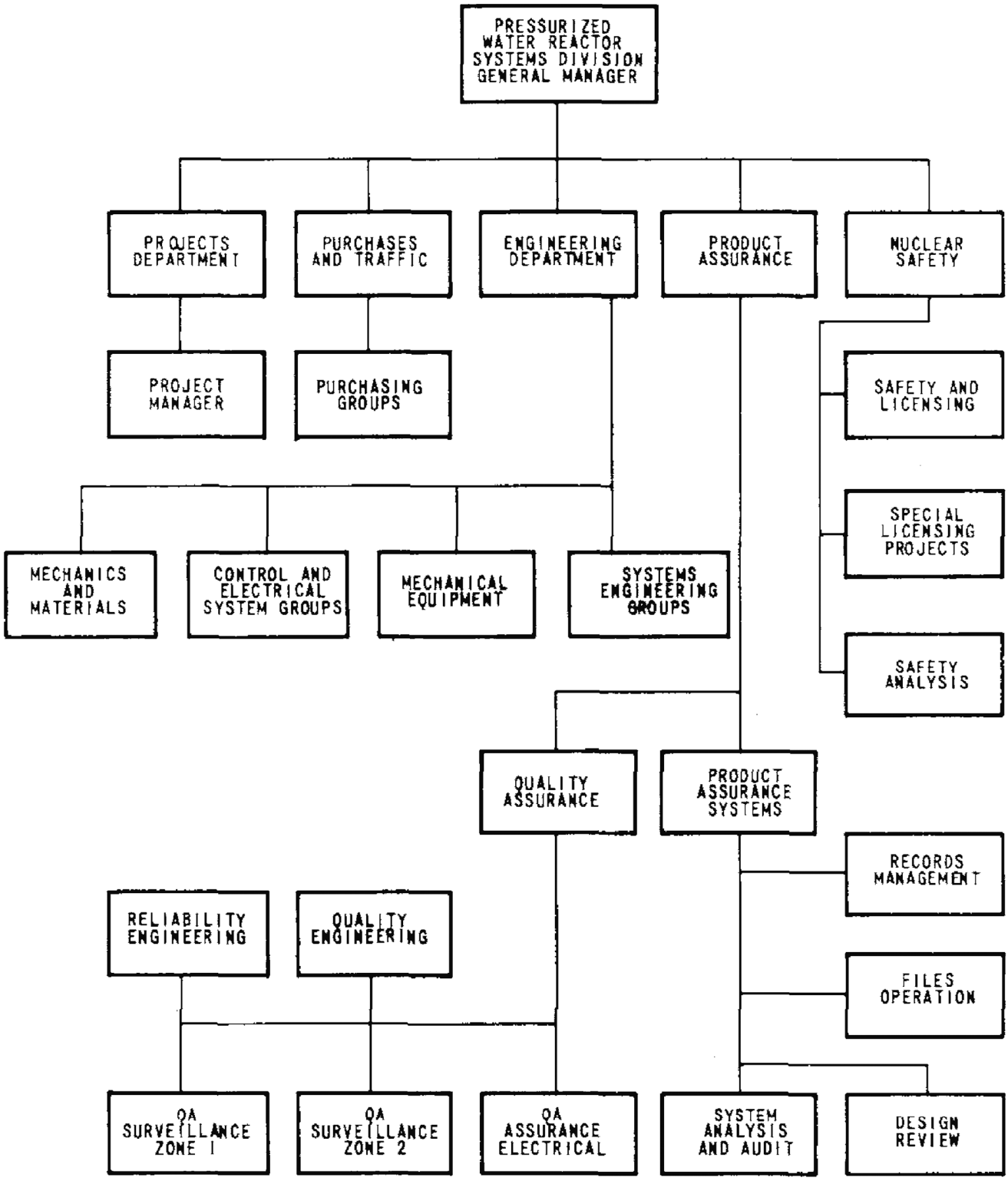
UNIT 1 AND UNIT 2

INSSS FUNCTIONAL RELATIONSHIP CHART

FIGURE 17C-2



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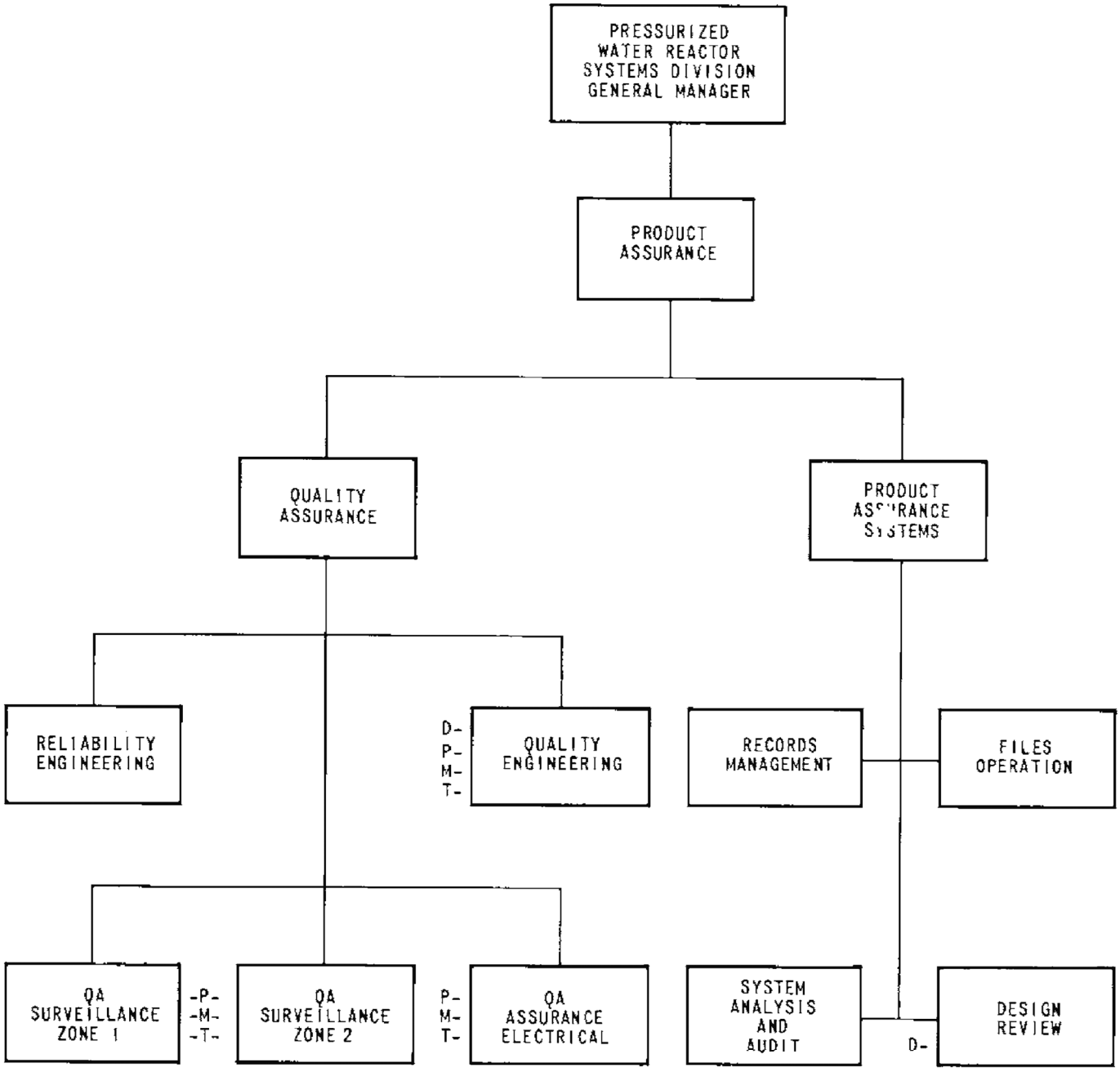
UNIT 1 AND UNIT 2

[PWRSD QUALITY ASSURANCE PROGRAM ORGANIZATION

FIGURE 17C-3]



LEGEND:

D - DESIGN
P - PROCUREMENT
M - MANUFACTURING
T - TESTING

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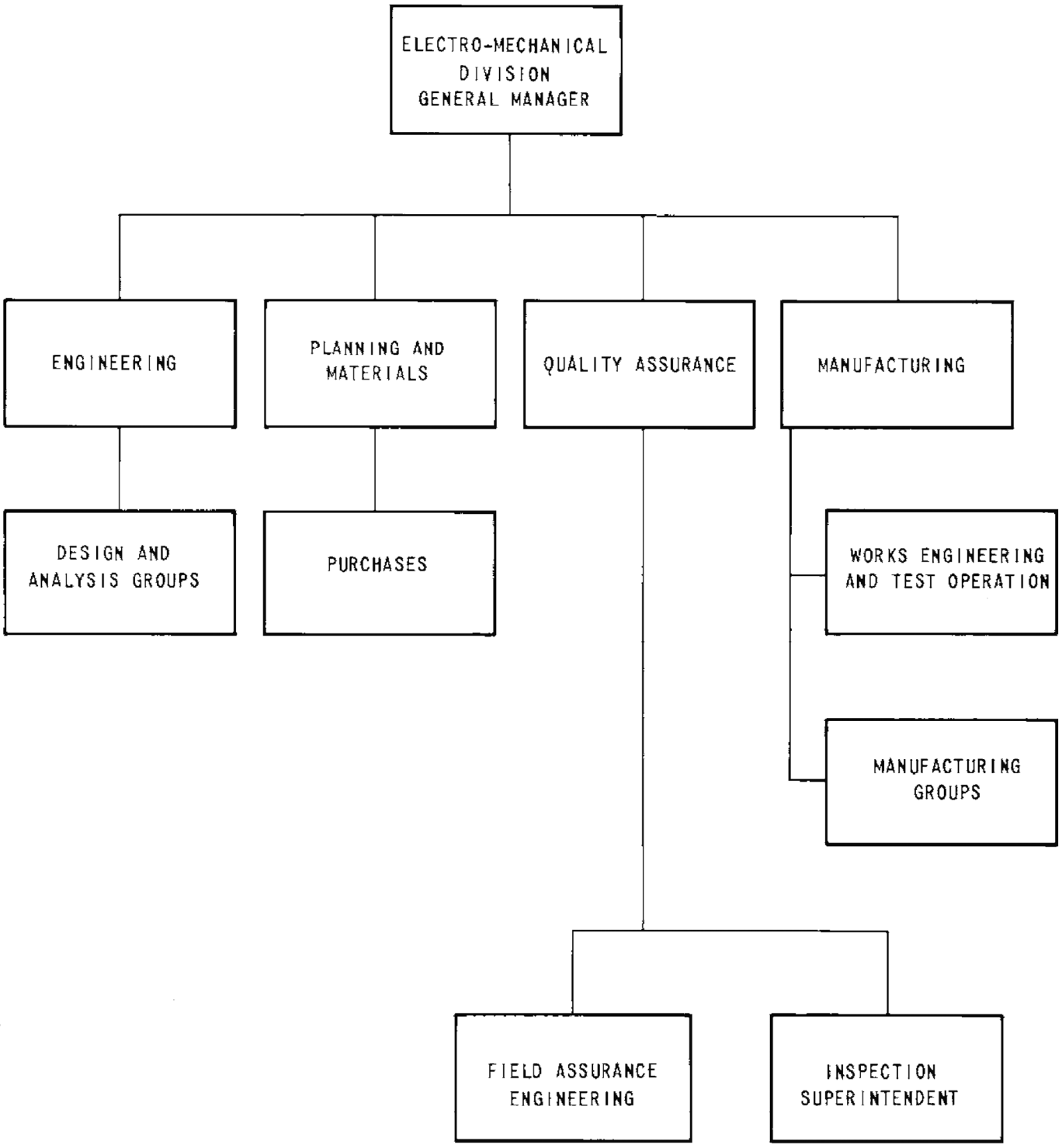
SOUTHERN COMPANY *Energy to Serve Your World®*	**JOSEPH M. FARLEY NUCLEAR PLANT UNIT 1 AND UNIT 2**	*[PWRSD PRODUCT ASSURANCE QA-RELATED FUNCTIONS*
		FIGURE 17C-4]



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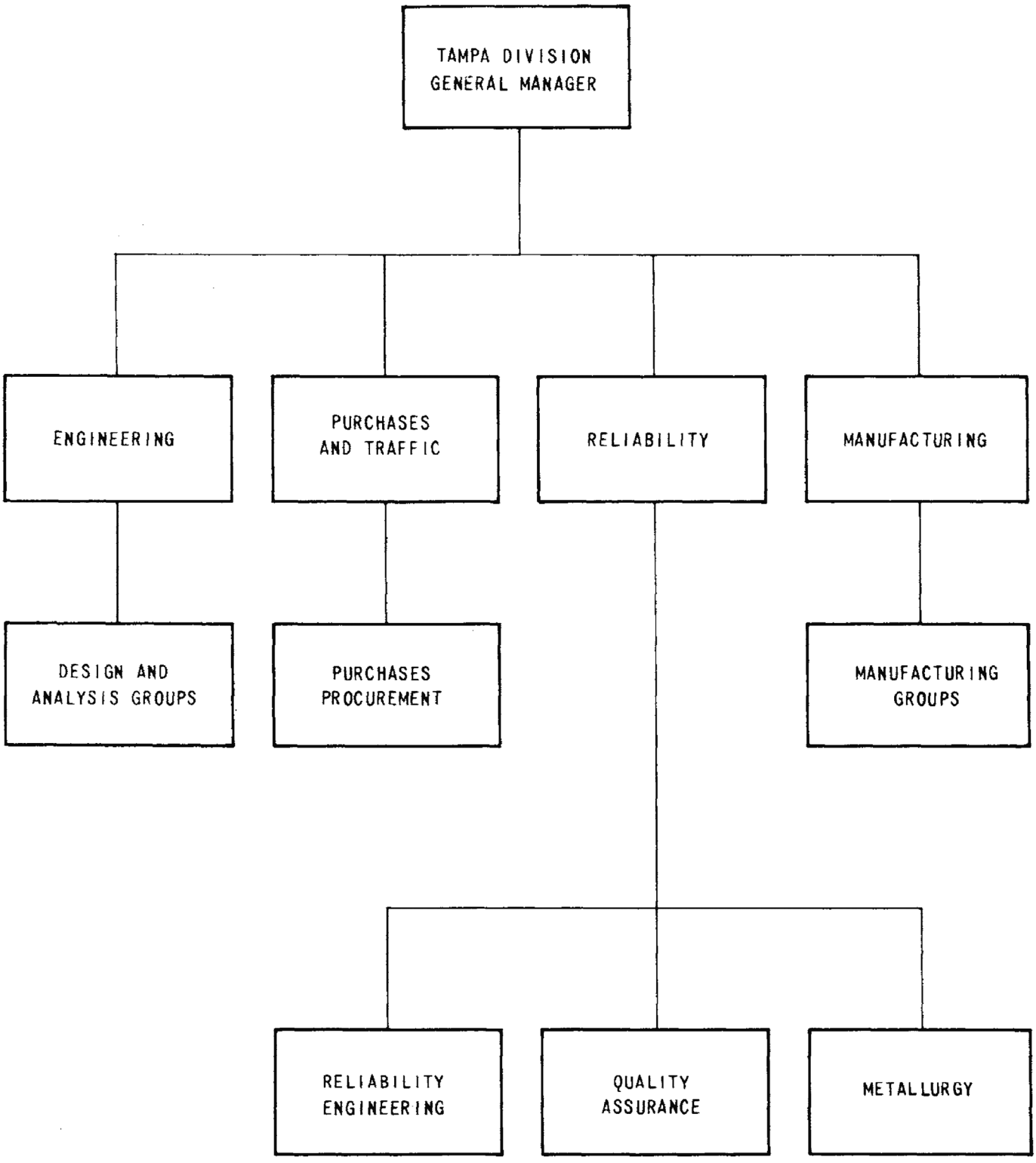
NUCLEAR PLANT
UNIT 1 AND UNIT 2

[ELECTRO-MECHANICAL DIVISION QUALITY ASSURANCE PROGRAM ORGANIZATION

FIGURE 17C-5]



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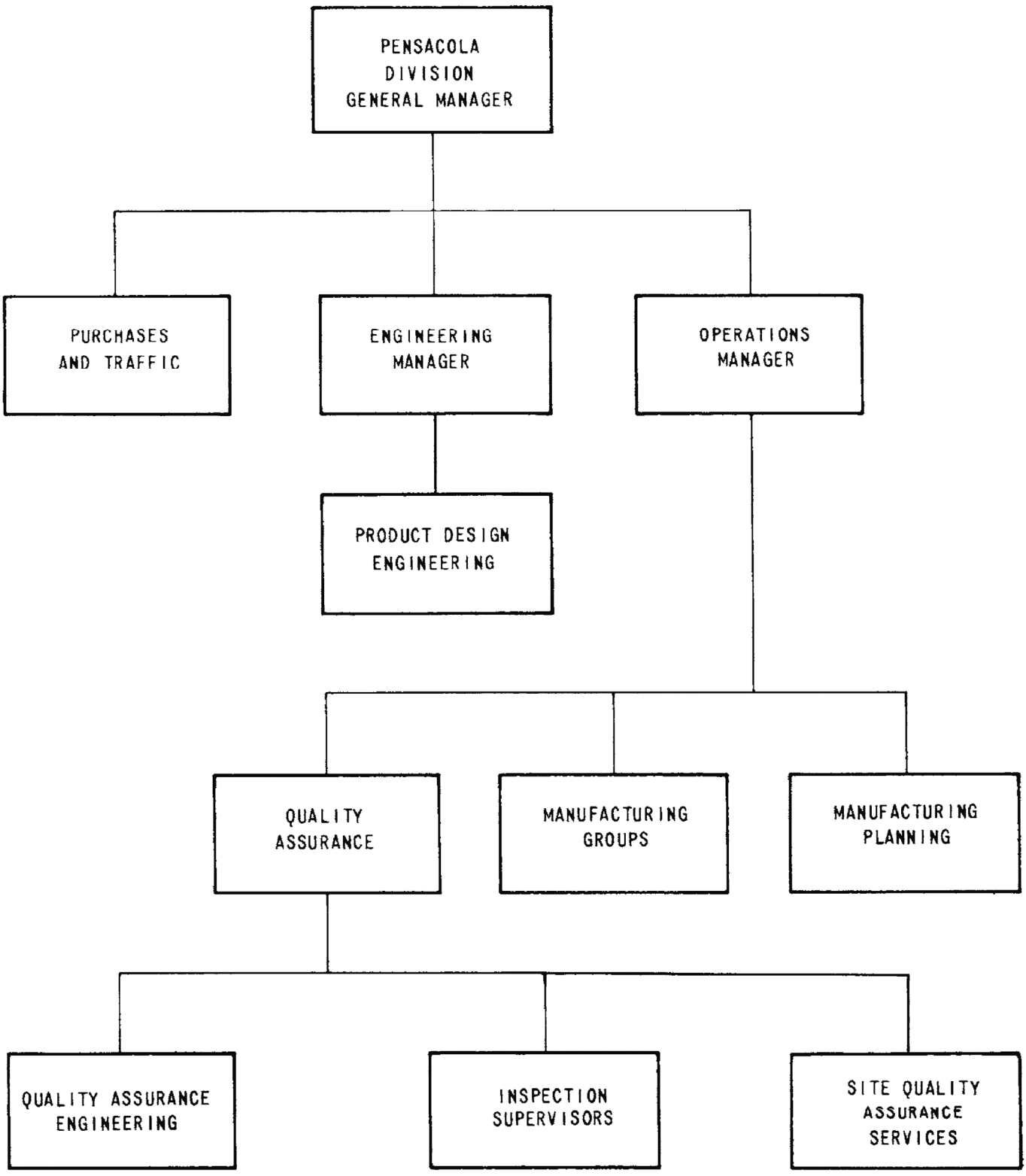
NUCLEAR PLANT
UNIT 1 AND UNIT 2

[TAMPA DIVISION QUALITY ASSURANCE PROGRAM ORGANIZATION

FIGURE 17C-6]



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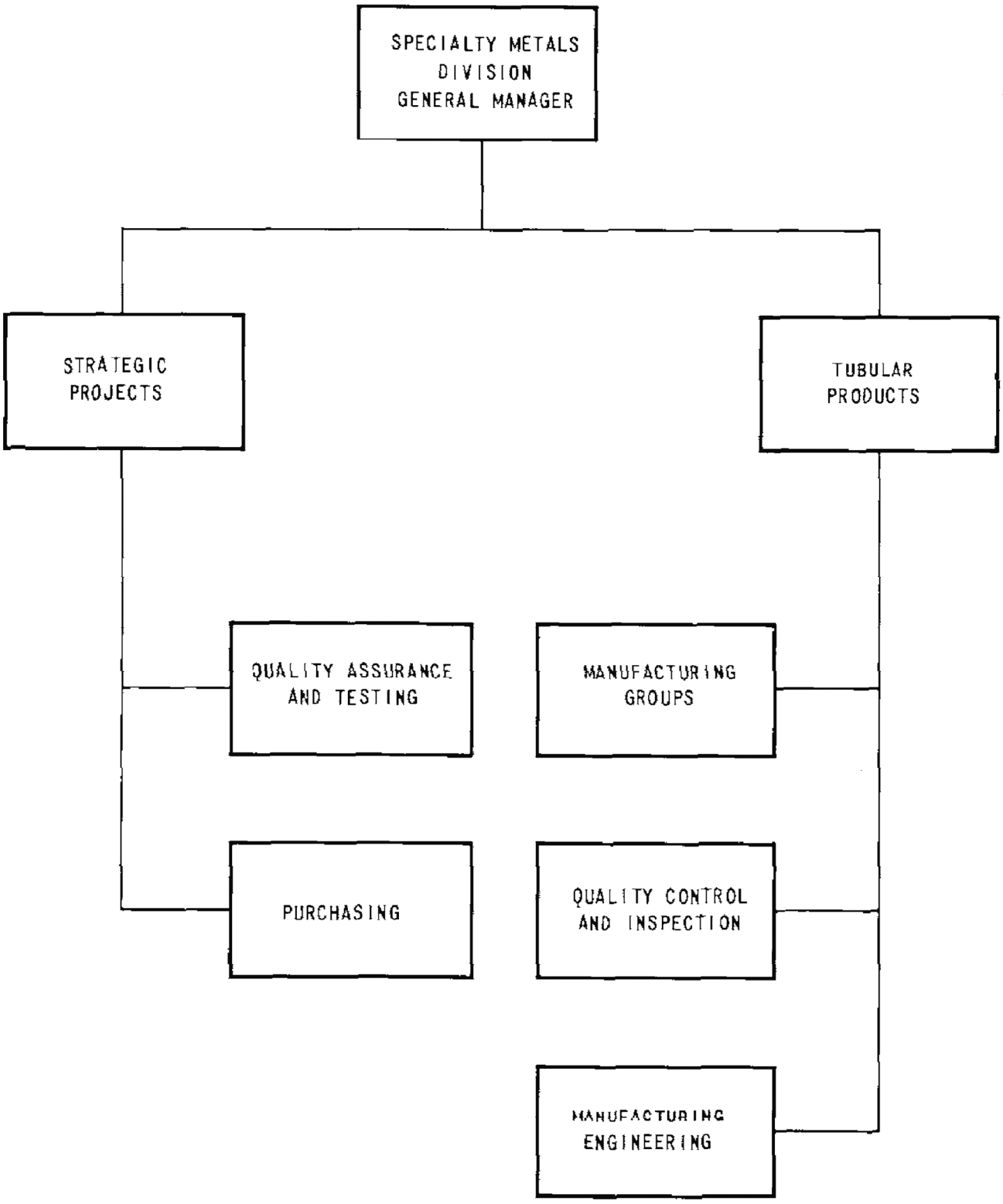
JOSEPH M. FARLEY NUCLEAR PLANT UNIT 1 AND UNIT 2

[PENSACOLA DIVISION QUALITY ASSURANCE PROGRAM ORGANIZATION

FIGURE 17C-7]



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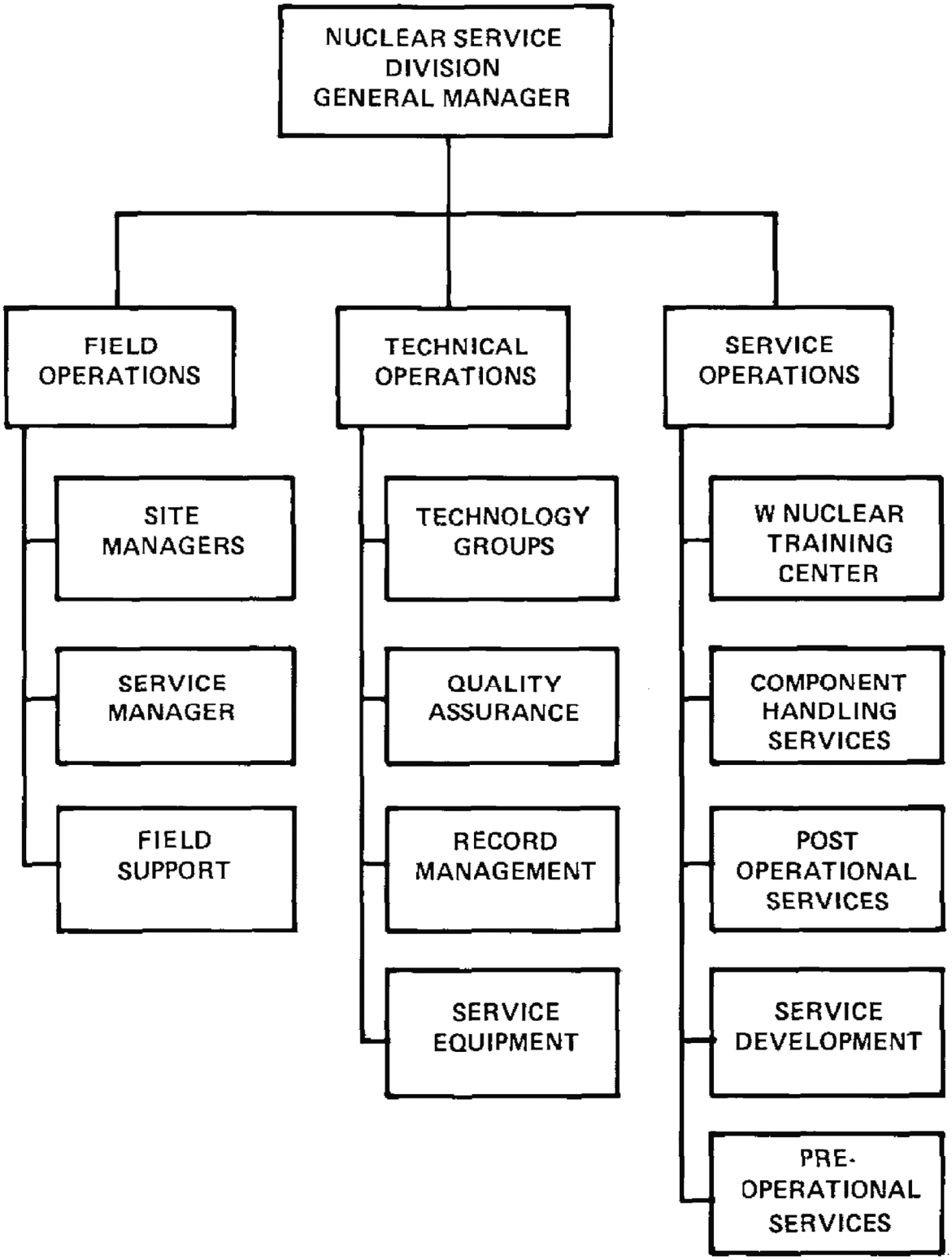
**JOSEPH M. FARLEY
NUCLEAR PLANT
UNIT 1 AND UNIT 2**

*[SPECIAL METALS DIVISION
QUALITY ASSURANCE
PROGRAM ORGANIZATION*

FIGURE 17C-8]



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UNIT 1 AND UNIT 2

[NUCLEAR SERVICE DIVISION QUALITY ASSURANCE PROGRAM ORGANIZATION

FIGURE 17C-9]

APPENDIX D

DANIEL CONSTRUCTION COMPANY OF ALABAMA QUALITY ASSURANCE PROGRAM

TABLE OF CONTENTS

LIST OF FIGURES

[HISTORICAL]
[APPENDIX 17D

DANIEL CONSTRUCTION COMPANY OF ALABAMA
QUALITY ASSURANCE PROGRAM

Appendix 17D contains historical information about the Daniel Construction Company quality assurance program implemented during design and construction of FNP.

As the plant constructor, Daniel Construction Company of Alabama (Daniel) has developed and is implementing a quality assurance (QA) program to control the quality of all assigned construction, field purchasing, field engineering, and other related services.

The Daniel quality assurance program includes the procedures, instructions, and control actions used by Daniel to assure that field fabrication and construction, purchased materials, and workmanship are controlled to meet all applicable specifications, codes, and regulatory requirements. The program is directed toward, but not limited to, providing the necessary quality control for safety-related structures, systems, and components and for providing quality assurance surveillance and audits to assure that the specified requirements are achieved. The procedural controls and instructions are developed and administered by project discipline management. A separate surveillance and audit activity is provided by the resident project quality assurance manager assigned by the Daniel corporate director - quality assurance.

17D.1.1 ORGANIZATION

The project manager represents Daniel on all matters relating to the Farley Nuclear Plant (FNP) and is fully responsible for the proper implementation and satisfactory operation of the construction QA program.

The project manager has delegated to the quality control (QC) manager responsibility for the development, implementation, and administration of the Daniel quality control program. Figure 17D-1 shows the functional relationships among the individuals and units performing the construction quality control activities. Figure 17D-2 shows the functional relationship of the Daniel corporate director - quality assurance with the project and corporate organization. The corporate director - quality assurance assigns a resident project quality assurance manager (PQAM) to provide a completely independent audit and surveillance of the adequacy and effectiveness of the Daniel quality assurance program.

The independent quality assurance audit within the Daniel organization is in addition to the continuous field surveillance audit being performed by the Alabama Power Company (APC).

The duties and responsibilities of each individual performing a quality control function have been set forth in writing in the Daniel FNP Project Procedure Manual (figures 17D-1 and 17D-2). Referring to figure 17D-1, the development and implementation of the construction QC procedures and instructions are carried out through QC responsibilities assigned to the QC disciplines under the direction of the quality control manager, and through the purchasing agent and the warehouse superintendent under the direction of the services manager. As indicated in figures 17D-1 and 17D-2, the project civil QC engineer, the project mechanical QC engineer, the project welding QC engineer, and the project electrical QC engineer have principal responsibility for quality control in their respective construction disciplines; the purchasing agent and warehouse superintendent have a principal responsibility for quality control related to the procurement, inspection, receiving, storage, preservation, and issuance of material and equipment.

The quality control manager has under his supervision a project civil QC engineer whose principal responsibility and duty is quality control. He is responsible for directing the quality control inspectors and technicians, and all testing and inspection, whether on or off the site or by independent testing laboratories or consultants, for those functions under the jurisdiction of the Civil Discipline.

The quality control manager has under his supervision a project mechanical QC engineer whose principal responsibility and duty is quality control. He is responsible for directing the quality control inspectors and technicians, and all testing and inspections, whether on or off the site or by independent testing laboratories or consultants, for those functions under the jurisdiction of the Mechanical Discipline.

The project electrical QC engineer has the responsibility of quality control of the electrical work. He has under his supervision a group of quality control inspectors and technicians and is responsible for all testing and inspection, whether on or off the site or by independent testing laboratories or consultants, for those functions under the jurisdiction of the Electrical Discipline.

The project welding QC engineer has principal responsibility for the quality of all welding and related control activities of metal fusion processes on the project. He is responsible for the direction of welding inspectors and nondestructive examination (NDE) activities performed or subcontracted by Daniel.

The QC manager also has under his direction the Quality Control Documentation Section. This section is responsible for the filing of records and documents related to quality control. It is also responsible for the completeness of QC documentation.

The inspectors and technicians assigned to the above disciplines will be required to be thoroughly familiar with the approved specifications, drawings, procedures, codes, and other instructions pertaining to their area of responsibility; they shall be suitably qualified for their

assigned responsibilities by training, experience, and test when required. These inspectors and technicians shall provide or initiate the required construction test and inspection documentation.

A separate Document Control Section reporting to the services manager is responsible for the administration and control of records and documents related to quality control, and for the control and distribution of all approved drawings, specifications, and construction procedures.

The purchasing agent and the warehouse superintendent are functionally responsible for quality control related to the procurement and receipt of material and equipment. However, they rely upon the quality control engineers and the cognizant engineers within the Project Civil, Mechanical, Welding, and Electrical Sections for checking and verifying material and equipment compliance with procurement requirements.

Engineering and QC personnel also perform required vendor or subcontractor preaward reviews and postaward surveillance and audit.

The function of the project quality assurance manager is to provide a completely independent review and evaluation of the adequacy and effectiveness of the construction QC program. He has been provided with sufficient organization freedom to be able to identify quality problems; to initiate, recommend, or provide solutions to quality problems; and to verify corrective action. He has a direct line of responsibility and communication to the Daniel corporate director – quality assurance. The PQAM prepares periodic reports on the status, adequacy, and conformance of the construction QC program with job requirements. The PQAM reports are distributed to Daniel corporate and project management and to APC QA representatives. The PQAM also works closely with APC's manager – quality assurance (MQA) field representatives. This close association, along with good communication between responsible Quality Control and Quality Assurance personnel at all levels, assures a minimum of interface problems and a good understanding of quality control and quality assurance objectives.

17D.1.2 QUALITY ASSURANCE PROGRAM

The objectives of the Daniel quality assurance program are to: develop written procedures and instructions to assure compliance by field work forces and vendors with specified quality requirements and acceptance criteria; select manufacturing facilities or subcontractors that can assure achievement of the required quality levels; and monitor the manufacturing (vendor shops), subcontractors, and field construction activities as appropriate to assure that the established quality level has been achieved.

Quality control procedures required to implement the construction QC program for safety-related structures, systems, and components are considered to meet the intent of the applicable criteria of Appendix B to 10 CFR 50, Quality Assurance Criteria for Nuclear Power Plants.

17D.1.3 DESIGN CONTROL

Design changes originating in the field as field change requests are processed to the owner/designer in accordance with Daniel QC procedure 5.3.2.1A, Field Change Requests. Approved changes, as documented on the field change request or design change notice, are incorporated by the owner/designer in revisions to the original approved design documents. Latest revisions of all design documents are processed at the project by Daniel in accordance with QC procedure 5.3.2.1, Document Control.

17D.1.4 PROCUREMENT DOCUMENT CONTROL

Inquiries and purchase orders for construction materials or plant equipment purchased by Daniel are based on approved procurement specifications provided by APC.

The supplier is held responsible for meeting the requirements of the bid inquiry or purchase order, and is required to possess or develop a QC/QA organization and program with a QC/QA manual of formal policies and practices by which the supplier can assure the control, verification, and record of product quality. Written QC/QA manuals or programs are obtained from bidders when required for review and approval by Daniel, APC, and others (where applicable) prior to placement of purchase orders.

Prospective vendors for Daniel-procured items or services not on the approved qualified bidders' list are surveyed in accordance with Daniel QC procedure 5.2.1, Supplier/Sub-contractor Qualification Survey, prior to being recommended to APC for approval as a qualified bidder.

The supplier has the responsibility for assuring the quality of materials or services in accordance with QC requirements of the purchase order and for assuring that any subvendors also meet all applicable QC requirements of the Daniel purchase order.

A supplier's or subcontractor's adherence to his QC program and to the procurement requirements is audited by Daniel's QC/QA representatives as required; the supplier or subcontractor is also subject to audit by APC QA representatives.

17D.1.5 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

Daniel implements its project QC program by the use of written procedures and instructions which set forth the practices to be followed at the construction project. These procedures are applicable to all field personnel performing work at the plant site. All quality control procedures are developed by the Quality Control Section in accordance with QC procedure 5.1.3, Preparation, Control, and Implementation of Procedures; they are approved by APC's MQA prior to implementation.

Daniel corporate office personnel assist the project organization as requested in developing selected detailed procedures such as welding, heat treating, and NDE procedures.

The PQAM assists Project Engineering QC personnel in developing detailed QC procedures, reviews QC procedures for adequacy, and audits implementation of QC procedures for effectiveness.

17D.1.6 DOCUMENT CONTROL

The Document Control Section is responsible for the administration, control, and filing of records and documents related to quality control, and for the control and distribution of all approved drawings, specifications, and construction procedures, in accordance with QC procedure 5.3.2.1, Document Control.

The Daniel project filing system has been set up in accordance with the total plant numbering system (TPNS) procedure supplied by APC which covers the systems and equipment for the FNP. Quality control and assurance records and other applicable documents are filed by system or area in accordance with the TPNS requirements to assure a complete history record of each system and its components.

A quality control history file will contain a record of inspections, tests, audits, and other documentation required by applicable specifications, codes, standards, and approved procedures. QC personnel generate the project inspection documentation, and review supplier and subcontractor documentation. This documentation is filed by the Quality Control Documentation Section and controlled by the Document Control Section. The Document Control Section also controls approved field use of documents, such as specifications, procedures, and drawings, in accordance with QC procedures for document control, field change requests, and reproduction of drawings to assure that only latest approved revisions are used to control project construction activities.

17D.1.7 CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

The description in paragraph 17.1.5.4, Procurement Document Control, applies to equipment and services subcontractors; i.e., material, equipment, and services must conform to the procurement documents. The supplier's/subcontractor's adherence to his QC program and the procurement requirements is subject to audit by Daniel QC/QA representatives and representatives of APC. Daniel QC personnel develop procedures, checklists, and instructions to assure conformance with the procurement documents. Receiving inspection includes verification of receipt and adequacy of required documentary evidence of conformance with the specified adequacy by the Daniel PQAM and APC's PQAM or his representative(s).

Procured materials are inspected at the FNP site for damage, identification, and conformance to the procurement documents. The receiving, storage, and handling of materials and equipment at the plant site is performed in accordance with approved QC procedures 5.2.3, Receiving QC Inspection, and 5.2.4, Storage and Handling. These procedures contain measures to preclude receiving and acceptance of material which does not conform to the purchase documents and to ensure that correctly identified, acceptable materials are properly controlled in storage to preclude damage or deterioration prior to use in the construction phase. The Daniel QC engineer or inspector performing the receiving inspection initiates the required QC documentation, and documents and initiates corrective action for damaged or nonconforming materials or equipment in accordance with QC procedure 5.3.1.2, Nonconformance and Corrective Action. Procurement documents for safety-related materials or components included in the text or by attachments, specifications, drawings, and QC/QA provisions which reflect the requirements of the applicable criteria in Appendix B of 10 CFR 50. Daniel controls onsite receiving QC inspection, storage, preservation, handling, material identification, status control, and nonconformances with approved QC procedures. These procedures control the status of the material or equipment from its arrival on the site until its final acceptance for operation. Documentation generated by QC personnel in the implementation of these procedures is maintained in Document Control in accordance with paragraph 17.1.5.6.

17D.1.8 IDENTIFICATION AND CONTROL OF MATERIAL, PARTS, AND COMPONENTS

The following QC procedures are implemented by Daniel for onsite receiving QC inspection: 5.2.3, Receiving QC Inspection; 5.2.4, Storage and Handling; 5.2.5, Material Identification and Status Control; and 5.3.1.2, Nonconformance and Corrective Action. These procedures cover the status of the material or equipment from its arrival on the site until its final acceptance for operation. The QC inspection procedures provide for identification of material and equipment with approved for installation, quality control hold, or reject tags, and segregated storage area for nonconforming items. The storage and handling procedure defines environmental storage conditions and requires surveillance and audit of storage and handling by QC inspectors. The material identification and status control procedure describes the tags and marking methods to

be used and the checks to be made to ensure the status identification of materials and equipment whether approved for use in QC hold or rejected. The nonconformance procedure defines the steps to be followed in controlling deficient material and equipment, and for obtaining disposition instructions such as rework, repair, rejection, or hold for receipt of required documentation. The nonconformance procedure requires that materials, parts, or components which are reworked or repaired be reinspected and accepted by the QC inspector prior to use.

17D.1.9 CONTROL OF SPECIAL PROCESSES

Engineering provides technical direction for assigned construction, fabrication, and equipment erection. QC personnel are responsible for developing and implementing approved procedures and instructions to assure that all field construction is in conformance with approved specifications, drawings, codes, and other specified requirements. They develop status tags, checklists, quality documents, etc., necessary to comply and to demonstrate compliance with specified requirements. Welding, heat treating, nondestructive examination (NDE), and other special processes are controlled by written procedures in accordance with approved specifications. Quality Control personnel perform and document inspections and audits to verify conformance with requirements.

Field construction and erection activities are closely monitored and audited by the PQAM and APC QA. Work on the nuclear steam supply system equipment is also monitored by Westinghouse representatives.

17D.1.10 INSPECTION

Tests and inspections are performed by Quality Control personnel in accordance with written procedures developed by the Engineering and Quality Control Sections and approved by APC prior to implementation. The program of testing and inspection assures conformance with specification requirements, procedures, and drawings. Nonconformities or damages are reported, documented, and controlled by written approved procedures until corrective action approved by APC resolves the nonconformance. Certain types of testing and inspection at the plant site are performed directly by Daniel personnel, while personnel from outside testing laboratories or subcontractors may be called upon to perform other types of inspection and testing. For example, Daniel operates the project concrete laboratory and test facility. X-Ray Engineering is subcontracted to perform a part of the NDE work. Radiography and other nondestructive examination of the welding on the containment liner are the responsibility of the erector (CB&I) and surveillance of subcontracted erection activities is performed by the cognizant Daniel Quality Control Discipline. Daniel inspectors carefully follow the work of all subcontractors at the site to ensure that both workmanship and materials are in accordance with the approved specifications, drawings, and the provisions of the contract or purchase order documents.

Mandatory inspection hold points, where inspection is required by Quality Control personnel or a third party inspector before the work sequence may proceed, shall be indicated in the QC procedure and process sheets in accordance with the Daniel procedures for control of installation of piping, equipment, and instrumentation.

17D.1.11 TEST CONTROL

Construction proof testing is performed in accordance with written test procedures approved by APC; test results shall be documented by and acceptable to APC. Daniel will assist APC as required during the preoperational and startup phase. Procedures developed by Daniel for testing receive internal Daniel review and approval and APC approval prior to release for implementation.

17D.1.12 CONTROL OF MEASURING AND TEST EQUIPMENT

Devices (tools, gauges, instruments, etc.) used in the testing and inspection activities are calibrated and controlled in accordance with QC procedure 5.3.3, Calibration and Control of Testing and Measuring Equipment, to assure accuracy, calibration, periodic recalibration, and disposition control of affected work when out of calibration is discovered.

17D.1.13 HANDLING, STORAGE, AND SHIPPING

The receiving, storage, and handling of materials and equipment at the plant site is performed in accordance with QC procedures for receiving QC inspection, storage, and handling. These procedures contain measures to preclude receipt and acceptance of materials which do not conform to the purchase documents and to assure that correctly identified, acceptable materials and equipment are properly controlled to preclude damage or deterioration prior to use. Handling of materials and equipment is documented in accordance with the above procedure when applicable.

17D.1.14 INSPECTION, TEST, AND OPERATING STATUS

QC personnel are responsible for developing and implementing approved procedures and instructions to assure that project construction is in conformance with approved specifications, drawings, codes, and other specified requirements. They develop the tags, checklists, process controls, quality documents, etc., necessary to comply and to demonstrate compliance with specified requirements.

17D.1.15 NONCONFORMING MATERIALS, PARTS, OR COMPONENTS

Daniel Quality Control personnel implement procedures, checklists, and instructions to assure conformance with specification requirements, procedures, and drawings. Nonconformities or damages are reported, documented, and controlled by written procedures until corrective action approved by APC resolves the nonconformance. QC procedure 5.3.1.4, Work Stoppage, is implemented by Daniel. Basically, work stoppage authority is vested in the quality control manager. The project discipline QC engineers are responsible for initiating action to stop work if the quality of work does not meet requirements or if there is a breakdown in a work process. The QC manager will also implement a work stoppage upon a recommendation from the APC MQA field representative or the Daniel PQAM. Material involved in a work stoppage is controlled in accordance with written procedures which contain instructions for identification, documentation, corrective action, notification of affected management, and followup to verify implementation of the approved disposition.

17D.1.16 CORRECTIVE ACTION

All nonconformances are handled in accordance with QC procedure 5.3.1.2, Nonconformance and Corrective Action. The nonconformance procedure defines the steps to be followed in controlling deficient material and equipment disposition, whether repair, rejection, or hold for receipt of required documentation. The procedure requires that materials, parts, or components which are reworked or repaired be reinspected and accepted by the QC inspector prior to use. Measures to prevent reoccurrence are specified in a disposition of nonconformances.

17D.1.17 QUALITY ASSURANCE RECORDS

Required record documentation verifying conformance to project requirements for Daniel's assigned activities in the construction of the Farley Nuclear Plant shall be maintained by Daniel Document Control in accordance with the TPNS and QC procedures for document control, records, and filing. Record documentation of Daniel QC/QA audit, inspection, and test activities are included in the Document Control files. The Document Control files are continuously monitored by Quality Control personnel and the project quality assurance manager to assure that records of activities affecting quality are adequate and retrievable.

17D.1.18 AUDITS

The project quality assurance manager is responsible for providing a completely independent review, audit, and evaluation of the adequacy and effectiveness of the project QC/QA program. He is resident at the project and reports to the Daniel corporate director - quality assurance. He is assisted, as required, by resident Daniel QA engineers assigned to the project by the QA

manager. Daniel QA engineers resident at the project perform continuous auditing of project activities to assure compliance with the approved program and procedures and to determine the effectiveness of the control system.

Daniel QA engineer audits consist of preplanned periodic surveillance and random spot audits to measure the overall effectiveness of the QC/QA program and systematic in-depth audits and reviews of individual program elements and procedures to evaluate the adequacy of the control system. QA audits are performed in accordance with specific instructions or checklists prepared by the resident QA engineers.

Daniel QA engineers report identified noncompliance with requirements to the responsible project management or supervision for immediate correction, or to QC personnel for documentation and control in accordance with the nonconformance and corrective action procedure.

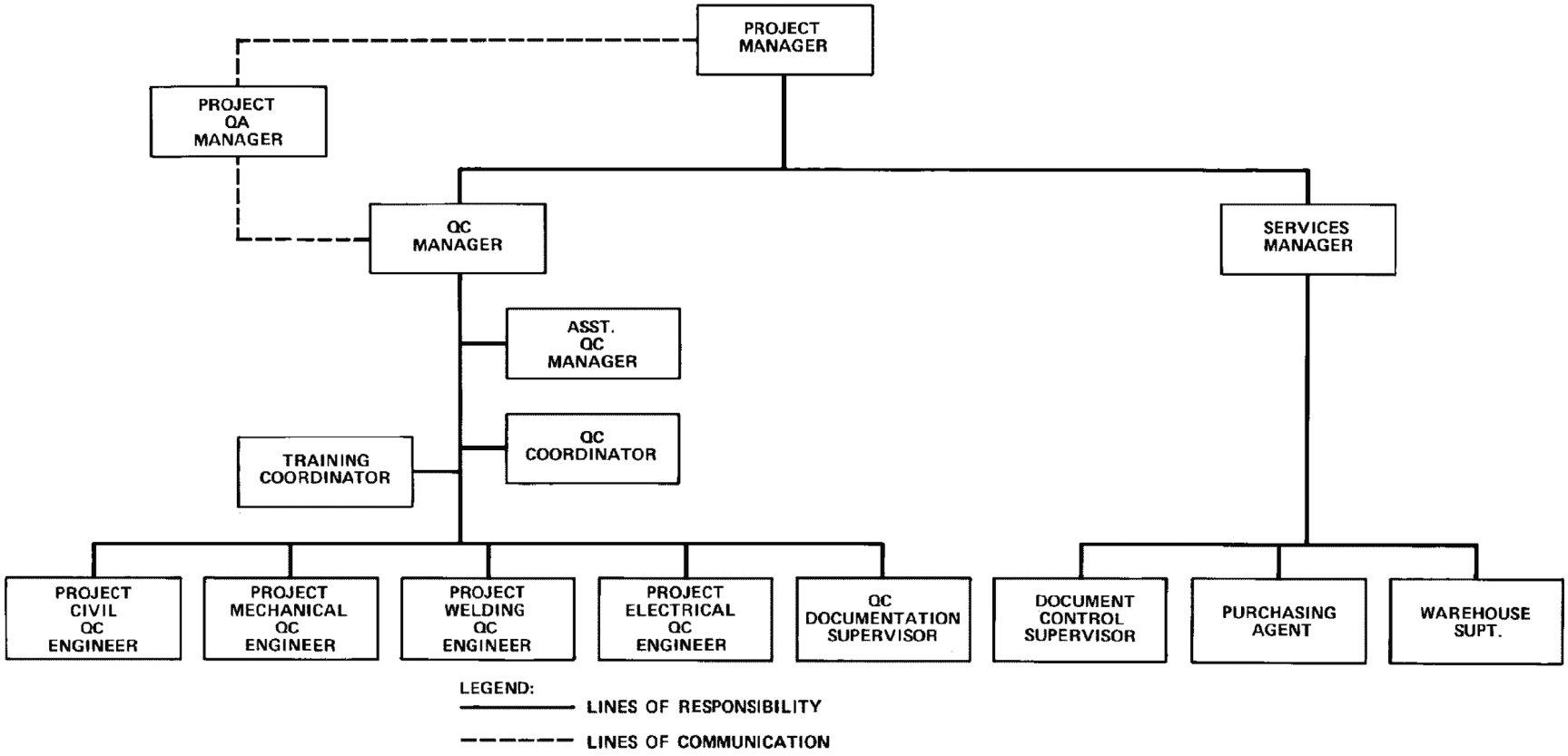
Daniel QA auditing provides for reporting and followup to verify proper disposition and corrective action on deficiencies identified during previous audits.

The project QA manager issues biweekly reports of QA audit results with distribution to responsible project management, to the Daniel corporate director - quality assurance, and to APC as required. Responsible project management shall identify in writing the action taken on QA-identified control system and performance deficiencies.

The project QA manager uses QA deficiency reports or special reports to initiate involvement of the Daniel corporate director - quality assurance when necessary to effect corrective action or work stoppage.

Daniel Quality Assurance has unrestricted access to all project activities, and unrestricted, informal communication paths to all individuals and organizational components.

In addition to Daniel Project QA audit activities, the Daniel Corporate QA Department performs periodic audits of the adequacy and effectiveness of the project control system under the Daniel corporate project monitoring program described in the Project Procedure Manual. The corporate project monitoring program has provisions for reporting results and recommendations for corrective action to Daniel corporate management, Daniel project management, and APC with followup audit of identified deficiencies.]



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[DANIEL CONSTRUCTION COMPANY OF ALABAMA PROJECT QUALITY ORGANIZATION

FIGURE 17D-1]

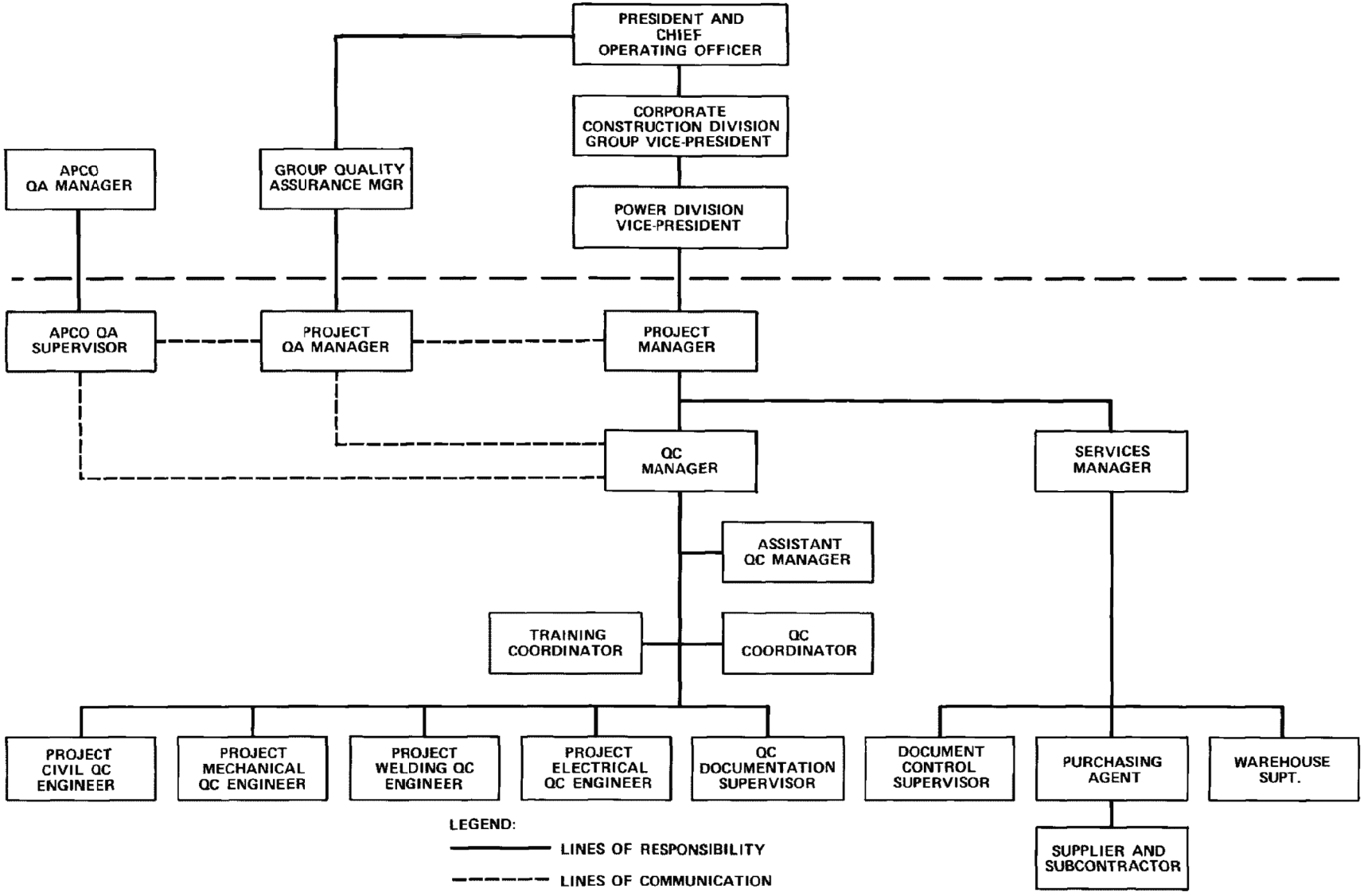

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FIGURE 17D-2]