

RIVER BEND STATION

CONSTRUCTION QA PROGRAM

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CHAPTER 17

QUALITY ASSURANCE

17.1 QUALITY ASSURANCE DURING DESIGN AND CONSTRUCTION

Three inputs to Section 17.1 are provided. Section 17.1A is a description of the Gulf States Utilities Quality Assurance (QA) Program. Sections 17.1B and 17.1C describe the Stone & Webster (SWEC) and General Electric (GE) QA Programs, respectively.

17.1A QUALITY ASSURANCE DURING DESIGN AND CONSTRUCTION (GULF STATES UTILITIES)

Gulf States Utilities (GSU) is responsible for the establishment and execution of the QA Program for River Bend Station. The GSU QA organization is assigned the responsibility to assure implementation of this task. The QA Program for River Bend Station conforms to the requirements of Title 10 of the Code of Federal Regulations, Part 50, Appendix B, effective July 27, 1970, in order to provide assurance that River Bend Station is in conformance with applicable regulatory requirements and with the design bases specified in the license application.

17.1.1A ORGANIZATION

The GSU River Bend project organization is shown as Figure 17.1A-1 and the functional GSU QA organization is further delineated as Figure 17.1A-2. These figures illustrate the lines of authority and responsibility of the departments affected by the QA Program.

17.1.1.1A Functional GSU QA Assignments and Responsibilities

17.1.1.1.1A Director-Quality Assurance

The Director-Quality Assurance reports to the Senior Vice President-RBNG and is responsible for the QA Program for River Bend Station. These responsibilities include the development of the QA Program, auditing to assure proper implementation, and seeing that corrective action is taken when activities do not conform to the requirements of the QA Program, including Stop Work Action. The QA Department is located at the construction site and consists of surveillance and auditing personnel. The Director-Quality Assurance may supplement the QA staff with the use of outside consultants and/or other GSU personnel.

Specific duties assigned to the Director-Quality Assurance include, but are not limited to the following:

- a. Planning, scheduling, and directing the QA Program;
- b. Representing GSU in activities regarding the QA Program;
- c. Directing audit programs;
- d. Seeing that corrective action is taken upon determining that activities do not conform to the requirements of the QA Program;
- e. Reviewing selected purchase documents and selected specifications for inclusion of quality requirements;
- f. Ensuring that the document control system functions to retain quality related records;
- g. Ensuring that the training program at River Bend Station meets QA requirements;
- h. Directing QA consultants in quality assurance related matters; and
- i. Assisting and advising GSU management personnel with regard to QA policy matters.

17.1.1.1.2A Quality Assurance Department

The QA Department is structured to fulfill the responsibilities of the Director-Quality Assurance. To accomplish this goal, the department is divided into three groups as shown on Figure 17.1A-2. Each group has specific functions and responsibilities, and is composed of the necessary QA personnel to fulfill these functions and responsibilities.

17.1.1.1.3A Supervisor-Quality Engineering

The Supervisor-Quality Engineering reports to the Director-Quality Assurance and is responsible for the supervision of Quality Assurance Engineers for:

- a. Review of selected design documents to verify the adequacy and effectiveness of systems provided to ensure conformance to applicable quality requirements;
- b. Preparation and approval of GSU-initiated inspection planning to assure the adequacy and appropriateness of inspection requirements;

- c. Participation in reviewing the QA Program adequacy of all GSU contractors and suppliers as requested by the Supervisor-Quality Systems;
- d. Performing surveillance of site activity to verify conformance to specifications, drawings, and procedures;
- e. Participation in audits to verify adequacy and effectiveness of the QA Program, as requested by the Supervisor-Quality Systems;
- f. Participation in safety-related inspections, as required, performed by the NRC with affected organizations to assure understanding of observations; and

17.1.1.1.4A Supervisor-Quality Systems

The Supervisor-Quality Systems reports to the Director-Quality Assurance and is responsible for supervision, coordination, and direction of Systems Quality Assurance Engineers for:

- a. Control and maintenance of the GSU Quality Assurance Manual and supporting procedures;
- b. Coordination within QA of quality related inputs and changes affecting the applicable SAR.
- c. Review and evaluation of the QA Program adequacy of GSU, major contractors and suppliers.
- d. Scheduling, coordinating, and conducting audits of major contractors, suppliers, and GSU internal audits to verify the adequacy and effectiveness of the QA Programs;
- e. Performance of surveillance of system-oriented site activities, such as document control, warehousing, storage, and training;
- f. Monitoring GSU QA records control and participation in audits of major contractors' QA records control systems to assure adequacy and orderliness of records to be provided to GSU; and
- g. Coordination of NRC safety-related inspection activities and follow-up to assure prompt resolution and closeout of audit findings.

17.1.1.1.5A Supervisor-Operational Quality Assurance

The Supervisor-Operational Quality Assurance reports to the Director-Quality Assurance and is responsible for:

- a. Performing long range planning and organization studies to establish QA requirements for transition from construction to operations;
- b. Developing and preparing the operations phase QA program;
- c. Preparing and reviewing FSAR drafts and revisions from a QA perspective;
- d. Determining and coordinating QA start-up responsibilities;
- e. Assisting plant staff, start-up, and quality control personnel in the development of procedures; and
- f. Review and approval of GSU-generated QA Category I purchase orders for inclusion of quality related requirements;
- g. Scheduling and coordinating the performance of supplier surveillance on GSU QA Category I procurements and maintaining an approved suppliers list.

17.1.1.1.6A Corporate Nuclear Review Committee (CNRC)

The CNRC is composed of RBNG management personnel. It has been established by GSU to assure that appropriate levels of management share the responsibility for review of the adequacy and effectiveness of the QA Program. The CNRC is responsible for assessing/auditing the adequacy and effectiveness of the GSU Quality Assurance Program and its management on approximately a semi-annual basis.

The CNRC directs the accomplishment of a semi-annual assessment/audit performed by an outside consultant, or other appropriate organization. The results of these audits are reviewed by the CNRC and recommendations of any corrective action or changes are made.

17.1.1.2A Qualification and Experience Levels

<u>Title</u>	<u>Min. Req. Degree</u>	<u>Min. Years Experience</u>	<u>Required Background</u>
Director-QA	BS*	5	At least five years in charge of responsible assignments in the design, construction, or operation of a power plant.
QA Supervisors	BS*	5	At least five years in charge of responsible assignments in the design, construction or operation of a power plant.
QA Engineers	BS*	1	At least one year quality related work or equivalent experience in the design, construction, or operation of a power plant.

*Equivalent qualifications in related physical science or two years of equivalent experience in the design, construction, or operation of a power plant per year of college education.

17.1.1.3A Organizational Authority and Freedom

Figure 17.1A-1 clearly indicates the organizational freedom of the GSU QA Department to enable it to verify, by daily monitoring and periodic auditing, that all activities affecting quality are being implemented.

17.1.1.4A Quality Assurance Authority

The Director-QA has the authority, delineated in writing, to direct stop work action if the specified quality of work is not being met. The Director-QA has the authority to exercise this directly by notifying the responsible management personnel of the affected organization.

Also, GSU maintains the right to require GE to repair or replace equipment which does not meet purchase requirements, is defective in workmanship or materials, or fails to meet preoperational test requirements. The GSU Director-QA has the authority to exercise these rights directly with the GE Project Manager.

Prior to execution of any repair, replacement or stop work action, the Director-QA may require reinspection of GE and/or SWEC accepted

material by a sampling procedure based upon recognized standards. The sample size is based on the safety implications of the equipment.

Rework, repair, replacement or stop work directives, subsequent to inspections or tests, requires reinspection and/or retesting to the extent necessary to demonstrate acceptability based on the original criteria and conformance with the approved rework/repair directives.

17.1.1.5A Reporting of Quality Program Status to Management

The Director-QA submits a monthly QA activities report to the Senior Vice President-RBNG. This report contains information on audits conducted, meetings attended, and miscellaneous activity or areas of special interest, i.e., notification point, NRC inspection, and consultant activity.

The Director-QA submits a QA status report every two months to the Senior Vice President-RBNG, with copies to cognizant GSU, SWEC and GE management personnel. This report contains a summary of the Quality Assurance Finding Reports (QAFR) opened during the month, a status of existing QAFR's, QAFR's closed during the month, the status of NRC Inspection Findings, the identification of significant quality problems, and a QAFR trend analysis of the previous six months.

17.1.2A Quality Assurance Program

Structures, systems, and components important to safety that prevent or mitigate the consequences of postulated accidents are covered by the GSU QA Program as indicated in Section 3.2.

17.1.2.1A Delegated Responsibility

SWEC has been delegated the responsibility for the design and procurement of the balance of the plant, onsite construction, and to assist GSU in the development and implementation of the overall QA Program.

GE has been delegated the responsibility for the design and procurement of the NSSS system and nuclear fuel.

Although GSU has delegated the responsibility to SWEC and GE, GSU retains the ultimate responsibility for River Bend Station. Through surveillances and periodic, planned audits, GSU assures itself of an implemented QA Program. Surveillance includes the review of monthly project progress reports from both GE and SWEC and the review/observation of construction activities.

| SWEC's and GE's QA Programs for performance of their delegated
| functions are as described in Sections 17.1B and 17.1C respectively,
| and comply with the applicable portions of 10CFR50, Appendix B.

| 17.1.2.2A GSU Nuclear Quality Assurance Manual

| The specific quality functions of GSU are delineated in the GSU Nuclear
| QA Manual (NQAM). The NQAM is organized into 18 parts corresponding to
| 10CFR50, Appendix B. The general content is as follows:

| QAP 1

| Organization
| Interface with SWEC and GE QA

| QAP 2

| Issue and Review of Gulf States NQAM and NQAPD Procedures
| Classification of Systems, Structures, and Components
| Training Requirements and Training Records Maintained
| Management Reports
| Corporate Nuclear Review Committee

| QAP 3

| Review of Technical Documents
| Communication and Follow-up of Review Comments

| QAP 4

| Verification of Contractor Procurement Document Controls
| GSU Procurement Control
| QA Requirements for Purchasing

| QAP 5

| Generation of GSU Project and QA Procedures and Instructions

| QAP 6

| Control of GSU Generated Documents

| QAP 7

| GSU Procurement Activity
| Evaluation of Vendors
| Vendor QA Program Evaluation and Approval

| QAP 8

| Identification and Control of Materials, Parts, and Components
| (delegation of authority to SWEC and GE with specific
| responsibilities applicable to off-site storage of
| material/equipment being retained by GSU)

| QAP 9

| Control of Special Processes (delegation of authority to SWEC and GE)

| QAP 10

| Witnessing of Shop Tests (delegation of authority to SWEC and GE)

| QAP 11

| Test Control (delegation of authority to SWEC and GE)

| QAP 12

| Control of Measuring and Test Equipment (delegation of authority
| to SWEC and GE with specific responsibilities applicable to
| off-site storage of material/equipment being retained by GSU)

| QAP 13

| Handling, Storage, and Shipping (delegation of authority to SWEC and GE
| with specific responsibilities applicable to off-site storage of
| material/equipment being retained by GSU)

| QAP 14

| Inspection, Test, and Operating Status (delegation of authority
| to SWEC and GE with specific responsibilities applicable to
| off-site storage of material/equipment being retained by GSU)

| QAP 15

| Control of Nonconforming Parts or Components (delegation of authority
| to SWEC and GE)
| Generation of GSU Finding Reports
| Interface with S&W and GE

| QAP 16

| Corrective Action Report Initiation
| Corrective Action Report Follow-up and Close-out
| Inclusion of Corrective Action into Audit Program

Reporting of Significant Deficiencies
Corrective Action Analysis
Initiation of Site Stop Work Action

QAP 17

Preparation, Collection, Storage and Maintenance of QA Records
Quality Assurance Records List
Quality Assurance Records File

QAP 18

Audit Planning and Scheduling
Qualification and Training of Auditors
Management Review of QA
GSU Internal Audits
Contractor Audits
Vendor Audits
Audit Reports
Follow-up and Close-out of Audit Reports

The NQAM is considered by GSU to be a working document and the general content as shown above is subject to continual revision and change.

The NQAM is prepared by the QA Department. Concurrence with each section is obtained from the appropriate department manager or supervisor. The NQAM is approved by the Director-QA and the Senior Vice President-RBNG. All revisions to the NQAM undergo the same review and approval process.

QA program requirements for startup testing and operations are described in the FSAR.

17.1.2.3A Project Procedures

The review, approval, release, distribution and revision of design documents are accomplished in accordance with the GSU River Bend Project Procedures Manual. Similar procedural systems exist in SWEC and GE. Interface activity or coordination is effected by GSU concurrence of applicable GE and SWEC procedures.

The NQAM requirements affecting QA Department activities are implemented by Nuclear Quality Assurance Program Documents (NQAPD's), which are approved by the Director-QA.

17.1.2.4A Periodic Review of Controlled Documents

GSU reviews all controlled documents which they issue, including the Nuclear Quality Assurance Manual, every two years. Major revisions to

these documents may constitute this review. Measures are established to assure that documents are reviewed for adequacy and approved for release by authorized personnel and are distributed and used at locations where the activity is being performed. Quality Assurance, Nuclear Plant Engineering, Project Engineering, Licensing, and Administrative Services participate in this review, as applicable.

17.1.2.5A Fuel QA Program

GSU, as the plant owner, retains the responsibility for the quality of the nuclear fuel. GSU performs an overall audit and review of the GE Fuel QA Program. GSU may use consultants, as required, in preparation of the nuclear fuel contract, contract negotiations, and in preparation of a technical evaluation of fuel design, and an initial audit of the GE nuclear fuel quality system. GSU may use consultants to further assist in evaluation of fuel design, recommended quality program changes and a system of detail audits during the fabrication cycle. GSU provides instructions for receipt inspection, handling, and storage of the nuclear fuel.

GE performs the first level quality program, consistent with the requirements of 10CFR50, Appendix B for design and fabrication of the nuclear fuel, to assure the mechanical integrity of the fuel over its anticipated lifetime. The GE fuel design and quality inspections requirements are discussed in Chapter 4.

GSU maintains the right to conduct special tests, in addition to GE's QC inspection requirements, during the fuel fabrication phase. Special tests to be performed are established prior to fuel fabrications based on the state of the art and current industry problems.

GSU Fuel QA Program requirements are delineated in the GSU NQAM.

17.1.2.6A QA Training

The Director-Quality Assurance must have as a minimum five years in charge of responsible assignments in the design, construction, or operation of a power plant. He draws upon this experience in handling technical problems and personnel relations, as they arise. Initially, he familiarizes himself with the GSU QA manuals and policies to more adequately understand the overall program. He familiarizes himself with codes, standards, and regulatory requirements, related to quality assurance and to nuclear power plants in general. He participates in all phases of the audit program, including preparation of inspection plans, conduct of audits, and writing of summary audit reports.

GSU maintains a reading list to monitor QA employees' progress in acquainting themselves with regulatory standards, codes, GSU QA manuals, technical descriptions, and other related project literature.

Experience reports from reactors, both in construction and operation, are routed to QA personnel. In addition, periodic training meetings are conducted by various members of the GSU staff or outside technical personnel, and documented in accordance with QAP 2.

All personnel involved in any audit in which GSU is participating familiarize themselves with Section 18, Audits, GSU Nuclear Quality Assurance Manual.

Where background education indicates and circumstances permit, personnel who do a substantial quantity of auditing are allowed to accompany an audit team for purposes of observation, education and training.

In addition, as a part of training, principal GSU audit personnel are required to prepare an audit checklist, participate in audits under the supervision of Quality Assurance and prepare Summary Audit Reports.

Director-Quality Assurance maintains a working file for each auditor within GSU QA organization to demonstrate accomplishment of minimum training requirements specified above. Permanent auditor training files are transmitted to Nuclear Document Control.

It is the responsibility of QA to assure that an adequate training program is utilized and maintained according to 10CFR50, Appendix B.

GSU may utilize the services of consultants and architect engineers to support GSU QA in quality related activities on the nuclear projects. These activities include but are not limited to, reviewing specifications for quality requirements, accompanying GSU on manufacturing notification points, training, and audits.

17.1.2.7A Applicable ANSI/Regulatory Guides

GSU's QA program references those ANSI standards that comprise that "GREY BOOK", July 1973, and applicable Regulatory Guides. The "GREY BOOK" standards that are specifically referenced in our QA Program include:

ANSI 45.2 - 1971

- 45.2.9 (Draft 11, Rev. 0 - Jan. 17, 1973)*
- 45.2.11 (Draft 2, Rev. 2 - May 1973)
- 45.2.12 (Draft 3, Rev. 0 - May 2, 1973)*
- 45.2.13 (Draft, _____ - May 31, 1972)*

Regulatory Guides 1.28, 1.30, 1.31, 1.37 and 1.38

* Including the additional Staff Comments in the July 1973 "GREY BOOK".

17.1.3A Design Control

The GSU QA Program requires that measures be established to assure that:

- a. Applicable regulatory requirements, design bases for those safety-related structures, systems, and components are correctly translated into specifications, drawings, procedures, and instructions
- b. There is adequate selection and review for suitability of application of materials, parts, equipment
- c. There are design control measures for verifying or checking the adequacy of designs
- d. There is control of design changes
- e. There are measures for the control and identification of design interfaces for coordination between participating design organizations.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. Measures for the control and identification of design interfaces between GE, SWEC, and GSU are delineated in the River Bend Station Project Procedures Manual. The implementation of design control has been delegated to SWEC and GE. GSU reviews and comments on design documents.

GSU performs no design of safety related equipment. GSU performs technical and QA reviews of selected safety related documents to assure that licensing commitments and regulatory requirements have been met. Such documents are reviewed for conformance to:

1. Applicable SAR
2. Operational and Construction Experiences
3. GSU practices
4. QA requirements

GSU performs periodic audits of the SWEC and GE design control programs. GSU presently documents deficiencies found during design reviews in the form of a controlled letter (uniquely identified) to either GE or SWEC, issued by the River Bend Project Engineer. Assurance that adequate design reviews are performed is verified by planned and periodic audits conducted by GSU personnel not having direct responsibilities in the area audited.

The GSU NQAM and project procedures provide implementing procedures for GSU conduct of technical and QA reviews of safety related specifications, purchase documents, and selected safety related drawings and sketches; and periodic audits of SWEC and GE design control programs.

17.1.4A Procurement Document Control

The GSU QA Program requires measures to be established to assure that:

- a. Applicable regulatory, design bases, and other requirements which are necessary to assure quality are suitably included or referenced in procurement documents of material, equipment, and services.
- b. To the extent necessary, contractors or subcontractors are required to provide a QA program consistent with the pertinent provisions of 10CFR50, Appendix B.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. SWEC and GE have been delegated the implementation of procurement document control.

GSU Project Engineering Staff and QA Groups review and approve selected material and equipment bids received by SWEC. GSU as the licensee maintains the ultimate responsibility for all phases of the nuclear project. In an effort to ensure this, a selected review of procurement documents is conducted. These may include, but not be limited to, purchase orders, specifications, drawings, bid evaluations, and approval of final bidder. Subsequent review of procurement document revisions are on a case-by-case basis, subject to the discretion of the Project Engineer and based on the extent the revision affects quality or technical adequacy. Additionally, GSU may audit procurement documents in GE, SWEC, or their subcontractors. Provisions for access to supplier shops for source inspection or audit, and applicability of procurement requirements extended to subcontractors, where applicable, may be examined. All changes to procurement documents are subject to the same control measures applied to the original document. These include engineering approval and the option of GSU to review any change prior to its incorporation.

17.1.5A Instructions, Procedures, and Drawings

The GSU QA Program requires measures to be established to assure that:

Activities affecting quality are prescribed by documented instructions, procedures, or drawings and accomplished in accordance with these instructions, procedures, or drawings.

Instructions, procedures, or drawings include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. This quality function has, during design and construction, previously been delegated to SWEC and GE with exception of GSU quality related instructions.

The detailed procedures and instructions to implement GSU's QA responsibilities are contained in the GSU NQAM/NQAPD. The NQAM provides criteria for the control, issue, and revision of procedures contained therein. GSU QA performs periodic audits of GE and SWEC to verify implementation of this section.

17.1.6A Document Control

The GSU QA Program requires measures to be established to assure:

- a. Control of the issuance of quality related documents.
- b. That documents, including changes, are reviewed for adequacy and approved for release by authorized personnel and are distributed to and used at the location where the prescribed activity is performed.
- c. Changes to documents are reviewed and approved by the same organization that performed the original review unless otherwise designated by GSU.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. This quality function has primarily been delegated to SWEC and GE during design and construction with the exception of GSU quality related documents. GSU QA performs periodic audits of GE and SWEC to verify implementation of this section.

GSU is responsible for the controlled issue, distribution, revision, and review of all GSU controlled documents.

All GSU controlled documents issued carry on them the document title and manual number, as appropriate.

The manual numbers are likewise noted beside the name of the manual holder on the distribution list. Issues, revisions, additions, or changes to controlled documents, are transmitted by use of a GSU Controlled Document-Revision Form.

The holder, when receiving an addition or revision, makes the necessary changes, signs the revision form, and returns it to GSU QA or Administrative Services Support as applicable.

A controlled table of contents is a part of each controlled document indicating the effective date of each section of the manual. A revision number is noted by procedure or page number as applicable.

17.1.7A Control of Purchased Material, Equipment, and Services

The GSU QA Program requires that measures be established to assure:

- a. Purchased material, equipment and services conform to procurement document requirements.
- b. There are provisions, as appropriate, for source evaluation and selection.
- c. Objective evidence of quality furnished by the contractor or subcontractor as appropriate.
- d. Inspection of material at source and examination upon delivery as appropriate.
- e. Documentary evidence that specific quality requirements have been met will be at the power plant site prior to installation.
- f. The effectiveness of the control of contractors and subcontractors is assessed by GSU, GE, and SWEC.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. This quality function has been delegated to SWEC and GE during design and construction.

The GSU NQAM and NQAPD provide audit and surveillance procedures for the assessment of the effectiveness of control by GE, SWEC, and their subcontractors.

17.1.8A Identification and Control of Materials, Parts, and Components

The GSU QA Program requires that measures be established for:

- a. The identification and control of materials, parts and components, including partially fabricated assemblies.
- b. Requirements to maintain identification of an item by heat number, part number or their appropriate means, either on the

item or on records traceable to the item, as required throughout fabrication, erection, installation, and use of item.

- c. Identification and control to prevent the use of incorrect or defective material, parts and components.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. GSU is responsible for the maintenance of item identification and the control of items in off-site storage in accordance with delineated procedures. All other identification and control of materials, parts, and components has been delegated to SWEC and GE during design and construction.

The GSU NQAM and NQAPD provide procedures for periodic GSU QA audits of the effectiveness of the implementation of identification and control of materials, parts, and components by GE and SWEC.

17.1.9A Control of Special Processes

The GSU QA Program requires that measures be established to assure that:

Welding, heat treating, nondestructive testing, cadwelding, destructive testing, and other special processes as appropriate are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. This quality function has been delegated to SWEC and GE during design and construction.

The GSU NQAM and NQAPD provide procedures for periodic audits to determine the effectiveness of implementing and controlling special processes by GE and SWEC and their respective contractors.

17.1.10A Inspection

The GSU QA Program requires that measures be established to assure that:

- a. Inspection of activities affecting quality are established and implemented to verify conformance with documented instructions, procedures, and drawings for accomplishing the activity.

- b. Inspection is performed by individuals other than those that accomplished the activity being inspected.
- c. Inspection is performed for each work operation where necessary to assure quality.
- d. Where inspection is impossible or disadvantageous, process monitoring may be provided.
- e. Inspection and process monitoring are both provided when control is inadequate without both.
- f. Mandatory inspection hold points are indicated in the appropriate documents where necessary.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. This quality function has been delegated to SWEC and GE during design and construction.

The GSU NQAM and NQAPD provide procedures for periodic audits of the effectiveness of the implementation of inspection activities by GE and SWEC, and their contractors.

17.1.11A Test Control

The GSU QA Program requires that measures be established to assure that:

- a. All testing required to demonstrate that structures, systems, and components will perform satisfactorily in service are identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents.
- b. The test program includes, as appropriate, proof tests prior to installation, preoperational tests, and operational tests during nuclear power plant operation of structures, systems, and components.
- c. There are provisions for assuring that all prerequisites for the given test have been met.
- d. Adequate test instrumentation is available and used.
- e. The test is performed under suitable environmental conditions.
- f. Test results are documented and evaluated to assure that test requirements have been satisfied.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. This quality function has been delegated to SWEC and GE.

The GSU NQAM and NQAPD procedures provide for the witnessing and auditing of selected vendor shop tests in the SWEC and GE scope of supply.

The GSU staff is on site during the construction stage to become familiar with the station and assist in the startup and testing of the systems, as required. The startup and Test Program is described in Section 14.2 of the FSAR.

GSU staff or SWEC Preliminary Test Organization (PTO) checks the readiness of equipment for initial operation, the cleanliness of piping and equipment for initial operation of controls and protective devices. In general, operations of equipment is accomplished by GSU operators. GSU personnel are preparing preoperational and startup testing procedures from test instructions and specifications prepared by GE Nuclear Energy Division for the NSSS power plant equipment, operate said equipment for the prescribed tests, record the necessary data, and prepare summaries of test results.

17.1.12A Control of Measuring and Test Equipment

The GSU QA Program requires that:

Measures be established to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. GSU is responsible for assuring that all M&TE utilized, in the storage and maintenance of items at the off-site storage location, are properly controlled and calibrated. SWEC provides GSU with such M&TE and GSU utilizes SWEC's Control and Calibration System for this function. All other Control of Measuring and Test Equipment has been delegated to SWEC and GE during design and construction.

The GSU NQAM and NQAPD provide procedures for periodic audits of the effectiveness and implementation of the control of measuring devices by SWEC and GE.

17.1.13A Handling, Storage, and Shipping

The GSU QA Program requires that measures be established to assure that:

- a. There is control of the handling, storage, shipping, cleaning, and preservation of material and equipment in accordance with work and inspection instructions to prevent damage or deterioration.
- b. When necessary for particular products, special protective environments, such as inert gas atmosphere, specific moisture control levels, and temperature levels are specified and provided.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. GSU is responsible for handling, storage, and shipping of items at the off-site storage location in accordance with delineated procedures. All other handling, storage, and shipping has been delegated to SWEC and GE during design and construction.

The GSU NQAM and NQAPD provide procedures for periodic audits of the effectiveness and implementation of handling, storage, and shipment by GE and SWEC and their contractors.

17.1.14A Inspection, Test, and Operating Status

The GSU QA Program requires that measures be established to assure that:

- a. There is indication by marking such as stamps, tags, labels, routing cards, or other suitable measures, of the status of inspections and tests performed.
- b. Identification of items which have satisfactorily passed required inspections and tests, where necessary to prevent inadvertent bypassing of such inspections.
- c. There is indication of the operating status of structures, systems, and components of the nuclear power plant such as by tagging valves and switches to prevent inadvertent operation.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. GSU is responsible for the maintenance of inspection status on items at the off-site storage location in accordance with delineated procedures. Implementation of all other Inspection, Test, and Operating Status during construction, but prior to turnover, has been delegated to SWEC and GE. Turnover of equipment by SWEC at the end of construction is accomplished by GSU/SWEC approved procedures.

The GSU NQAM and NQAPD provide procedures for periodic audits of the effectiveness and implementation of inspection, test, and operating status of equipment purchased and/or designed by SWEC and purchased and/or designed by GE. The GSU startup manual provides instructions for turnover of equipment by SWEC at the end of preliminary testing.

There is a documented sign off by SWEC designating completion of all required installation testing by system or subsystem at the end of construction. All required installation testing is identified as a part of the final sign off. The Joint Test Group discussed in FSAR Chapter 14 reviews and recommends acceptance of the installation testing to the GSU Plant Manager. Upon acceptance by the GSU Plant Manager these systems or subsystems are tagged out to limit operation of the completed systems to GSU designated personnel. System status is maintained during final completion of installation testing by utilizing an index of required tests for systems and individual components. The index is kept current during system inspections, testing, and initial operation prior to conditional acceptance by GSU for the preoperational testing phase. A central records section is established including the procedural and administrative control for maintenance of completed inspection reports, nondestructive tests, test records, initial operation records, and preoperational test records. Preoperational testing is conducted by GSU personnel with the technical assistance of SWEC and GE as described in FSAR Chapter 14. System status is maintained by means of time scaled networks and charts that indicate sequence of Preoperational Tests and/or Acceptance Tests to be performed for a given system or subsystem. These networks are annotated by SWEC, GE, and GSU personnel to maintain an up-to-date status of systems undergoing Preoperational Testing. Each phase of the testing program from Installation Testing through Startup Testing, and the 100 hr Acceptance Test is based on the requirements of Appendix B to 10CFR50 and the Applicable NRC Guides.

17.1.15A Nonconforming Materials, Parts, or Components

The GSU QA Program requires that measures be established to assure that:

- a. Controls are established for materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation.
- b. These measures include, as appropriate, procedures for the identification, documentation, segregation, disposition, and notification to affected organizations.
- c. Nonconforming items are reviewed and accepted, rejected, repaired or reworked in accordance with documented procedures.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. GSU is responsible for the identification, documentation, segregation, and notification of affected organizations of nonconforming items at the off-site storage location in accordance with delineated procedures. GSU refers all identified nonconformances to SWEC for documentation of dispositions. All other functions regarding nonconforming materials, parts, or components during design and construction have been delegated to SWEC and GE.

GSU receives the following nonconformance and corrective action reports from SWEC.

1. Nonconformance and Disposition (N&D) Reports as they are issued.
2. Engineering Assurance Audit Report Summaries for the River Bend Project. These are received as accomplished which is approximately bimonthly.
3. QA Site Audit Reports performed by SWEC personnel quarterly.
4. Construction inspection reports from the River Bend site at turnover of individual systems.
5. Significant Deficiency reports as they are generated.

GSU additionally receives Field Deviation Disposition Request (FDDR) reports from GE as they are generated.

These GE reports are received in all cases whenever the deviation affects interchangeability, life of the component, performance, or safety. Other nonconformances affecting "Internal" items are not forwarded to GSU. This decision is made by GE, and the GE River Bend Project Manager has a review in all cases of generated disposition reports. These reports listed above are reviewed by the appropriate Project Engineer Quality Assurance, and other GSU personnel as they are received. Depending upon the nature of the report and the importance of the deviation, appropriate quality trends are reported to management through existing communications channels. These channels may include but not be limited to GSU QA Status Reports, Corrective Action Reports, Reporting of Significant Deficiencies, and verbal communications.

The GSU NQAM and NQAPD provide procedures for periodic audits to determine the effectiveness and implementation of the control of nonconforming items by SWEC and GE.

17.1.16A Corrective Action

The GSU QA Program requires that measures be established to assure that:

- a. Conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected.
- b. For significant conditions adverse to quality, the measures assure that the cause of the condition is determined and corrective action taken to preclude repetition.
- c. Identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. SWEC and GE have been delegated the quality responsibility for corrective action in their respective scopes of supply. GSU QA has corrective action responsibility to take direct action for conditions adverse to quality in the SWEC and GE scope of supply as well as within GSU. GSU monitors nonconformance and deviation reports from both SWEC and GE. Quality Assurance Finding Reports (QAFR's) issued by the GSU QA organization are forwarded to the Senior vice President-RBNG, and as applicable, Vice President-Nuclear Operations, Manager-Engineering, Nuclear Fuels and Licensing, Plant Manager, GE and SWEC Project Managers, and other selected individuals.

To benefit from abnormal experiences at other facilities, GSU Project Engineering reviews safety-related design documents against a file of nuclear power plant experiences to be maintained by GSU. GSU periodically monitors SWEC and GE to determine that these abnormal experiences are not repeated in the design and construction phases of the River Bend Project. Periodic GSU audits of the overall SWEC and GE corrective action programs are performed.

The GSU NQAM, NQAPD and RBPP's provide implementing procedures for: GSU initiated corrective action, review of design documents; audits of SWEC and GE corrective action programs; and reporting of significant deficiencies to the NRC.

17.1.17A QA Records

The GSU QA Program requires that measures be established to assure that:

- a. Sufficient records are maintained to furnish evidence of activities affecting quality.
- b. Records include at least operating logs and results of reviews, inspections, tests, audits, monitoring of work performance, and material analyses.
- c. Records include closely related data such as qualifications of personnel, procedures, and equipment.
- d. Inspection and test records at a minimum identify the inspector or data recorder, type of observation, results, acceptability, and action taken in connection with deficiencies noted.
- e. Records are identifiable and retrievable.
- f. Record retention is established, such as duration, location, and assigned responsibility.
- g. Storage facilities are constructed, located, and secured to prevent destruction of the records through fire, flooding, theft, and deterioration by temperature or humidity conditions.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM. GSU, SWEC, and GE each have responsibility for QA Records. The majority of all permanent and non-permanent quality records are stored onsite and maintained by SWEC Field Quality Control during construction. Records which are not sent to the site, but are retained by SWEC or GE home offices include the following:

Permanent (40 year life of plant)

Design Calculations
Verification of Design Calculations
Technical Analysis, Evaluations and Reports

Non-permanent

QA Audits
Field Audit Reports
Pre-awarded QA Surveys

In general, all QA records required by applicable codes and regulatory requirements are permanently stored onsite. Records may be microfilmed as appropriate.

Included are such records as:

- Code Data Reports
- Stress Reports
- Deviation Reports
- Nondestructive Testing Reports
- Major Defect Repair Records
- Mill Test Reports

In some cases, records such as radiographic reports may be retained by the manufacturer for a specified period of time, after which they would be transferred to GSU. There are two other general exceptions:

- a. QA records for the reactor vessel are to be retained and maintained by the vessel manufacturer for the life of the vessel, with the exception of those required by code or regulation to be available onsite
- b. Detailed QA records for the nuclear fuel are to be retained and maintained by GE Nuclear Fuel Department

| GSU also performs audits to determine the adequacy of the QA record
| programs of SWEC and GE.

| The GSU NQAM, NQAPD and RBPP's provide procedures for maintaining GSU
| generated QA Records and for periodic audits.

17.1.18A Audits

| The GSU QA Program requires that measures be established to assure
| that:

- a. A comprehensive system of planned and periodic audits be carried out to verify compliance with all aspects of the QA program and to determine the effectiveness of the program.
- b. Audits are performed in accordance with written procedures or check lists by appropriately trained personnel not having direct responsibility in the areas being audited.
- c. Results are to be documented and reviewed by management having responsibility in the area being audited.
- d. Follow-up action, including reaudit of deficient areas, is taken where indicated.

The policy requirements to establish and delegate implementation of these measures are delineated in the GSU NQAM and NQAPD's. GSU, SWEC, and GE each have responsibility for conducting audits. GSU has the responsibility for the overall audit of the GSU, SWEC, and GE QA Programs. Also GSU, through its Corporate Nuclear Review Committee conducts assessments/audits of the GSU QA Program approximately twice per year. The scope of these management assessments/audits is aimed at assessing the effectiveness of the QA program to the applicable criteria of Appendix B and ANSI N45.2.

Additionally, GSU QA audits the RBNG to formally assess the implementation of the QA program and the progress of the quality efforts. These activities are audited to assure all elements of the QA program are audited at least annually. Semi-annual audits are conducted of SWEC (Cherry Hill), and GE (San Jose) to assure all elements of the QA Program are audited at least annually. Annual audits of SWEC (Boston) for the applicable criteria are also performed. GSU may audit selected prime vendors in the SWEC and GE scope of supply. These audits are normally conducted concurrently with a SWEC or GE vendor audit or notification point. Audits may be a system audit against manuals and procedures, or a product audit to verify inspection effectiveness. They may include reinspection of randomly selected material, product or processes. The audit covers the applicable sections of 10CFR50, Appendix B.

GSU QA conducts quarterly audits of the site construction activity after start of construction to assure all elements of the program are covered on annual basis. The GSU QA Department performs surveillance of site related activities on a continuing basis. Appropriate consultants may assist GSU in performing the required audits.

Audits of the GE Fuel QA Program are to be conducted by GSU and as necessary with the assistance of appropriate consultants.

The implementation and scheduling of audits is consistent with the magnitude of general activity in each area. The results of audits, are forwarded to the Senior Vice President, RBNG, Vice President-Nuclear Operations, Manager-Engineering, Nuclear Fuels and Licensing, Project Manager, and other appropriate personnel. Status reports are forwarded as the above mentioned audit reports. Follow-up and close-out of open items are performed as necessary.

17.1B. QUALITY ASSURANCE DURING DESIGN AND CONSTRUCTION (SWEC)

A Quality Assurance (QA) Program is provided by Stone & Webster Engineering Corporation (SWEC) to ensure that the required effort, equipment, procedures, and management are directed toward complying with the provisions of the Code of Federal Regulations, 10CFR50 Appendix B, "Quality Assurance Criteria for Nuclear Power Plants" dated June 27, 1970.

This section summarizes the QA measures established by SWEC for application to QA Category I items for River Bend Station Units 1 and 2, Gulf States Utilities Company (Gulf States). The 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 are classified as QA Category I items, and are listed in Section 3.2.

17.1.1B Organization

17.1.1.1B General Description

Fig. 17.1.1B-1, "River Bend Station 1 & 2 Project S&W Company Organization for the Quality Program" denotes the lines of authority, responsibility, implementation, and communication in matters pertaining to quality within SWEC.

Fig. 17.1.1B-2 "Quality Assurance Department Organization" denotes the lines of authority and responsibility within QA Department at headquarters in Boston, at procurement inspector locations, and at the construction site.

Fig. 17.1.1B-3 "Engineering Assurance Division Organization" denotes the lines of authority and responsibility within the Engineering Assurance Division with headquarters in Boston.

Fig. 17.1.B-4 "River Bend Station 1 & 2 Project SWEC Quality Program Organization" denotes the lines of authority and communications utilized by the Project QA Program Administrator (QAPA).

SWEC's Corporate organization with respect to plant design, construction, and testing is described in Section 13.1.

17.1.1.2B Management of Quality Assurance

The QA Department is directed by the Vice President of QA who derives his authority from, and reports directly to the President. The Chief Engineer, Engineering Assurance of the Engineering Department is responsible for the administration and management of the Quality Assurance Program as applied to engineering and design activities.

The Manager, QA, coordinates all SWEC QA and Quality Control (QC) activities and directs these activities with respect to procurement and construction. The Manager, QA, and the Chief Engineer, Engineering Assurance have the authority, responsibility, and organizational freedom to identify quality assurance problems, initiate corrective actions, and verify implementation of solutions to these problems.

The Project Manager provides leadership in project matters that are inter-departmental in nature, or in the case of conflict, resolves the conflicts among Department Managers. The quality-related activity of the Project Manager is an administrative function and consists of, but is not limited to, the following:

- a. Reviews all client correspondence to ensure compatibility between client and company policy and compatibility between individual Departmental policies or project activities.
- b. Be cognizant of significant QA problems that could have an effect on client relations or project schedules and cost.

The Project QA Program Administrator (QAPA) has overall authority for Project QA functions, and reports directly to the Assistant Manager Quality Assurance. The Project QA Organization is responsible for the performance of activities described herein, but may delegate the actual work to others as deemed necessary and economical and as reflected herein.

The Project QAPA has the organizational freedom and authority to identify Quality problems; initiate, recommend, or provide solutions through designated channels; and verify implementation of corrective action.

The Project QAPA directs Project-related QA administration and operations at the Project office and the construction site. This includes incorporating corporate policy and guidance into Project procedures or requesting modifications to such policy or guidance as necessary to meet the needs of the River Bend Project.

The Manager, Procurement QA, the Manager-Field QC, the Chief Engineer QA NDT, the Chief Engineer Cost and Auditing and the Chief of Quality Systems Division derive their authority from the Manager, QA, and are responsible for support of procurement QA, field QC, nondestructive testing, cost and auditing and quality engineering activities respectively.

17.1.1.3B Areas of Implementation

Quality requirements are established by the Engineering, Construction, and Purchasing Departments for materials, equipment, and erection specifications and procedures. These specifications and procedures include QA and QC requirements which are reviewed and approved by the QA Department.

Engineering Department policy is established by the Director of Engineering and documented in Engineering Assurance Procedures. These procedures which interface with QA procedures are reviewed for concurrence by the Manager, QA.

QA and QC policy is established by the Project Manager QA. The preparation of the Project QA Program Manual, the Company Quality Assurance and Control Manual ASME Section III, the Quality Standards Manual, and the Quality Assurance Directives Manual are the responsibility of the Manager of QA.

The seven major QA areas of activity within SWEC are as follows:

- a. Engineering Assurance
- b. Procurement QA
- c. Field QC
- d. QA Nondestructive Testing
- e. Quality Systems Division
- f. QA Management
- g. Cost and Auditing

17.1.1.3.1B Engineering Assurance

Within the SWEC QA organization, the Engineering Assurance Division is responsible for assuring the implementation and proper functioning of management systems for the control of the technical work of the Engineering Department. Engineering Assurance also assures that completed designs and specifications conform to SWEC procedures and regulatory commitments.

To fulfill these responsibilities, Engineering Assurance issues appropriate procedures, provides training in the Engineering Assurance Program, audits engineering and design work, reports to management audit trends of projects and disciplines, and acts to assure the satisfactory completion of any required corrective actions. Engineering Assurance personnel are assigned to the project and provide a constant interface between the Project Engineer and the EA Division.

17.1.1.3.2B Procurement QA

The Procurement QA Division serves the function of assuring manufacturers conformance to applicable procurement specifications and drawings. The Procurement QA Division is organized with headquarters in Boston and consists of the Manager and Assistant Manager and a staff of QC engineers. Eight District Offices that are strategically located near major manufacturing centers in the United States. A District Manager directs each District Office and reports directly to the respective Assistant Manager Procurement QA.

17.1.1.3.3B Field QC

Field QC serves the function of assuring that erection and construction at the project site is in conformance with the specifications and drawings. The project is staffed in the field by a Superintendent of Field QC who communicates directly to the Project QAPA. The Superintendent of Field QC is assisted by a support organization consisting of Assistant Superintendents, QC engineers, inspectors, and field laboratory personnel. All site Field QC personnel report to the Superintendent of Field QC who in turn communicates with the Project QAPA.

The Field QC Division is organized with headquarters in Boston and consists of the Manager FQC, Assistant Managers and an office staff of QC Engineers and support specialists. This division assists the Project QAPA and provides technical guidance and support to the field organization when requested.

17.1.1.3.4B QA Nondestructive Testing

The QA Nondestructive Testing (NDT) Division of the QA Department is organized to provide the capability for assisting the Procurement QA and Field QC Divisions in matters of Nondestructive Examinations.

The QA NDT Division is organized with headquarters in Boston and is a technically oriented group of engineers consisting of a Chief Engineer and a Staff of NDT qualified QA Engineers and Specialists.

Responsibilities of the QA NDT Division include defining of examination systems, preparation of implementing procedures, training, auditing, certification of NDT personnel, and direction of the QA NDT Laboratory facilities.

Control is exercised via issue of NDT QA directives and technical instructions for use by Field QC, by means of surveillance audits and, in the case of vendor and contractor, by capability survey, review of test procedures and audits. The proficiency of company NDT personnel is evaluated by oral, written, and practical examination in accordance

with SNT-TC-1A. Competency and efficiency of personnel is maintained and upgraded by providing special technical courses in the several NDT disciplines.

Laboratory facilities and test equipment are maintained for development and validation of testing techniques prior to field application, for calibration of testing instruments, and for development and maintenance of test standards.

17.1.1.3.5B Quality Systems Division

The Quality Systems Division (QSD) provides quality engineering support for the Quality Assurance Department activities and is responsible for the establishment and control of standardized quality systems.

The QSD, with headquarters in Boston, consists of a Chief Engineer, Assistant Chief Engineer, and a staff of QA Engineers and Specialists.

Standardized integrated quality systems are developed and controlled by methods, continuing education, technical support, and reports activities. Data analysis and reporting of SWEC performance to management are provided to assure that the assigned efforts accomplish the intended function.

17.1.1.3.6B Project QA Program Administrator

The responsibilities of the Project QA Program Administrator are divided into eight areas:

1. Project QA Management
2. Licensing
3. Manuals and Procedures
4. Liaison/Communication
5. Procurement QA Liaison
6. Field (Site) Operations
7. Project Support
8. Audits

The specific functions and responsibilities associated with each of these areas are described below.

PROJECT QUALITY ASSURANCE MANAGEMENT

Establishing and monitoring the scope of QA activities and requested changes thereto.

Developing QA budget estimates and controlling expenditures, including authorizing QA Project travel for all SWEC QA activities.

Developing Project QA schedules, manpower requirements, and an organization tailored to meet Project needs.

The administration of Headquarter's Project QA personnel.

The preparation of Project-unique reports for the purpose of communicating to appropriate SWEC and GSU QA Management on the effectiveness of the Project QA Program.

Arranging for the indoctrination and training of Project QA personnel.

LICENSING

The development, review, and approval of QA portions of Safety Analysis Reports and changes thereto.

Preparing responses to QA program related questions received from GSU, NRC, and others regarding the Safety Analysis Reports.

Reviewing Safety Analysis inputs from other Project participants.

Assuring that the SWEC QA Program is compatible with commitments of the other Project participants.

Assuring SWEC meets Safety Analysis Report Commitments.

MANUALS AND PROCEDURES

Arranging for the development, review, and approval of Project-unique QA procedures and instructions, as appropriate, to support Project activities.

Providing direction relative to the implementation of corporate procedures on River Bend Project as well as the assurance of the satisfactory implementation of the Project QA Program, including QA procedures and instructions by Project personnel.

Arranging for the preparation, review, and approval of required interface documents.

Controlling or arranging for the control of Project-unique QA manuals, procedures, and instructions; and assuring that Project QA personnel maintain other manuals issued by SWEC, GSU, and other Project participants.

Reviewing applicable manuals, procedures, and instructions prepared by SWEC, GSU, and other Project participants for compatibility and interfaces.

LIAISON/COMMUNICATION

Providing the liaison and interface activity between the Project and other SWEC departments and divisions, GSU, other Project participants, and, as necessary, Sellers, regarding QA requirements and activities.

Requesting and coordinating Headquarters' QA support activities for the Project.

PROCUREMENT QA LIAISON

Responsible to assure adequate implementation of PQA activities and compliance with Project and GSU requirements. This includes audits, manual reviews, surveys, preproduction reviews, inspections, etc.

Provide necessary interface to assure PQA districts/inspectors have the currently released Design configuration base (as reflected in specifications, addenda, E&DCRs. purchase order changes) available for use in shop inspections.

Assist Project in developing positions on Quality problems at supplier facilities.

Provide input requested in preaward evaluations of suppliers.

Assure necessary Quality evaluations are performed prior to purchase order award.

Review audit reports, inspection plans, survey, and manual reviews transmitted to GSU.

Interface with Project and GSU concerning PQA matters.

FIELD (SITE) OPERATIONS

Provide assistance to the Superintendent of Field Quality Control in order that the following activities are accomplished by FQC Dept. in accordance with the applicable documents.

Assuring conformance to specifications, drawings, instructions, and procedures during fabrication, erection, installation, and construction, testing, by implementing the Quality Control Program at the construction site.

Coordinating, monitoring, and reporting on Quality-related activities performed by subcontractors and commercial testing laboratories.

Assuring required construction, erection and installation inspections and tests, including nondestructive tests, are performed, witnessed, or verified as specified.

Assuring construction, erection and installation test data is collected and evaluated for conformance with the specified requirements.

Assuring that required documentary objective evidence (records) of the accomplishment of Quality Control tasks are prepared, maintained, and turned over to the permanent plant site file.

PROJECT SUPPORT

Assisting the Project, including Project management in the implementation of all aspects of the QA Program, including that portion applicable to Engineering.

Participating in the Project Records Program.

Reviewing Project specifications, as required.

AUDITS

Review the Headquarters' QA Cost and Auditing Division (QACA), Engineering Assurance Division (EA) audits of the Project and report status to the client, and Project management when requested.

Participate in GSU and NRC audits as requested.

17.1.1.3.7B Quality Assurance Cost and Auditing Division (QACAD)

The QA Cost and Auditing Division (QACAD) will provide Department cost control, program evaluation, special management studies and audits, and information and support services within this program. The following summarizes the specific activities of the Division.

Department Cost Control Section - The Cost Control Section maintains the internal QA Department cost control system, providing inputs for the QA program estimates to Stone & Webster management as required.

Evaluation Section - The Evaluation Section has investigative responsibilities, management and/or quality related, to determine the adequacy, effectiveness, and adherence to quality related procedures and systems; these include project quality program evaluations, site audits, contractor audits, ASME Section III

program audits, and Quality Assurance Department and Engineering Assurance Division performance audits, as well as the appraisal of a quality system or function, to determine adequacy and effectiveness of implementation.

Information Section - The Information Section maintains the QA Department central files containing all incoming and outgoing general and project quality related correspondence. In addition, it maintains the QA Department library providing reference material such as PSAR/FSAR's, technical literature, Project Manuals, Codes, and Standards.

Support Services Section - The Support Services Section provides general administrative support for selected activities to the overall Quality Assurance Department.

17.1.1.4B System and Authority For Stop-Work Action

SWEC has established a system for control of, and authority for stop-work action to cover those items which do not conform to technical or quality requirements specified in specifications, drawings, Codes and Standards, and applicable regulatory requirements.

Procedures for implementing the system are contained in the Quality Standards Manual and the Company Quality Assurance and Control Manual-ASME Section III.

Stop work orders can also be issued directly at the jobsite during field construction activities. When a condition exists which is detrimental to plant quality, the FQC Engineer/Inspector who observed or was notified of the condition, shall initiate an Unsatisfactory Inspection Report and affix a Q C Reject Tag to the nonconforming item (See Section 17.1.15.2B).

The Construction Department is responsible for taking appropriate action when specified requirements are violated, and stopping work in progress when it is necessary.

The Quality Assurance Department has the authority to identify inprocess production nonconformances at the construction site or in a seller's shop and, when required, stop the nonconformance or nonconforming practice. In situations where continued work at the construction site would cause damage, or preclude further inspection or make remedial action ineffective, the Field Quality Control representative who is responsible for inspecting that work shall have the authority to stop work in progress by issuing an unsatisfactory Inspection Report in accordance with the "Inspection Report System" and promptly transmit the report to the senior construction representative who will investigate and take corrective action immediately upon

receipt of this report. In an emergency when no construction representative can be reached, the Field Quality Control representative has the authority to unilaterally stop work in progress.

In situations where continued work in a seller's shop, would cause damage, preclude further inspection or make remedial action ineffective, and when the seller, after having been notified of the non-conforming item or practice, refuses to unilaterally halt the work, the inspector has the authority to initiate a stop work action by notifying QA Department management through established channels. If QA Department management concurs with the inspector's recommendation, a stop work directive shall be immediately forwarded to the seller.

In those situations at the construction site where continued work would cause damage, preclude further inspection, or make remedial action ineffective; and where there is no authorized representative of the Resident Manager immediately available at the work location, the inspector responsible for quality control of that work has the authority to stop the work in progress. The inspector would immediately notify the Resident Manager or his designee as well as the Superintendent of Field QC of such action.

17.1.1.5B Qualification and Experience Levels

Qualification and experience levels of QA management personnel are summarized in Table 17.1.1B-1.

17.1.2B QA Program

17.1.2.1B General Description

The SWEC QA Program is formulated to provide written policies, procedures, and instructions covering engineering, design, procurement, manufacture and fabrication, construction and installation, and field testing, and provides measures for quality assurance throughout the designated phases of the project including:

- a. Conceptual design
- b. Detailed engineering and design
- c. Procurement specifications
- d. Seller selection
- e. Inspection and audit of vendor activities
- f. Erection and installation specifications

- g. Field inspection
- h. Field testing
- i. Records and documentation

The QA Program comprises those planned and systematic actions necessary to provide adequate confidence that structures, systems, and components perform satisfactorily in service. The program provides control over activities affecting the quality of QA Category I items to an extent consistent with their importance to safety and other Gulf States defined criteria, and assures that these items have met predetermined requirements.

17.1.2.2B QA Program Manuals

The SWEC QA Program policies, procedures, and instructions are delineated in a set of program manuals listed below, together with a schedule of their effectivity:

- a. Project QA Program Manual. This manual is prepared specifically for this project. It is approved and in effect.
- b. Engineering Assurance Manual. This manual is approved, issued, and in effect.
- c. Quality Standards Manual. This manual is approved, issued, and in effect.
- d. Quality Assurance Directives - This manual is approved, issued and in effect.
- e. Company QA and Control Manual - ASME Section III. This manual is approved, issued and in effect.
- f. Construction Methods Procedure Manual - This manual is approved, issued and in effect.
- g. Calibration Manual - This manual is approved, issued and in effect.
- h. Project Test Program Manual - This manual is made of several test program directives which have been approved, issued and are in effect.

Item (a) above is prepared specifically for the project and is currently in effect while items (b), (c), (d), (e), (f) and (g) are generic to SWEC nuclear projects, and in some cases have been projectized to suit the River Bend Project. These Manual/Procedures are now in effect. The provisions of the Project QA Program Manual have precedence over items (b) through (g) above. A cross reference of implementing documents is contained in Table 17.1.2B-1.

The QA manuals are reviewed and approved by appropriate Company management which interfaces with the policies delineated in the manuals. All manuals are revised and distributed as controlled documents to members of the project having a need, and to Gulf States on request. A historical file and distribution list of all revisions are maintained by the QA Department or Engineering Assurance Division for the manuals they publish.

Details of the preparation, issue, and control of the eight program manuals are delineated in the respective manual sections as follows:

<u>Manual</u>	<u>Section No.</u>
a. Project QA Program Manual	19
b. Engineering Assurance Manual	EAP 5.1
c. Quality Standards Manual	QS 5.1
d. Quality Assurance Directives (QAD) Manual	QAD 5.1
e. Company QA and Control Manual- ASME Section III	Section 19
f. Construction Methods Procedures Manual	CMP 1.1
g. Calibration Manual	MS-1.1
h. Project Test Program Manual	1.2

A controlled system of audits required by the QA manuals assures that the execution of the given activity is in conformance with the prescribed program. Verification of quality by inspection and tests is accomplished through Procurement QA and Field QC as required by policy and procedures in the applicable manuals.

Engineering Assurance procedures and audits assure compliance with engineering and design requirements. The Engineering Assurance Audit Program includes a "closed loop" requirement to ensure implementation of committed corrective action.

17.1.2.3B Identification of Structures, Systems, and Components

The structures, plant systems or portions of systems, and components covered by the SWEC QA Programs are listed in Section 3.2 of the River Bend FSAR.

17.1.2.4B Indoctrination and Training

Training and qualification of personnel performing quality related activities are requirements of the QA program. Training programs are conducted by Engineering Assurance, Engineering Department Technical Divisions, QA, and Construction Departments.

Selected Field QC Inspectors and selected Procurement QA Inspectors are trained and qualified in accordance with the applicable requirements of SNT-TC-1A and Supplements, "Recommended Practice For Nondestructive Testing Personnel Qualification and Certification" of the American Society of Nondestructive Testing. Such training and qualifications are administered by qualified instructors from the NDT Division of the QA Department.

An indoctrination program is implemented by the Quality Systems Division within the QA Department for training engineers in the activities of Procurement QA, Field QC, and Project QA Management.

Stone & Webster will comply with Regulatory Guide 1.58, Rev. 1.

Personnel performing inspections, examinations, and tests on safety related systems, structures, components, and services subject to the provisions of R.G. 1.58 shall be trained, qualified, and requalified by a combination of Stone & Webster management evaluation and/or continuing education programs.

17.1.2.5B Periodic Review of QA Programs

The status and adequacy of the QA program manuals are regularly reviewed. Periodic management level audits are conducted for the purpose of assuring the implementation of QA program requirements, and for upgrading the program to properly reflect changing Code, Standard, and regulatory requirements.

17.1.3B Design Control

17.1.3.1B General Description

Measures are established to assure that applicable regulatory requirements and the nuclear power plant design bases are correctly translated into SWEC specifications, drawings, procedures, and instructions.

The essential elements required to implement design control and to validate the adequacy of the control are:

- a. The establishment of basic methods of scoping, accomplishing, and accounting for the completeness of essential engineering and design tasks.
- b. A system of thorough review and checking, accomplished by competent technical personnel, and applied to designs, calculations, specifications, drawings, and documents.
- c. An Engineering Assurance program, functioning to assure compliance through measurement of conformance to procedures, and documented by objective evidence.

17.1.3.2B Design Standards

Design documents and specifications for QA Category I structures, plant systems or portions of systems, and components are prepared and reviewed for the following: Engineering requirements, Safety class conformance, NRC General Design Criteria conformance, NRC Regulatory Guide applicability, Industry Codes and Standards applicability, Topical reports, Safety Analysis Report conformance, QA adequacy, Interface requirements between SWEC and GE, and Interface between engineering disciplines.

Deviations from the above requirements will be thoroughly discussed and resolved at design review meetings, and, when necessary, accepted deviations will be documented.

17.1.3.3B Design Reviews

Engineering Department internal design reviews are numerous and detailed, and include the Project Engineer, the Engineering Specialist (for specifications) and the Lead Engineer. Material or component suppliers may participate on a case by case basis.

Design review meetings were held upon completion of the preliminary conceptual phase of the project and will be held at such time as significant modifications or changes necessitate. This review includes all plot plans and arrangements for adequacy of design and assures that all practical alternatives have been considered. QA personnel do not directly participate in this phase of design reviews. Design reviews are included as part of the normal review process for design documents. Formal design review meetings are convened when necessary to augment the normal review process.

QA personnel participate in all design review meetings involving QA and QC matters. Furthermore, the QA Department reviews and must concur with all procurement and erection specifications, and internally generated welding and other process procedures. Such concurrence indicates that the specification and/or procedure contains sufficient

information pertaining to Codes and Standards, inspection, testing, and documentation so that quality functions can be performed properly and efficiently in accordance with the specifications and/or procedure requirements.

Procurement and erection specifications are reviewed and approved by an Engineering Department equipment specialist for technical adequacy and code conformance, the Lead Materials Engineer for adequacy and compatibility of specified materials or material processes, a Quality Assurance Engineer of the Systems Support section for adequacy of quality requirements and by Construction and Environmental Engineers when those disciplines are involved.

Procurement specifications for QA Category I Standard "off the shelf" (non-engineered) commercial or previously approved materials, parts and equipment are reviewed for suitability of application by the equipment specialist and by Quality Assurance prior to issue.

The nature and extent of involvement of Engineering Assurance personnel during design review includes comprehensive scheduled audits to assure compliance with design review requirements established by procedures delineated in the Engineering Assurance Manual.

17.1.3.4B Design Control and Change Control

Verification of design is accomplished by a review conducted by qualified Engineering personnel, other than the originator, for completeness and acceptability of the design. These reviews are described in EAPS. Such reviews are applied to, but are not limited to, SWEC drawings, calculations, and specifications, as well as engineering diagrams and design criteria. Any changes to these documents require the same review and approval as the original document. Evidence of review is by signature or initials of Engineering personnel applied to the document. Descriptions of these reviews follow:

a. Design Criteria Documents

Design criteria documents are reviewed and approved by the Project and cognizant engineers before submittal to Gulf States for final review and approval. Examples of such documents are the Structural and Electrical Design Criteria. The following items, where applicable, are applied to the design criteria documents:

Accident analyses

Analytical methods to be used in design

Compatibility of materials

Compatibility of design interfaces with GE and others

Accessibility for inservice inspection, maintenance, and repair

Compliance with Licensing commitments

Compliance with codes and standards

Quality requirements

The Structural and Electrical Independence Design Criteria are considered key design documents and are independently reviewed as described in EAP 3.1.

b. Engineering Calculations

Calculations for a project fall into two classifications, hand calculations and machine calculations. Hand calculations prepared for project are reviewed, approved, and signed by another engineer. Each set of calculations are reviewed for original assumptions, correct methods, inputs, format, content, and results. Machine calculations are prepared with a summary sheet including all pertinent input parameters, as well as results including curves, tables, etc. The machine data printout sheets are cataloged and filed.

All methods and assumptions for engineering calculations relating to QA Category I structures, systems, and components are independently reviewed as defined in EAP 3.1 by an engineer other than the originator. These calculations are considered key design documents.

c. Specifications

The procedures and assurance methods for controlling the quality of procurement specifications are presented in Section 17.1.4B. Category I specifications are considered key design documents and are independently reviewed as described in EAP 3.1.

d. Drawings

After a drawing is produced, it is thoroughly reviewed by another designer, as are all subsequent revisions, for adherence to standards, supporting calculations, engineering instructions, compatibility with other drawings, and

correctness of dimensions. The drawing is then examined and initialed by the design supervisor, the responsible engineer, the Project Engineer, and signed by the responsible registered professional engineer who affixes his seal prior to issue. The Engineering Assurance Manual Procedure establishes the drawing review system for project drawings. Independent review of Category I drawings is not required.

e. Engineering Diagrams

Category I Flow, Logic and One Line Diagrams are considered key design documents and are independently reviewed as described in EAP 3.1. The procedures for controlling the quality of these diagrams are detailed in the Engineering Assurance Manual and the River Bend Project Procedures Manual.

Design interfaces are identified and defined on a case by case basis. Such interfaces include those between contractors, safety classes, and engineering disciplines. Specific procedures are incorporated in the Engineering Assurance Manual and establish written instructions governing the review, approval, release, distribution, and revision of documents involving design interfaces with the participating design organizations including those with GE.

Quality related auditing is performed by the Engineering Assurance Division in order to measure performance and compliance with established Engineering Assurance Procedures and project instructions. Formal reports are issued to management covering each audit, with indicated corrective action if necessary. The Engineering Assurance Manual includes procedures for the audit program of engineering and design activities.

Significant changes in approved QA Category I design drawings and specifications are allowed only after being reviewed by the same organization as the original drawing or specification. Document revisions or addenda issued to the field are issued and controlled in the same manner as the original issue. Measures are established in the Engineering Assurance Manual, which prescribe the method of authorizing changes to design drawings and specifications which are urgently needed to support shop or field work and, therefore, must precede revision of the approved parent drawing or specification.

Urgently needed changes are incorporated into their parent documents as required by project procedures.

17.1.4B Procurement Document Control

17.1.4.1B General Description

Engineering design, quality, and regulatory requirements, and any other requirements which are necessary to assure adequate product performance, are specified or referenced in the specifications for materials, equipment, and services. The control over input, review, and approval of QA and QC requirements delineated in specifications engineering services scope of work and approved design drawings is maintained through procedures and instructions in the SWEC procedure manuals.

Standardized instructions and requirements for the preparation, review, and approval of procurement and erection specifications and engineering services scope of work are contained in Section 4 of SWEC's Engineering Assurance Manual.

17.1.4.2B Headquarters Purchased Items

All QA and QC requirements are made part of equipment and erection specifications, engineering service scopes of work, and process procedures. SWEC written procedures require the review and approval of QA Category I equipment and erection specifications by the QA Department. Review and approval of quality requirements in engineering service scopes of work (ESSOW's) is performed by Engineering Assurance Division in accordance with section 4 of SWEC's Engineering Assurance Manual. This review and approval is performed by engineers in the Procured Services Group of the EA Division. Review and approval of quality requirements in specifications is performed by engineers in the QSD Systems Support Group of the QA Department. Each specification is controlled, and reviewed for consideration and applicability of:

- a. Codes and Standards including proper identification
- b. QA Program requirements
- c. Test requirements by vendors and erectors
- d. Inspection requirements by vendors, erectors and SWEC Inspectors
- e. QA NDT requirements
- f. Records and documentation requirements

After review and approval, the signature of the Quality Systems Division reviewing engineer is placed in the approval block stamp on the cover of each specification approved by the QA Department. Approval of ESSOW's is accomplished in the same manner by the EA Division Reviewing Engineer.

Revisions to QA Category I specifications and ESSOW's are reviewed and approved by the QA Department (if QA requirements have changed), and EA Division, respectively, in the same manner as the original documents.

Sellers, contractors, and subcontractors who perform work on QA Category I items are required to submit for review and evaluation by SWEC their QA Program which must be in conformance with the pertinent provisions of Appendix B-10CFR50. The survey and review of sellers' qualifications and QA Programs are governed by the procedures contained in the QAD (Quality Assurance Directive) Manual of SWEC.

Specifications for QA Category I items specify that all quality requirements must be passed on to contractors and subcontractors furnishing materials, components, and services.

The Company Quality Assurance and Control Manual - ASME III includes procedures for procurement document control for those items designed and fabricated to the requirements of the ASME Section III Div. 1 code.

17.1.4.3B Field Purchased Items

For field purchases, a Field Purchase Requisition is initiated and completed by the field forces using specifications which have been reviewed and approved by the appropriate SWEC Departments. The requisition indicates the specification number and revision from which the data was extracted, the QA Category, applicable Code and Code Class. The QA requirements in the Field Purchase Requisition are approved by the Superintendent of Field QC before forwarding to Field Purchasing.

Field purchase orders for Category I items shall be placed only with approved Category I sellers. In establishing that a seller for Category I items is approved, the following guidance may be used in addition to the Quality Rating List:

- a. If the seller is a distributor and does not handle the item, and if the source of the item is an approved Stone & Webster supplier, then the seller (distributor) need not be on the approved list, provided that the seller furnishes copies of documentation to indicate that the items were obtained from the approved Stone & Webster source supplier. EXAMPLE: Company "A" is an approved Stone & Webster supplier for Category I electrodes. Company "B" is a distributor that

sells Company "A" electrodes. Further, Company "B" does not handle these electrodes (i.e., they are shipped directly from Company "A"): Company "B" need not be on the approved seller list, provided that Company "B" furnishes objective evidence to show that the electrodes supplied came from Company "A" and that applicable documentation is furnished by Company "A".

- b. If the acceptability of an item is based on inspections and/or tests performed after the item has been delivered to the site and before its use, then the Seller need not be on the approved list.
- c. Sellers who furnish items which are referenced in a specification by manufacturer and specific model or other identification, are considered as approved for the specified items. By referencing a specific manufacturer's product, approval of the product is established during the review of the specification by the Equipment Specialist based on past experience with the product.

17.1.4.4B Code and Regulatory Requirements

Codes and regulatory requirements are identified in the procurement documents by their full name, the name of the sponsoring organization, and by the edition number of the code that is to apply. The application of Codes and Standards prescribed in 10CFR50, Paragraph 50.55a, is made in all applicable QA Category I procurement specifications.

17.1.5B Instructions, Procedures, and Drawings

17.1.5.1B General Description

The QA program manuals provide policy, procedures, and instructions which prescribe the technical, administrative, and quality-related inputs to documents affecting the quality of QA Category I structures, systems or portions of systems, and components. Appropriate quantitative and qualitative acceptance criteria for determining that quality related activities have been satisfactorily accomplished are contained in instructions, procedures, specifications, drawings, or other appropriate documents.

17.1.5.2B Procedures and Manuals

The SWEC QA program is documented by written procedures contained in the supporting QA manuals referenced in Section 17.1.2B.

The Quality Assurance Directives Manual procedures similarly control and require quality verification of erection and installation of structures, systems, or portions of systems at the construction site. Written procedures in this manual are intended to assure the quality of materials and equipment from receipt, through installation, and installation phase testing.

17.1.5.3B Effectivity of Codes and Standards

Methods and procedures for determining the effective dates of Codes and Standards are outlined in Engineering Assurance Manual and are in conformance with NRC Code of Federal Regulations - 10CFR50.55a.

17.1.5.4B Reporting Significant Deficiencies

The Engineering Assurance Manual procedures delineate the measures for complying with NRC Code of Federal Regulations - 10CFR50.55(e) and 10CFR21.

17.1.5.5B Authorized Engineering and Design Changes

Procedural measures for making changes to specifications and drawings are delineated in the Engineering Assurance Manual. Changes to specifications or drawings may be accomplished by three methods:

- a. Revision of the drawing or specification, or by issuing an addendum to a specification
- b. An approved disposition to N&D
- c. Authorization for change by an Engineering and Design Coordination Report (EDCR) or by a Construction Revision Notice (CRN)

Changes to specifications which affect quality and N&D report dispositions which change QA requirements of specifications are reviewed and concurred with by QA/QC personnel. These reviews include the design characteristics of changes to determine whether they can be inspected and controlled.

17.1.6B Document Control

17.1.6.1B General Description

Instructions and procedures for implementing document control measures are contained in the QA Program Manuals described in Section 17.1.2B. These instructions and procedures control the issuance of documents such as specifications and drawings, including authorized changes

thereto, and assure that the documents and revisions are reviewed for adequacy and approved for release by authorized personnel.

17.1.6.2B Review and Approval of Documents

| SWEC specifications, inspection procedures and drawings, including revisions thereto, are prepared, reviewed, and approved in accordance with procedures outlined in the Quality Assurance Manuals. Similar procedures govern the review of suppliers' drawings and revisions to assure compliance with specification requirements if review is required by the specification.

| Project drawings are listed on the "Drawing Index." Approved modifications to drawings may be documented by means of Engineering and Design Coordination Reports which are listed on the E&DCR change record.

| Design changes are incorporated on revised drawings by the Responsible Supervisor (Design) Engineer to reflect the as-built condition.

17.1.6.3B Controlled Distribution and Use

| Distribution to the location and use at the location by the designated responsible authority are carefully controlled by means of document logs, signed document receipts, and audited by responsible personnel. Written procedures will govern the removal and disposal of obsolete drawings from the construction site work areas.

No single master list exists which identifies the current revision number of instructions, procedures, drawings and procurement documents, however, individual lists or indices do exist. Typical document lists are:

| Stone & Webster Drawings
| Seller's Drawings
| Stone & Webster Welding Procedures
| Seller's Welding Procedures
Project Procedures
Quality Assurance Manuals
Engineering Assurance Manual
Various Stone & Webster Division Guidelines
Purchase Specifications and Purchase Orders
Special Process Procedures

These document lists or indices are updated and reissued to a predetermined distribution list of responsible personnel on a timely basis, at established intervals, as specified in the various implementing procedures.

17.1.7B Control of Purchased Material, Equipment, and Services

17.1.7.1B General Description

The quality of QA Category I purchased material, equipment, and/or services is controlled through source evaluation and selection; review of submitted seller QA Program, data and drawings; progressive inspection at sellers' shops; witnessing of shop tests; audits of QA/QC systems and documentation; and jobsite receiving inspections.

17.1.7.2B Control Methods

Sellers' QA capabilities are assessed by the Procurement QA Division or Engineering Assurance Division and the Purchasing Department to determine their suitability to bid on QA Category I items. The assessment covers past performance, surveys at the sellers' facilities, evaluation of performance results, surveillance and audits, and general QA attitudes. Procurement QA Survey Form and Supplement are used by PQA for preplanned bidder surveys and documentary evidence of survey findings. Whenever required, purchase documents include sections on QA Program requirements, tests, inspections, and documentation, as well as references to appropriate governing Codes and Standards. Project engineering establishes the quality requirements in procurement specifications consistent with the functional importance and complexity of the individual item or system.

17.1.7.3B Source Evaluation and Selection

The principal method of collecting information on prospective suppliers of specified items of materials and equipment is the "Vendor QC Survey System". Provisions of this system are outlined in the SWEC Quality Assurance Directives Manual, and established source evaluation information for use by the QA Engineering, and Purchasing Departments.

The Engineering Assurance Division evaluates an engineering service supplier's ability to meet the quality assurance requirements of an engineering service scope of work or purchase requisition by reviewing a supplier's QA program and/or performing a survey as described in the Engineering Assurance Manual. Reports of surveys and audits are provided to the Project Engineer and Project QA Program Administrator.

Bids are compared on a technical and economic basis to determine compliance with specifications and intended use. Comparison of bids for major items are reviewed by the Project Engineering Group and the Purchasing Department before recommendation of award of a purchase order or contract is made to Gulf States. Bidders QA Programs on QA Category I items are reviewed and evaluated by the Procurement QA Division in parallel with the technical and economic comparison of bids.

A copy of the recommended bidders QA Program and a SWEC evaluation of that program will be forwarded to Gulf States as part of the bid evaluation.

17.1.7.4B Inspections at Sellers

Inspections and/or audits are performed at manufacturer's facilities by properly qualified SWEC personnel to ensure that the requirements of the purchase order, specifications, approved shop drawings, and all specified Codes and Standards are adhered to. Specific instructions regarding inspection activities are described in the specification. The SWEC "Vendor Shop QC Inspection System," and the specific "Duties and Responsibilities of Inspectors" are given in the Quality Assurance Directives Manual.

17.1.7.5B Site Receiving Inspection

Examination of materials and equipment, upon delivery at the construction site, is performed by the Superintendent of Field QC and his staff engineers for assurance that quality was not impaired during transit to the construction site. Receipt inspection also verifies that specified QC records are available prior to use or installation of the material or equipment.

Receiving inspection and examination consists of, as appropriate to the item, the following actions:

- a. Verification that identification and markings are in accordance with applicable codes, specifications, purchase orders, drawings, and applicable quality control procedures or instructions.
- b. Visual inspection to assure that protective covers and seals are intact.
- c. Verification that special coatings and preservatives are applied in accordance with specifications, purchase orders, or manufacturers' instructions.
- d. Initiate a Quality Assurance Inspection Report.
- e. Visual inspection for cleanliness to assure that accessible internal and external areas are within the specification requirements for dirt, soil, mill scale, weld spatter, oil, grease, or stains.
- f. Items not previously accepted by the Procurement Quality Control Inspector are inspected at the site to the inspection requirements of the purchase document.

17.1.7.6B Quality Documentary Evidence

Effectiveness of the control of quality by vendors is assured at intervals, as necessary and consistent with specification requirements and the complexity of the item. Vendor assessments by SWEC are documented and include the following evidence of quality: test reports, inspection records, special process procedures approvals, witnessing of required NDT and operating tests, audit reports, inprocess checks of materials, manufacturing, and fabrication. The fully signed-off SWEC Certificate of Compliance by the Engineers' QA Representative is the summary documented evidence that specification requirements in the procurement and manufacturing or fabrication area have been complied with.

17.1.8B Identification and Control of Materials, Parts, and Components17.1.8.1B General Description

SWEC is responsible for assuring that only specified materials are used. This assurance is gained by established methods for proper identification and control of materials, parts, and components, including partially fabricated assemblies. These methods include traceability to chemical and physical properties of materials by documentation and/or physical markings, comparison of material test reports against specified Code requirements, maintenance of identification through production phases by marking, tagging, or other means such as labeling, ID plates, color coding, etc.

Traceability requirements of QA Category I items to their original chemical and physical characteristics are identified in the procurement specification and by reference to the requirements of applicable Codes and Standards. Traceability, when required, will be maintained by quality related documentation or by physical marking systems.

17.1.8.2B Materials, Parts, and Components

Materials, parts, and components are identified by individual mark numbers or serial numbers to permit traceability to chemical and physical test reports and other quality documentation prepared by the manufacturer in compliance with Code and specification requirements. Component parts of an assembly are identified or otherwise coded to permit traceability.

Category I materials, parts, and components shall be identified by heat number, serial number, part number, or other appropriate means. The identification may be on the item (physical markings are preferred) or on records directly and readily traceable to the item. The type of

identification shall be established by specifications, drawings, instructions, or procedures.

Procurement Quality Assurance Inspectors shall verify at vendor facilities that the identification and control of materials, parts, and components is in accordance with the procurement documents.

Traceability to records which will verify conformance of materials, parts, and components to specified requirements (e.g., chemical and physical properties, tests, inspections etc.) shall be maintained from initial receipt of materials, during storage, to installation and use.

General construction materials such as reinforcing steel, random pipe, bolts, etc., are approved for use by the lot-acceptance and physical marking methods. Mill test reports for each heat of material within a given lot are checked for compliance with requirements of specifications, Codes and Standards. A random sampling is made to assure that the reports examined represent the material in the lot. The lot is released for use when the material is found to be acceptable by the QC Inspector. Identification of lot-accepted materials is maintained, when required, by physical markings. For example, a color coding system is used for identification of an accepted lot of random pipe, which identifies the ASTM designation, type, and pipe wall thickness.

Mark numbers and similar identification coding assigned to items are used for identification purposes on drawings, specifications, correspondence, and reports concerning the item of equipment and are maintained from start of design through manufacture, shipping, installation, operation, maintenance, and throughout the life of the item.

17.1.8.3B Identification and Control at Site

Identification and control of QA Category I piping systems during construction installation is accomplished through a system of control isometric drawings and pipe weld data sheets, as specified in the SWEC QA and Control Manual - ASME Section III.

The Superintendent of Field QC is responsible for assuring conformance to policies and procedures for identifying, classifying, and segregating all nonconforming materials and components at the jobsite. The implementation and adherence to these procedures and policies is verified by the Field QC Engineers during periodic QC site surveillance and scheduled Headquarters QA staff audits. A system of tagging and physical segregation of nonconforming items is used at the construction site to implement procedures outlined in the Quality Standards Manual. Records of the disposition of nonconforming items become a part of the Master QA site file.

17.1.9B Control of Special Processes

17.1.9.1B General Description

Control of special processes including arc welding, heat treating, stud welding, cadwelding, and NDT is maintained by SWEC either by specifying the requirements in detail or by requiring the fabricators and subcontractors to submit their procedures for SWEC review and evaluation. These procedures are logged in by Engineering, and forwarded to the responsible Division where a special file is established to indicate the originator, process, revision, approval status, and applicability.

Verification of wall thickness of QA Category I cast and forged valves and other cast components important to nuclear safety is an SWEC specification requirement.

17.1.9.2B Welding

Welding procedure specifications prepared by the SWEC Materials Engineering Division are qualified in accordance with applicable codes and standards and are the written procedures followed for erection work performed by SWEC field forces. QA personnel review and concur with these procedures prior to their issue and use at the construction site. Such concurrence indicates that the procedure contains sufficient information pertaining to codes, standards, and methods of testing so that QC functions can be performed properly. Field QC is also responsible for assuring by documentation, and surveillance that the weld procedure qualification has, in fact, been performed as stated. For erection work performed by others, the welding procedures to be used are submitted for review and evaluation by the Materials Engineering Division prior to use at the construction site. Vendor's and subcontractor's welding procedures are submitted for review and evaluation when required by the specification.

Materials Engineering Division issues Performance and Qualification, Methods with instructions for their use for the qualification of SWEC welders.

Welding operators employed at fabrication shops and construction sites must be qualified to perform the applicable welding process by code requirements. At the construction site, the Superintendent of Field QC monitors the qualification examinations and has the authority to request a retest of any operator who may not be performing welding in accordance with the quality standards established by the written procedures. The welding operator's certifications are issued by Field QC and copies maintained in the applicable permanent record file. If during the previous 90 day period a welder has not performed welding in

accordance with a given procedure, the welder must be requalified for that procedure.

The control of special processes includes documentation of welding by welder, date, procedure, inspection performed and records of preheat, post heat, and stress relief. These records are used to assure that the requirements of the weld procedure, specifications, standards, and special requirements have been met.

17.1.9.3B Cast and Forged Components

Specifications for QA Category I cast and forged valves and other cast components important to nuclear safety require verification of wall thickness. Cast and forged valves over one in. nominal pipe size, within the reactor coolant pressure boundary (Quality Group Classification A) and within the boundaries of systems of Quality Group Classification B and C as defined in Regulatory Guide 26, shall require demonstration of acceptable wall thickness. Thickness measurements are made using deep throated vernier calipers or approved ultrasonic thickness measuring devices. A sufficient number of measurements are taken to assure that the finished valve body and bonnet meet the minimum wall thickness requirements as shown on drawings, which in turn must meet the requirements of ASME Section III. Qualified UT procedures, including calibration requirements must be submitted to SWEC for review and evaluation prior to use. All wall thickness verification measurements are to be documented.

17.1.9.4B Nondestructive Testing

Nondestructive test examinations and personnel performing these examinations are controlled by requirements specified in specifications and in the QA Program manuals.

Manufacturer's personnel performing NDT must be qualified in accordance with the applicable Code requirements. Qualification, certifications, and the results of such tests are reviewed and verified by SWEC QC Inspectors in vendor's shops and at the construction site.

Field QC personnel witnessing and/or performing NDT examinations at the construction site are qualified in accordance with the ASME Boiler and Pressure Vessel Code, Section III, and the American Society of NDT, SNT-TC-1A Recommended Practice. SWEC QC personnel performing radiography are also qualified in accordance with NRC regulations for safe handling of radioactive sources. A computer program for SWEC Nondestructive Test personnel is established and maintained current in regard to qualification and training. Sellers and subcontractors NDT procedures are submitted for review and evaluation when required by the specifications.

Nondestructive testing procedures are documented in the Quality Assurance Directives Manual. Acceptance standards for noncode components are established by the Materials Engineering Division.

17.1.9.5B Cleaning and Flushing of Components and Systems

Cleaning requirements for manufactured components are specified in the SWEC specification, when required. Systems cleaning and flushing procedures are prepared by SWEC for those components under its control. Performance and acceptance criteria are included in the specification or approved manufacturer's or installer's procedures.

17.1.10B Inspection

17.1.10.1B General Description

Project Engineering, with assistance from Equipment and Division Specialists, are responsible for including the necessary inspection requirements, with acceptance criteria, in drawings, specifications, instructions and procedures.

Inspection functions are implemented by SWEC inspectors in accordance with the procedures and instructions of the Quality Standards and Quality Assurance Directives Manual. Inspection requirements are stated in the procurement and erection specifications.

The organizational description of the groups and individuals performing inspection for SWEC and their independence from groups performing the activities being inspected are described in Section 17.1.1B. Policies and procedures for inspections are contained in the Quality Standards and Quality Assurance Directives Manuals listed and described in Section 17.1.2B.

17.1.10.2B Items and Activities Covered

Those structures, systems or portions of systems, and components for which inspection is a requirement, and which are classified as QA Category I items and are listed in Section 3.2 of the River Bend FSAR. The specific inspection items to be verified, witnessed, or performed by the SWEC QC Inspector are delineated in the body of the specification.

17.1.10.3B Procurement QA Inspection

Procurement QA inspection requirements are outlined in the procurement specification. The detailed inspection is defined by codes, standards, and the specification itself. The shop inspections designated are performed by the manufacturer's personnel charged with the quality responsibility, and these inspections are verified by the SWEC

Procurement QA Inspector. In addition to the specified tests, the Procurement QA Inspector may be instructed to perform examination of large lots of material on a sampling basis. Equipment is not released for shipment until the inspections are completed. This process is used to assure that the quality level specified has been maintained at the shop. Verification of manufacturer's compliance with quality requirements is evidenced by an SWEC Certificate of Compliance generated in accordance with the Quality Assurance Directives Manual.

17.1.10.4B Field QC Inspection

In-process inspection of material and components continues when the item is received at the construction site. Field QC personnel, perform regular examination of material and components during receiving, storage, handling, installation, and preparation for operation. The activities inspected and the criteria of acceptance are shown on approved drawings, specifications, manufacturer's special instructions, codes, and in the Quality Assurance Directives. Inspections and nondestructive tests are specified and performed where required to assure quality. Specific hold points are included in the specification or are established by Field QC.

The Superintendent of Field QC has the responsibility for assuring that field requirements have been fully implemented to meet the specified criteria, in the following construction activities:

- Soils identification and control of moisture and compaction

- Inspection of concrete forms, reinforcing steel, electrical, mechanical, and structural embedments prior to concrete placement

- Verification of proper proportioning, mixing, and delivery of concrete

- Inspection of structural steel erection and bearing pile installation, if applicable

- Nondestructive examination of welding

- Inspection for proper assembly of piping systems and components

- Alignment and clearance of mechanical equipment

- Verification of electrical cable routing, raceways, instrumentation termination, and equipment installation

Field piping fabrication and erection operations associated with QA Category I systems and equipment receive in-process and final QC inspections for assurance that the requirements of specifications,

approved drawings, welding procedures, nondestructive testing, etc., are complied with in accordance with approved procedures of the Program Manuals. The inspections specified are documented, and evidence of compliance is maintained at the construction site in the QA Site File.

17.1.11B Test Control

17.1.11.1B General Description

The SWEC QA Program requires that shop, field installation, nondestructive, and preliminary tests be specified and implemented to assure that structures, systems or portions of systems, and components perform satisfactorily in service. Individual areas of implementation are controlled by specification requirements, and policies and procedures in the QA Program manuals.

17.1.11.2B Test Requirements

Test requirements are delineated in procurement and erection specifications in conformance with engineering practices and Code requirements. All required tests are specified in the body of the specification. The specification indicates when test procedures are required to be sent to SWEC for review and evaluation. All tests required by Codes and Standards are conducted and their results documented.

17.1.11.3B Shop and Field Test Control

The testing of materials and components at Sellers and suppliers shops is accomplished in accordance with documented and approved test procedures. If required by the SWEC specification, the supplier's nondestructive testing procedures will be reviewed by the QA NDT Div. as required by the Quality Standards Manual. Other test procedures may be reviewed and evaluated by SWEC and tests may be witnessed by the Procurement QA Inspectors. In accordance with SWEC Procedures the Procurement QA Inspector reviews the specification in detail with the seller prior to start of work. Should Gulf States or SWEC require participation in the test, they will so advise the Procurement QA Inspector and the vendor.

Any deviations or questionable shop test data are reviewed by the Project Engineer and instructions are issued for disposition in accordance with procedures for handling nonconforming material or components, and corrective action if required.

NDT control during construction and installation at the jobsite is maintained by SWEC Field QC Engineers and Inspectors, operating under written procedures.

The Superintendent of Field QC is responsible for assuring that all QC field tests specified are performed under proper environmental conditions, with adequate test instrumentation and by qualified personnel. Bypassing of any required inspections or tests will be documented as incompletes in the test index discussed in the last paragraph of Section 17.1.14A. All items must be completed prior to final sign-off by Quality Control personnel.

Written test procedures shall include, but not be limited to, the following:

- a. Provisions to ensure that all test prerequisites have been met prior to the start of the test.
- b. Requirements and acceptance limits shall be specified as required by design documents.
- c. Required accuracy and type of test instrumentation to be used.
- d. Required environmental conditions, if applicable.

Test results shall be documented in sufficient detail to prevent misinterpretation and shall include an evaluation of the test results by qualified personnel.

Qualified Advisory Operations Engineers are assigned by SWEC to the construction site to direct preliminary testing activities. The preparation of preoperational test procedures is performed by Gulf States with the assistance of SWEC, GE, and major equipment suppliers.

17.1.12B Control of Measuring and Testing Equipment

17.1.12.1B General Description

SWEC specifications require manufacturers and material suppliers to control calibration of tools, gages, instruments, and other measuring and testing devices used in activities affecting product quality. Verification of such control is made by the SWEC Procurement Inspector. Control over measuring and testing devices used by SWEC, and contractors and subcontractors at the construction site is maintained by the written procedures contained in the Program Manuals. These procedures require that the calibration and proper adjustment of measuring and testing equipment be accomplished at established periods and against certified measurement standards which have known valid

relationship to national standards. To assure that inspection equipment is within calibration prior to performing an inspection or test, the following actions are taken, as required by appropriate procedures, for all controlled devices:

- a. Assignment of unique control number for each item.
- b. Calibration History Card established.
- c. Master Tool and Measurement Sheet completed for each device.
- d. Each device is physically identified with a control number and shall carry evidence of thier calibration status.

Identification of and calibration records for testing and measuring equipment used in final acceptance inspection are established so that equipment can be readily recalled for recalibration or adjustment. The records also serve as an indication of what devices were actually used on specific tests and provide for traceability, if such devices are found to be out of calibration and require corrective action. In addition to the up-to-date "Master Index File" of all Calibration History Cards, the Master Tool and Measurement sheets for each device are updated at regular established intervals.

Vendors and contractors calibration policy, schedule, and system for the control of measuring and testing equipment are detailed in their applicable QC Manuals. These procedures are reviewed for adequcy prior to authorization for use by SWEC Quality Assurance Department. Adherence to these procedures will be verified by periodic audits.

17.1.12.2B Calibration Standards

All calibrations are in accordance with manufacturer's instructions, Codes and Standards, specifications, or Engineers' instructions and are made against certified measurement standards which have known valid relationships to National Standards.

17.1.13B Handling, Storage, and Shipping

17.1.13.1B General Description

Quality of QA Category I materials and equipment is assured during handling, shipping and storage periods by implementation of procedures and instructions for pre-packaging, cleaning, and preparation, indentification and cautionary markings, protection against weathering, corrosion, damage, and the avoidance of undue stressing and other cautionary instructions and requirements for ensuring that materials and equipment arrive at the jobsite as intended, properly identified and as specified.

17.1.13.2B Instructions and Procedures

The procurement specification details special requirements for handling, storage, and shipping, when required. Procurement measures govern the inspection of packaging and preparation for shipment at the manufacturer's shop. Storage at the job site is maintained by construction in accordance with an approved storage specification.

Documented receiving inspection is performed at the construction site by QC personnel in accordance with established procedures and instructions. Material status is clearly shown by a tagging system. The storage of plant equipment and/or material is controlled to assure that deterioration of the component does not occur. Materials are placed in a proper state of preservation prior to storage. The four classes of storage used are special environment, inside heated, inside, and outside. The special environment class provides for special protection such as inert gas blankets, humidity level control, etc., where applicable. All storage areas are audited on a regular basis and any nonconformance or protection degradation found is corrected. The QC storage and maintenance program is continuous from receipt through installation until the material is released for preoperational testing.

17.1.14B Inspection, Test, and Operating Status

17.1.14.1B General Description

The applicable QA Program manuals provide measures for indicating the status of tests and inspections performed on materials, parts, and components, and the operating status of structures, systems, and components.

17.1.14.2B Inspection and Test Status System

The status of an item is indicated by means of stickers, tags, equipment record cards, Field QC test records and check-off lists. Inspection and test status is defined in two general categories described below:

ACCEPT status is assigned to materials, parts and components which are inspected and found satisfactory, and in conformance with applicable specifications. This status is recorded and only accepted materials, parts, and components are released to warehouse facilities, storage areas, or fabrication and erection areas.

REJECT status is assigned to materials, parts, and components which are inspected and found unsatisfactory, and not in accordance with applicable specifications. This status is recorded, and rejected items are tagged and segregated to a

controlled reject area until such time that a disposition is made. If segregation of rejected materials is not practical, the items are physically tagged to clearly show status.

17.1.14.3B Preliminary Testing and Operating Status

The status of plant structure, systems, and components during the preliminary test period is monitored by Field QC personnel and recorded. Procedures for the turnover of systems and components to plant operating personnel are mutually established by Gulf States and SWEC. Field QC surveillance is relinquished when the structure, system, or component is turned over to Gulf States.

Preoperational and startup testing and plant operation is accomplished by qualified personnel in accordance with written procedures.

17.1.15B Nonconforming Materials, Parts, and Components

Measures are taken to control nonconforming or unsatisfactory material, parts or components.

Material, equipment, and workmanship that deviates from approved specifications, codes, plans, or other applicable documents are considered unsatisfactory/nonconforming conditions and are controlled in order to prevent their inadvertent use in fabrication and/or installation. The control of nonconformances is detailed in written procedures which describe specific identification, documentation, segregation, disposition, and notification requirements.

Nonconformances discovered during any phase of engineering, manufacturing, fabrication, shipment, receipt, storage, installation, construction, or testing are reviewed and accepted, rejected, repaired, reworked, or scrapped in accordance with documented procedures.

Documented procedures reference the individual's and groups' responsibility for assigning dispositions to those nonconformances that can or cannot be corrected to meet the requirements and scope of the specification, code, plan, or other applicable documents. The procedures also reference the ultimate disposition, acceptance and repair and rework acceptance of the nonconformance.

17.1.15.1B Nonconformances at Seller Shops

A nonconformance discovered in a vendor's shop by a Procurement QA Inspector, which requires a SWEC engineering resolution, is reported both on his Inspection Report and recorded on a N&D Report. These Reports are sent to the Procurement QA Division and the Project

Engineer through established procedures. The Quality Standards and Quality Assurance Directives Manual contains the policy and procedures.

17.1.15.2B Nonconformities at Construction Site

Written procedures in the Quality Standards Manual detail the use of SWEC's Nonconformance and Disposition Reporting System. By use of an unsatisfactory inspection report or N&D Report, responsible individuals are required to provide a disposition to the nonconformance within their assigned authority and responsibility. If the deficiency cannot be resolved to meet the specification or requires a special repair procedure, the N&D Report is forwarded to the Project Engineer for his resolution. The nonconformity is considered closed when the required disposition has been accomplished and reinspection verifies that adherence to disposition requirements have been met. The unsatisfactory inspection report or N&D is then signed by the Superintendent of Field QC and entered in the Master QC File.

When a nonconforming condition is identified by organizations other than the above, including GSU, N&D's can be initiated by that organization after contacting the Superintendent of FQC or the Chief of the responsible Procurement QA district as appropriate.

17.1.16B Corrective Action

17.1.16.1B General Description

The unsatisfactory inspection reports and N&D Reports issued for both shop and field nonconformance items are used by the QA Department and management for analysis. As indicated by the results of analysis, the QA Department recommends appropriate measures designed to control and prevent recurring discrepancies and conditions adverse to quality. Corrective actions are documented and the effectiveness of the corrective actions reviewed by the QA Department management.

The Project QA Program Administrator is responsible for follow-through of corrective actions resulting from internal project audits, and from NRC and Gulf States audits.

17.1.16.2B Recurrence Preventive Action

Feedback information on nonconformances is transmitted from Shop and Field QC to Headquarters QC, and collected using a computer program. The data is analyzed and evaluated by QA personnel, after which corrective action is recommended to assist in controlling and preventing recurrences of nonconformances.

Conditions adverse to quality, cause of the condition, and the corrective action taken are documented. In addition, effectiveness of corrective action is checked by additional audits.

- | SWEC's internal procedure for communicating information concerning abnormal experiences at other facilities is delineated in the
- | Engineering Assurance Manual.

17.1.17B Quality Assurance Records

17.1.17.1B General Description

- | The elements of the SWEC project QA records system are defined in procedures, instructions, and in procurement and erection specifications. The records system and the identification of specific records requirements are initiated with the early concept of the plant. Procedures and instructions govern the general and specific requirements, development, transmittal and receipt, checking, storage, retrieval, and disposition of QC and QA records.

- | As a minimum, the records system includes those QA records associated with the design, engineering, manufacture, construction, and pre-operational testing of structures, systems, and components which are
- | classified as QA Category I items.

17.1.17.2B QA Records Requirements

- | Specific records requirements are identified in procurement and erection specifications, Codes and Standards, and in the QA Program manuals which govern quality associated activities, and include records of the results of reviews, inspections, tests, audits, monitoring of work performance, and qualifications of procedures and personnel. Records requirements associated with equipment and components are
- | summarized in QA Category I procurement and erection specifications.

- | Procedures contained in the QA program manuals provide instructions on the preparation of quality related records, the handling and documentation of nonconformities in the shop and field, and the review and approval of QA records by responsible authority.

17.1.17.3B Engineering and Design Records

Engineering and design records consist basically of engineering studies, calculations, specifications, and drawings. Documents generated during the engineering and design phases of the project are generally retained in the project files and at designated work locations at headquarters in Boston until such time as they are completed.

Engineering and design records which will become part of the lifetime or nonpermanent records retention system for the plant will be properly identified and forwarded to Gulf States for entry into its records

retention system at a mutually agreed upon time toward the end of project.

17.1.17.4B Installation and Construction Records

During the construction period the Superintendent of Field QC establishes and maintains a Master QA and QC File on site. This file will contain all final quality related documentation as identified in the Quality Assurance Directives Manual, and other records prescribed by SWEC and Gulf States. Records in the Site QA File are retained for the duration of the construction phase, and then transferred to Gulf States for entry into his records retention system.

Detailed quality related records and information which are generated by contractors and subcontractors are entered on a periodic basis into the Master QA and QC Files.

17.1.17.5B Collection, Storage, and Maintenance of QA Records

Requirements for the collection, storage, maintenance, and retention of QA records are established by procedures which are consistent with applicable Codes and Standards, regulatory requirements, and other requirements that may be established by Gulf States.

17.1.18B Audits

17.1.18.1B General Description

The project QA program provides written procedures for planned periodic audits which verify compliance with the quality related requirements specified for the project. Audits assure proper and timely implementation, compliance, and consistency in the discharge of assigned responsibilities.

The frequency of QA audits are based on the results of previous audits, significance of reported nonconformances and schedule of work accomplishment.

Audits are performed in accordance with written procedures or checklists, by Engineering Assurance and QA personnel, who by the nature of their position, are independent from the work functions being audited.

The audits encompass quality related activities in the following areas:

- a. Conformance to commitments in the PSAR and FSAR
- b. Conformance to requirements of the applicable QA manuals
- c. Control of engineering designs, specifications, service scope of work, and drawings including authorized changes thereto

- d. Control of suppliers quality and performance
- e. Materials control
- f. Manufacturing processes and controls
- g. Measuring and test equipment
- h. Inspection and test control
- i. Records of inspections
- j. Control of nonconformities and dispositions
- k. Control of special processes
- l. Handling and storage of equipment
- m. Construction and erection
- n. QA records

17.1.18.2B QA Program Audits

The requirements for conducting QA program audits of quality related activities are detailed in the QA Program Manuals listed in Section 17.1.2.2B. Table 17.1.18B-1, "QA Audit Responsibility and Frequency" summarizes the QA documents to be audited, the individuals responsible, the auditing group, the areas and locations to be audited, and the approximate frequency of audits.

17.1.18.3B Audit Results and Reports

QA audit results are documented and such reports reviewed by management having responsibility in the area audited.

When necessary, recommendations and corrective actions are outlined in the audit reports. Engineering Assurance and QA auditors follow up those recommendations and assigned corrective actions in order to determine their effectiveness. The results of follow up actions are also reported to management and those directly concerned.

Audit results and reports provide management with the means to analyze and evaluate the total project QA program. The designated management levels to which audit results are reported are prescribed in the QA program manuals.

17.1C QUALITY ASSURANCE DURING DESIGN AND CONSTRUCTION (GENERAL
ELECTRIC)

The current quality assurance program for safety-related activities and services for River Bend Station is described in the latest NRC accepted version of the General Electric Nuclear Energy Division's BWR Quality Assurance Program Description (NEDO - 11209).

TABLE 17.1.1B-1

SWEC QA QUALIFICATION AND EXPERIENCE REQUIREMENTS

<u>TITLE</u>	<u>EDUCATION</u>	<u>BACKGROUND EXPERIENCE</u>
V.P., Quality Assurance	BS/BA	Minimum of 10 years in responsible assignments in heavy construction management, engineering, or quality assurance. At least two years of this time should be in the nuclear field with emphasis on project/division management.
Manager, Quality Assurance	BS/BA	Minimum of 10 years in responsible assignments in engineering, quality assurance and control, or power station construction or operation.
Assistant Manager, Quality Assurance	BS/BA	Minimum of seven years in responsible assignments in engineering, quality assurance and control, or power station construction or operation.
Chief Engineer, Engineering Assurance	BS/BA	Minimum of five years in responsible assignments in engineering, quality assurance and control, inspection, or auditing.
Chief Engineer, Quality Systems	BS/BA	Minimum of five years in responsible assignments in quality assurance and control or construction of a power station.
Manager, Procurement Quality Assurance	BS/BA	Minimum of five years in responsible assignments in quality assurance and control or shop inspection.

<u>TITLE</u>	<u>EDUCATION</u>	<u>BACKGROUND EXPERIENCE</u>
Manager, Field Quality Control	BS/BA	Minimum of five years in responsible assignments in quality assurance and control or construction of a power station.
Chief Engineer, Nondestructive Testing	BS/BA	Minimum of five years in responsible assignments in nondestructive testing of materials or metallurgy.
Chief Engineer, QA Cost and Auditing	BS/BA	Minimum of five years in responsible assignments in quality assurance and control or construction of a power station.
Project Quality Assurance Program Administrator	BS/BA	Minimum of five years in quality assurance and related fields including manufacturing, construction, and/or installation activities. At least two years of this experience should be associated with the nuclear field in either field or headquarters project or quality assurance assignments.
Supt. of EQC/Assistant Manager or Assistant Chief Engineer of QA Divisions	BS/BA	Minimum of five years experience in quality assurance and related fields, including testing and/or inspection of manufacturing, construction, and/or installation activities. At least two years shall be in a supervisory capacity in the nuclear field.
		OR
	High School/	Minimum of ten years of

<u>TITLE</u>	<u>EDUCATION</u>	<u>BACKGROUND EXPERIENCE</u>
	General Education Development Equivalent (GED)	experience in general quality assurance or equivalent engineering, manufacturing, construction, and/or installation activities. Five years of total experience is required in quality assurance, including testing and/or inspection of equivalent manufacturing, construction, and/or installation activities. At least two years should be associated with the nuclear field.
Assistant Supt. of FQC/ Sr. QC Engineer/QC Inspection Supervisor	BS/BA	Minimum of five years of experience in quality assurance, including testing and/or inspection of equivalent manufacturing, construction, and/or installation activities. At least two years of this experience should be associated with the nuclear field.
		OR
	High School/ GED	Minimum of ten years of experience in general quality assurance or equivalent engineering, manufacturing, construction, and/or installation activities. Five years of this experience is required in quality assurance, including testing and/or inspection of equivalent manufacturing, construction, and/or installation activities. At

<u>TITLE</u>	<u>EDUCATION</u>	<u>BACKGROUND EXPERIENCE</u>
		least two years of this experience should be associated with the nuclear field.
Section Head/Supervisor/Sr. QA Engineer	BS/BA	Minimum of five years experience in quality assurance and related fields. The individual shall preferably hold a P.E. registration or ASQC certification as a Quality Engineer.
QC Engineer	BS/BA	A minimum of two years of experience in quality assurance including testing and/or inspection of equivalent manufacturing, construction, and/or installation activities.
	High School/ GED	OR Minimum of five years of experience in testing and/or inspection of equivalent manufacturing, construction, and/or installation activities.
QA Engineer	BS/BA	Minimum of five years experience in quality assurance and related fields.
	Associates Degree	OR Minimum of eight years experience and hold a P.E. registration or ASQC certification as a Quality Engineer.

<u>TITLE</u>	<u>EDUCATION</u>	<u>BACKGROUND EXPERIENCE</u>
Sr. QC Inspector/ Sr. PQA Representative (Level III)	BS/BA	Minimum of five years of related experience in equivalent inspection, examination, or testing activities, with at least two years of this experience associated with nuclear facilities - or if not, at least sufficient training to be acquainted with the relevant quality assurance aspects of a nuclear facility.
		OR
	Associates Degree	Minimum of seven years of related experience in equivalent inspection, examination, or testing activities, with at least two years of this experience associated with nuclear facilities - or if not, at least sufficient training to be acquainted with the relevant quality assurance aspects of a nuclear facility.
		OR
	High School/ GED	Minimum of ten years related experience in equivalent inspection, examination, or testing activities, or a minimum of eight years experience in equivalent inspection, examination, or testing activities with at least two years as a QC Inspector/PQA Representative (Level II), and with at least two years associated

<u>TITLE</u>	<u>EDUCATION</u>	<u>BACKGROUND EXPERIENCE</u>
		with nuclear facilities - or if not, at least sufficient training to be acquainted with the relevant quality assur- ance aspects of a nuclear facility.
		OR
	No Education Requirement	Minimum of six years of satisfactory perfor- mance as a QC Inspec- tor/PQA Representative (Level II) or fifteen years of related experience in the corresponding inspec- tion, examination, or test category or class.
Assistant QC Engineer	BS/BA	No experience require- ment.
		OR
	High School/ GED	Minimum of three years of experience in testing and/or inspection of equivalent manufactur- ing, construction, and/ or installation activi- ties.
Quality Data Supervisor	BS/BA or High School/ GED	Minimum of four years of experience in testing and/or inspection of equivalent manufactur- ing, construction, and/ or installation activi- ties or one year of satisfactory performance as a Quality Data Reviewer.

<u>TITLE</u>	<u>EDUCATION</u>	<u>BACKGROUND EXPERIENCE</u>
QC Inspector/ PQA Representative (Level II)	BS/BA	Minimum of six months of related experience in equivalent inspection, examination, or testing activities.
		OR
	Associates Degree	Minimum of one year of related experience in equivalent inspection, examination, or testing activities.
		OR
	High School/ GED	Minimum of three years of related experience in equivalent inspection, examination, or testing activities.
		OR
	No Education Requirement	Minimum of one year of satisfactory performance as a QC Inspector/PQA Representative (Level I) or five years related experience in the corresponding inspection, examination, or test category or class.
Quality Data Reviewer	High School/ GED	Minimum of two years experience in quality assurance, including testing and/or inspection of manufacturing, construction, and/or installation activities or one year satisfactory performance as a QC Technician.

<u>TITLE</u>	<u>EDUCATION</u>	<u>BACKGROUND EXPERIENCE</u>
QC Inspector/ PQA Representative (Level I)	BS/BA	Minimum of one month of related experience in equivalent inspection, examination, or testing activities.
		OR
	Associates Degree	Minimum of three months of related experience in equivalent inspection, examination, or testing activities.
		OR
	High School/ GED	Minimum of six months of related experience in equivalent inspection, examination, or testing activities.
	No Education Requirement	Minimum of two years of related experience in equivalent inspection, examination, or testing activities.
QC Technician	High School/ GED	Minimum of one year of experience in quality assurance concepts such as testing or inspection.
Assistant Technician/ Quality Data Clerk	High School/ GED	No experience require- ment.

*Equivalent qualification may be substituted based on other education accomplishments, experience in related fields, and technical achievements such as holding license as a Professional Engineer or Certification as a Quality or Reliability Engineer by the American Society for Quality Control. Assignment of SWEC personnel to any position described in this Appendix is a management prerogative within the indicated guidelines.

RBS - 1 & 2 PSAR
TABLE 17.1.2B-1

CROSS REFERENCE MATRIX OF IMPLEMENTING DOCUMENTS

	Section I Organization	Section II - Quality Assurance Program	Section III Design Control	Section VI - Procurement Document Control	Section V - Instructions, Procedures & Drawings	Section VI Document Control	Section VII - Control of Purchased Material, Equipment & Services	Section VIII - Identification and Control of Materials, Parts and Components	Section IX - Control of Special Processes	Section X Inspection	Section XI Test Control	Section XII - Control of Measuring & Test Equipment	Section XIII - Handling, Storage and Shipping	Section XIV - Inspection Test, & Operating Status	Section XV - Nonconforming Materials, Parts or Components	Section XVI Corrective Action	Section XVII - Quality Assurance Records	Section XVIII Audits
ISWEC Project Quality Assur- ance Program	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Quality Stan- dards Manual	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Quality Assur- ance Direc- tives Manual	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Quality Control Instructions	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ISWEC EA Manual	1, 2, 3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5, 9	3, 4, 5, 9	3, 4, 5, 6, 9	3, 4, 5	8	1, 3, 6, 9	4	1, 4, 12	4	4	N/A	3, 15, 16	15, 16, 18	17	18
Construction Methods Pro- cedures Manual	N/A	N/A	N/A	1	1	1	1	1, 3, 4, 5, 6, 7, 8, 9	1, 3, 4, 2, 3, 4, 5, 6, 7, 8, 9, 10	N/A	N/A	1	10	N/A	1	1	11	1
Calibration Manual	N/A	N/A	N/A	1	1	1	1	N/A	N/A	N/A	SEE QS-12.1 Entire Manual	N/A	N/A	N/A	N/A	N/A	1	N/A
Project Manual	3	4	5	788	Entire Manual	567	8	5	5	8	16	4	8	16	4	4	7	4
ASHE, Section III, Division I Manual	1, 3, 11, 2, 3, 4, 19, 21, 23	5, 6	7	5, 6	Entire Manual	Entire Manual	8, 7	8, 9, 11	10, 12, 14	13	22	16	8	18, 13, 15, 17, 22	13, 15	15	20, 24	18

Notes: 1. X-Manual Section Number Correlation

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TABLE 17.1.18B-1
SWEC QA AUDIT RESPONSIBILITY AND FREQUENCY

<u>QA DOCUMENT</u>	<u>AUDIT RESPONSIBILITY</u>	<u>CONDUCTED BY</u>	<u>AUDIT AREA</u>	<u>AUDIT LOCATION</u>	<u>APPROXIMATE FREQUENCY</u>
Project QA Program Manual	Manager, QA	QA Cost & Auditing Division	Engineering, QA, Construction, and Purchasing	Headquarters and Jobsite	Annually Quarterly
Engineering Assurance Manual	Chief Engineer Engineering Assurance	EA Division Staff	Engineering and Design	Headquarters and Jobsite	Quarterly
Quality Standards Manual	Manager QA, and Chief Engineer, Engineering Assurance	EA Division Staff and Cost & Auditing Division	Engineering, Construction, and QA/QC	Headquarters and Jobsite	Annually Quarterly
Quality Assurance Directives Manual	Manager, QA	QA Cost & Auditing Division	Field QC and QA Division	Headquarters and Jobsite	Annually Quarterly
Company QA and Control Manual-ASME Section III	Manager, QA and Chief Engineer, Engineering Assurance	EA Division Staff and QA Cost and Auditing Division	Engineering, QA, and Construction	Headquarters and Jobsite	Annually
Construction Methods Procedure Manual	Manager, QA	QA Cost & Auditing Division	Construction	Jobsite	Quarterly
Calibration Manual	Manager, QA	QA Cost & Auditing Division	Construction and QA	Headquarters and Jobsite	Annually
PSAR and FSAR QA Sections	Manager, QA	QA Cost & Auditing Division	Engineering, QA, and Construction	Headquarters and Jobsite	Annually*
Seller's QA Program Manual	Manager, Procurement QA	Procurement QA Division Staff	Seller	Seller's Shop	Twice or more**
Site Subcontractor's QA Program Manuals	Manager, QA	QA Cost & Auditing Division	Subcontractor	Jobsite	Annually

NOTES: *First audit approximately 6 months after submittal of PSAR; second audit approximately 6 months after submittal of FSAR.

**Normally there is an initial Seller audit immediately following award of work, another prior to start of fabrication, an intermediate, and a final acceptance audit. The number is dependent on size and complexity of the order. As a minimum, audits of Seller Activities will be conducted annually while project work is being performed at Seller's facilities.

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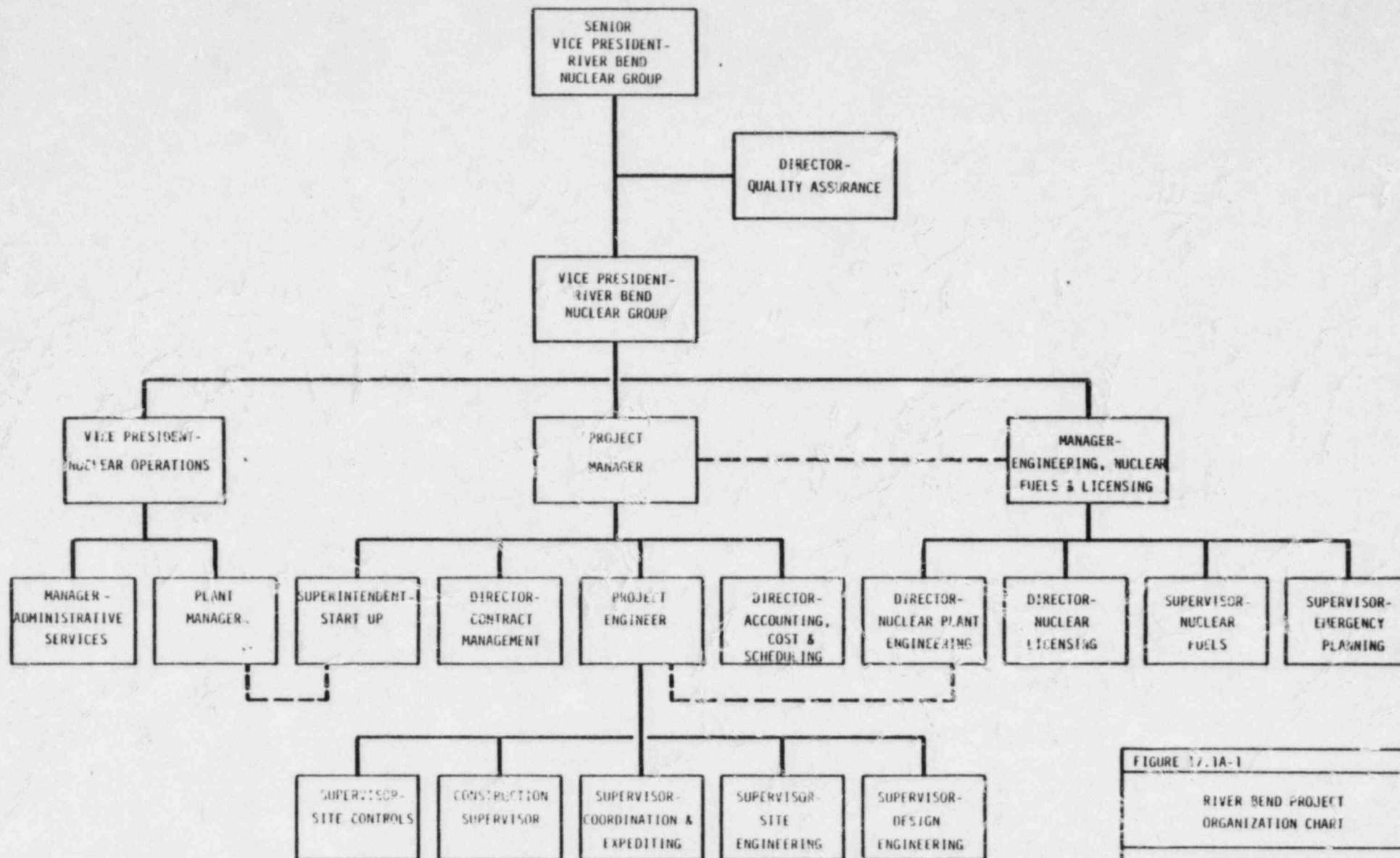
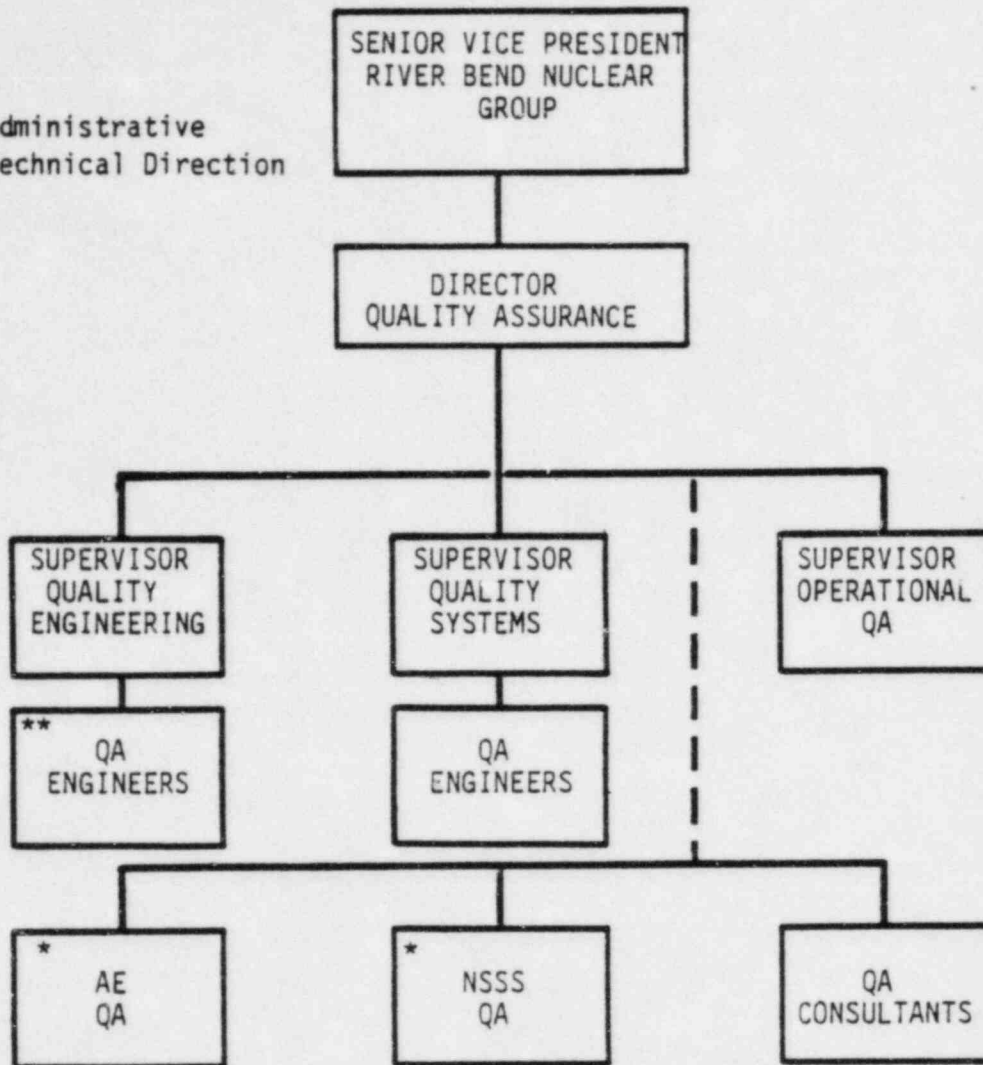


FIGURE 17.1A-1

RIVER BEND PROJECT
ORGANIZATION CHART

RIVER BEND STATION
CONSTRUCTION QA PROGRAM

——— Administrative
 - - - - - Technical Direction



*NOTE: AE PROJECT QA PROGRAM ADMINISTRATOR AND NSSS PROJECT QA MANAGER ARE RESPONSIBLE TO THE GSU DIRECTOR- QUALITY ASSURANCE, RIVER BEND STATION FOR TECHNICAL QA DIRECTION.

**WELD/NDE, MECHANICAL, ELECTRICAL, I & C, CIVIL/ STRUCTURAL

FIGURE 17.1A-2

FUNCTIONAL GSU QUALITY ASSURANCE
 ORGANIZATION AND INTERFACE

RIVER BEND STATION
 CONSTRUCTION QA PROGRAM

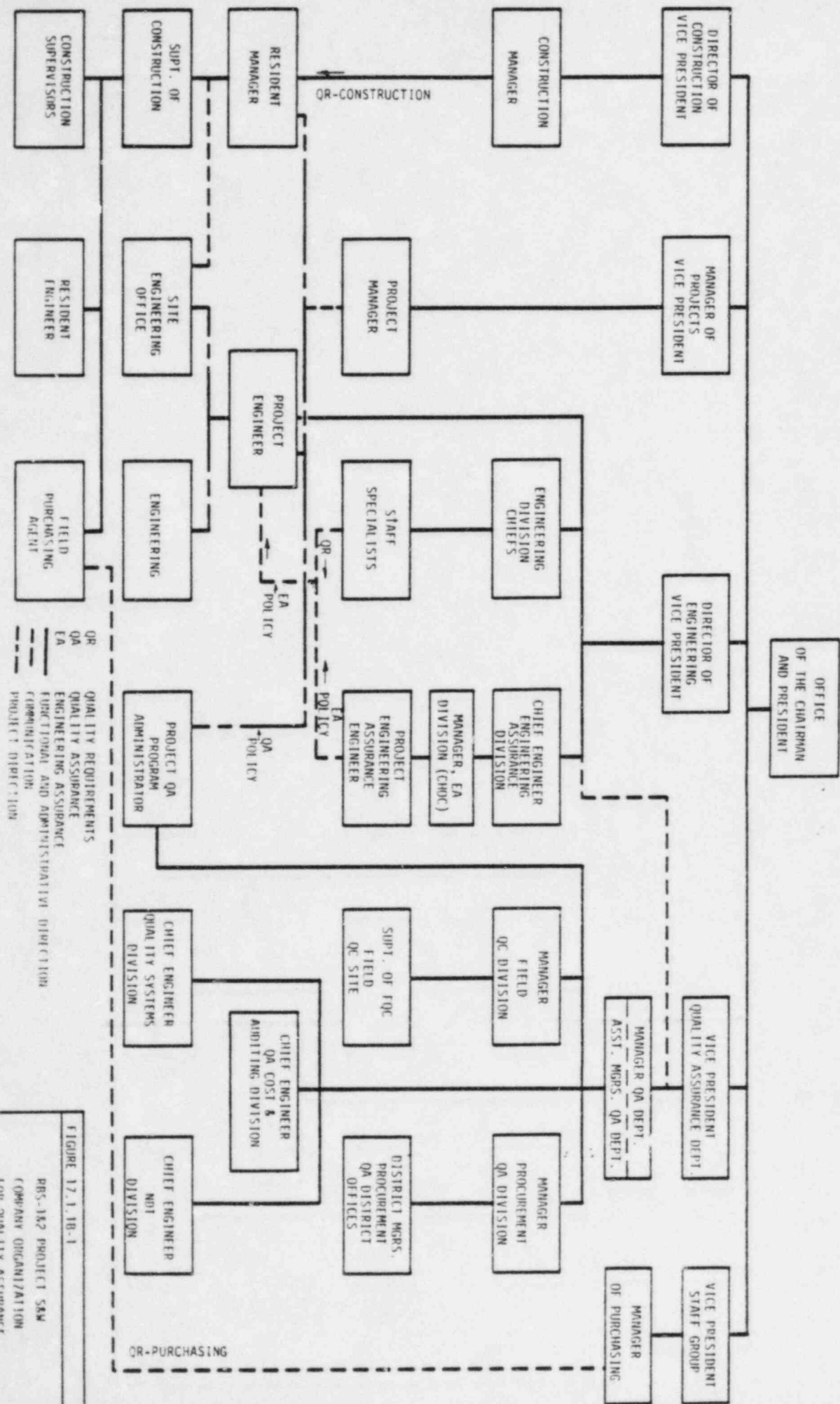


FIGURE 17.1.1B-1

RBS-1A2 PROJECT SAW
 COMPANY ORGANIZATION
 FOR QUALITY ASSURANCE

RIVER BEND STATION
 CONSTRUCTION QA PROGRAM

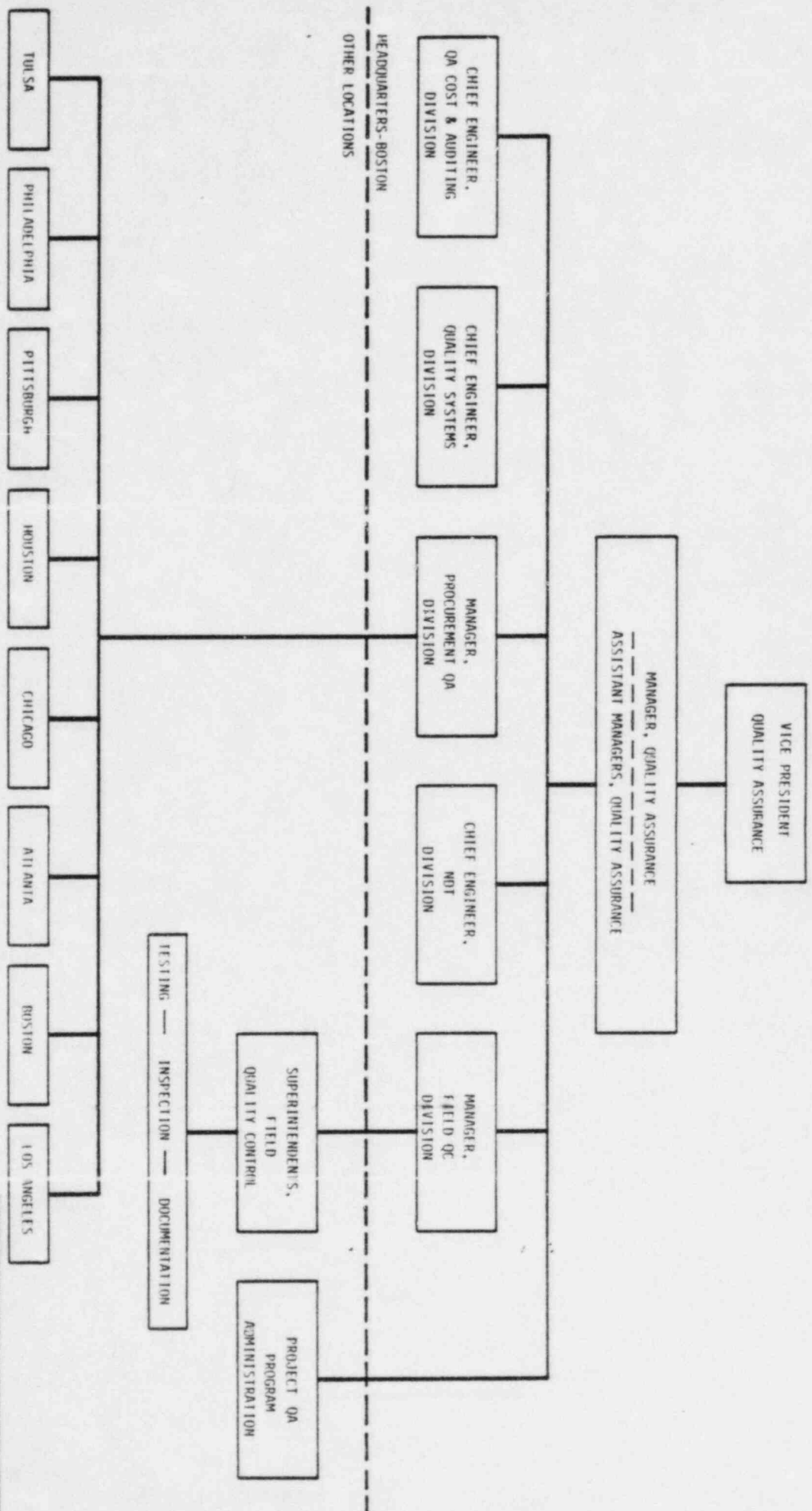


FIGURE 17.1.1B-2

SELF QUALITY ASSURANCE
IN PROJECT ORGANIZATION

RIVER BEND STATION
CONSTRUCTION QA PROGRAM

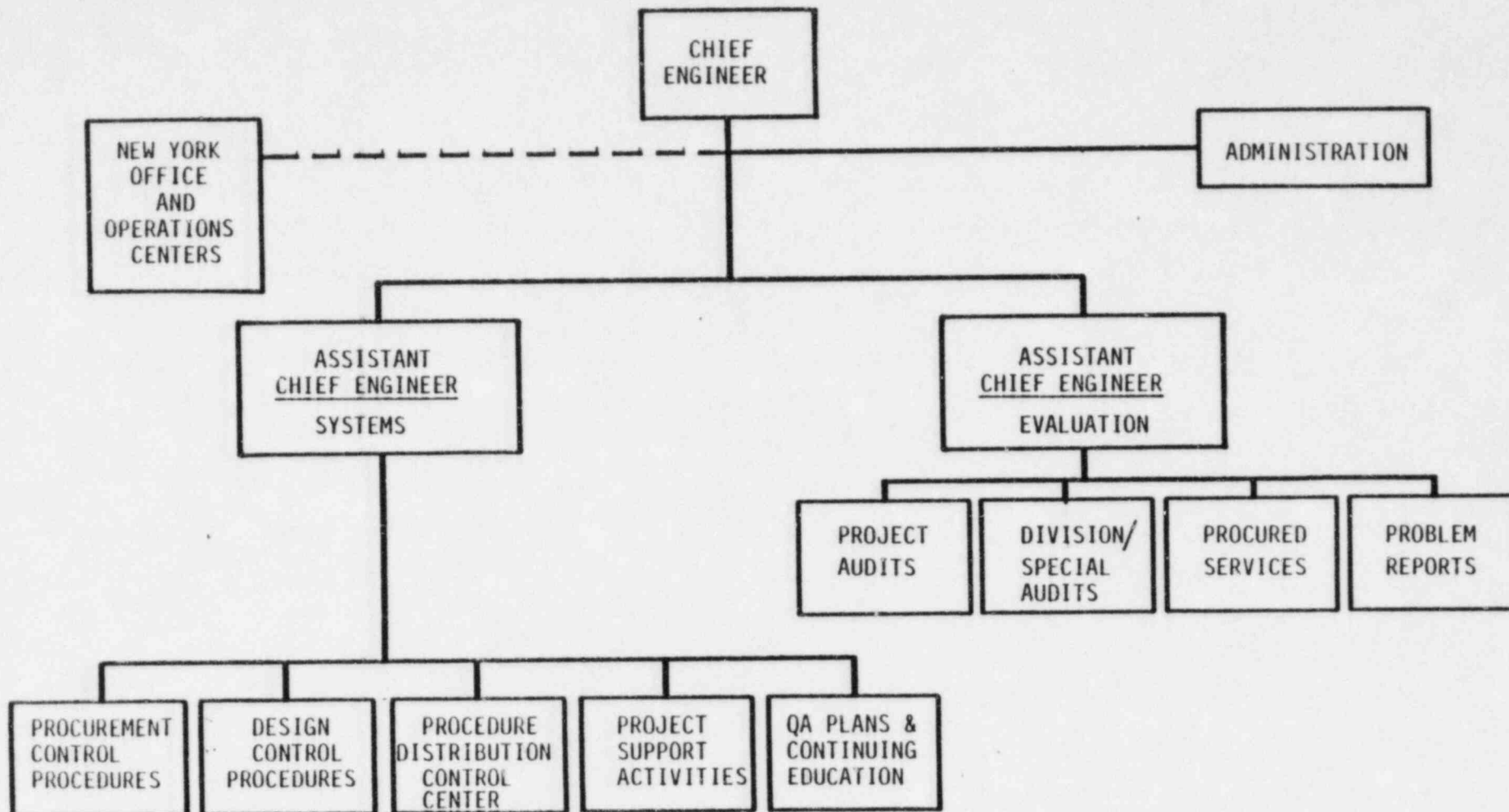
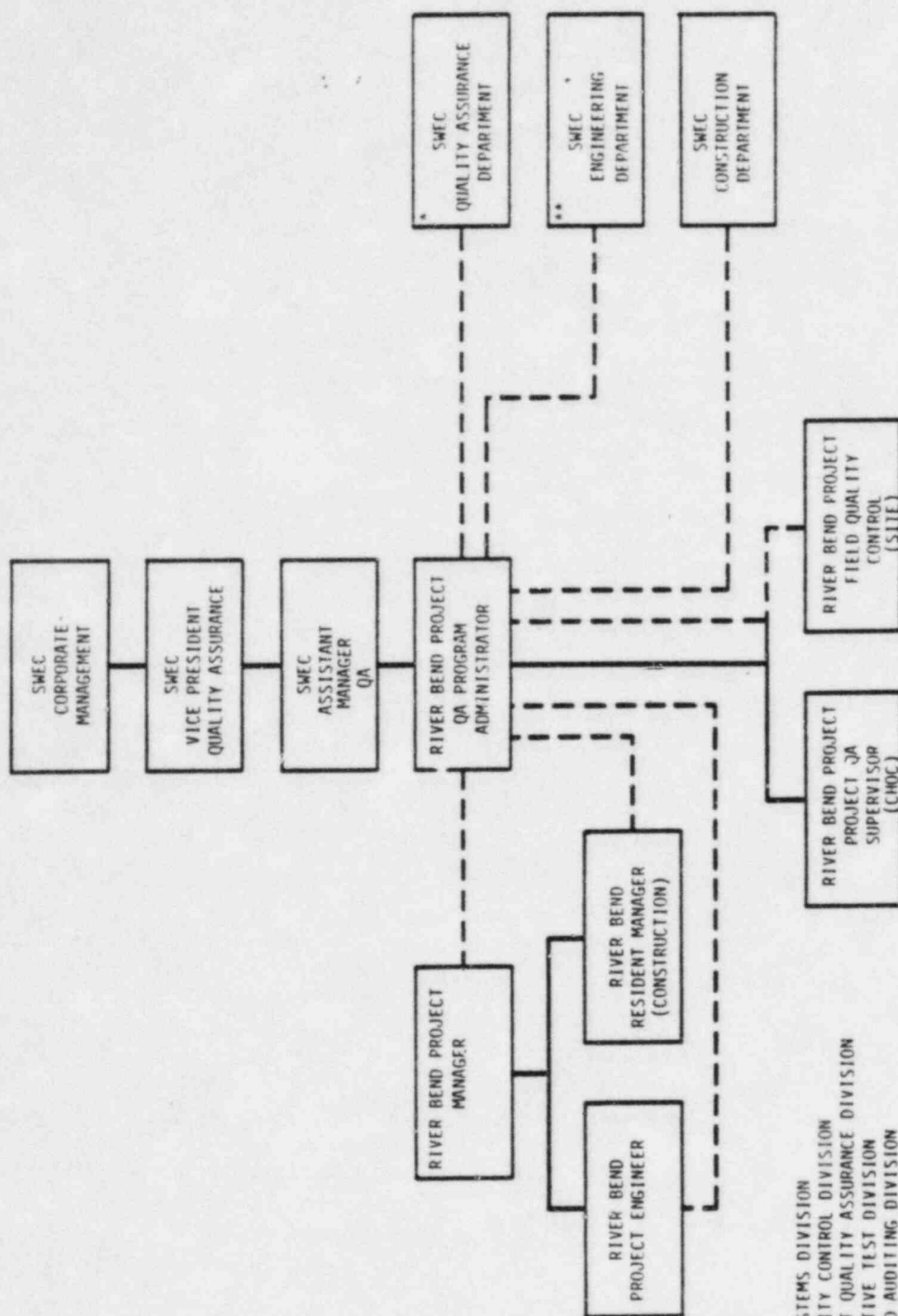


FIGURE 17.1.1B-3

SWEC ENGINEERING ASSURANCE
DIVISION ORGANIZATION

RIVER BEND STATION
CONSTRUCTION QA PROGRAM



- INCLUDES:
 - QUALITY SYSTEMS DIVISION
 - FIELD QUALITY CONTROL DIVISION
 - PROCUREMENT QUALITY ASSURANCE DIVISION
 - NONDESTRUCTIVE TEST DIVISION
 - QA COST AND AUDITING DIVISION

**** INCLUDES:**
ENGINEERING ASSURANCE DIVISION

LEGEND
—— DIRECTION
--- COMMUNICATION

FIGURE 17.1.1B-4

QBS-182 PROJECT
SWEE QUALITY
PROGRAM ORGANIZATION

RIVER BEND STATION
CONSTRUCTION QA PROGRAM