REVISION 2 INSERTION INSTRUCTIONS
RIVER BEND STATION PRELIMINARY SAFETY ANALYSIS REPORT

The following instructions are for the insertion of Revision 2 into the RBS PSAR. Remove the pages listed in the REMOVE column and replace them with the pages listed in the INSERT column.

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RBS-PSAR

History of Revisions

Revision 0	March 1983
Revision 1	May 1984
Revision 2	October 1984

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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 Manager-Quality Assurance (Manager-QA)

The Manager-QA reports to the Senior VP-River Bend Nuclear Group (RBNG). This relationship assures that GSU QA personnel responsible for monitoring, auditing, or otherwise verifying that safety-related activities have been performed are independent of personnel directly responsible for performing the activities.

The minimum qualifications for the Manager-QA are as follows:

1. Graduate of a college or university with a Bachelor's degree in engineering, a science, a related field, or equivalent capabilities.

2. A minimum of 4 years of experience in QA or a QA-related activity with at least two of those years in the nuclear power industry as a manager or supervisor.

3. Experience in development and implementation of QA Programs and Procedures.

4. Familiarity with Appendix B to 10CFR50 and applicable codes, standards, and Regulatory Guides.

5. Knowledge of inspection and testing techniques.

6. Ability to plan, organize, and administer an engineering activity.

7. Ability to provide effective written and oral communication.

8. Ability to maintain a good working relationship with employees, contractors, suppliers, government agencies, and the public.

The principal responsibilities of the Manager-QA are managing the construction phase QA Program and the Operational Phase QA Program.

The primary duties and responsibilities of the Manager-QA relative to the construction phase QA program are:

1. Developing procedures for and coordinating the implementation of the GSU Construction QA Program.

2. Reviewing, approving, and maintaining administrative control of the QA Program Manuals (NQAM and NQAPD) and changes thereto;

3. Assuring effective implementation of the QA Program by conducting audits, surveillances and inspections;

4. Interfacing with QA programs and activities of suppliers of safety-related material, spare parts, and services to assure QA-Program objectives are met;

5. Developing and implementing QA Department procedures;

6. Assuring that the RBNG organization develops appropriate QA Program implementing procedures and instructions;

7. Review of safety-related procurement documents to insure inclusion of QA requirements, including required QC inspection attributes and acceptance criteria;

8. Serving as a member of the Nuclear Review Board (NRB); and Corporate Nuclear Review Committee (CNRC);

9. Conducting pre-contract award vendor, supplier, and/or contractor surveys, where applicable;

10. Establishing and maintaining a Qualified Suppliers List (QSL) for use in procuring safety-related items and services;

11. Establishment and implementation of the QA Department indoctrination and training program;

12. Assuring the establishment and implementation of station and headquarters QA indoctrination and training programs;

13. Conducting post-contract award vendor, supplier, and/or contractor source audits, surveillances and inspections, where applicable;

14. Analyzing reports of nonconformances for quality trends;

15. Establishing a Quality Control organization and implementing the Quality Control (QC) Program;

16. Reviewing and/or auditing plant modifications and design changes;

17. Coordination of support for NRC and INPO inspections and inspection report responses.

18. Coordination of Quality Concern Program.

The Manager-QA is authorized to evaluate the manner in which all activities at the station are conducted, with respect to quality, by means of checks, reviews, audits, surveillance, and/or inspections. He performs this evaluation on a planned and periodic basis to verify that the QA Program is being effectively implemented. He is responsible for periodically evaluating and reporting on the status and adequacy (including QA Department staffing) to appropriate GSU management. He has the authority and organizational freedom to identify quality problems, to initiate, recommend, or provide solutions through designated channels, and to verify implementation of solutions. He has the authority to initiate stop work action, or control further processing, delivery, or installation of nonconforming material through appropriate channels as described in the applicable QA Department procedure.

The Manager-QA is assisted in carrying out his responsibilities by the QA Department Staff consisting of Quality Systems, Operational QA, Quality Engineering and Quality Control sections. These sections consist of engineers, inspectors, technical and nontechnical personnel as required. In addition, this staff is supplemented as required from other areas within GSU, consultants, or contractors. QA Department responsibilities, coordination and communication are through the Manager-QA.

In order to determine the size of the QA/QC organizational department, the Manager-QA reviews the requirements of the organization and the commitments provided in the FSAR. He reviews the organizations of other utilities with similar requirements and then estimates the man-hours required yearly from QA/QC personnel to fulfill the normal program. Temporary personnel may be contracted to assist during refueling outages and major modifications.

The Manager-QA is responsible for the development and administration of the overall QA Program during design, construction, pre-operational testing, operation, and modifications of River Bend Station.

17.1.1.1.2A Director-Operations Quality Assurance (Director-OQA)

The Director-OQA reports to the Manager-QA. He has no responsibilities for the construction phase QA Program. See Section 17.2.1.2.5 of FSAR.

17.1.1.1.3A Director-Quality Services (Director-QS)

The Director-Quality Services reports to the QA manager.

The minimum qualifications for the Director Quality Services are as follows:

1. Graduate of a college or university with a Bachelor's degree in engineering, a science, a related field, or equivalent capabilities.

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, and processes.

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.

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 is 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 and preoperational tests 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. 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, GE, and GSU.

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 responsible and senior management personnel within GSU, GE and SWEC.

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 (To be maintained until start of commercial operation

QA Audits
Field Audit Reports
Pre-awarded QA Surveys

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 shall 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 audits of the site construction Preliminary Test Organization (PTO) activity 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 responsible and senior management personnel within GSU, GE and SWEC. 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, Gulf States Utilities (GSU) Company. 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 Project SWEC Company Organization for Quality Assurance" denotes the lines of authority, responsibility, implementation, and communication in matters pertaining to quality within SWEC.

Fig. 17.1.1B-2 "River Bend Station Construction QA Program" 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 "SWEC 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 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.

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

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 inplementation 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, construction, and testing, by implementing the Quality Control Program at the construction site.

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.

"Off the Shelf" items which have not previously been approved for service are required to be certified for service by prototype test. For example, a pressure switch used for a safety related service which has not been previously qualified for the service may be qualified by a prototype test of an identical component under the conditions specified.

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

A written procedure requires the review and signature of at least one other engineer, in addition to the individual primarily responsible for the preparation of the engineering document. The engineering review is conducted to include

both original documents and their revisions associated with QA Category I items, and includes the following:

Conceptual design studies

Application of appropriate Codes and Standards, Regulatory Criteria, and the selection and suitability of application of materials, parts, equipment, and processes

Engineering calculations

Engineering specifications for procurement and erection of structures, systems, and components

Engineering drawings

b. 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.

c. 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.

d. 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.

e. 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.

f. 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.

g. Design Interfaces

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.

h. Design Auditing

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.

i. Prototype Testing Control

If prototype testing is required to confirm the adequacy of a design, the requirements and acceptance criteria are contained in the procurement specification or other applicable documents. The personnel having direct responsibility for carrying out the prototype testing are other than those who performed the original design.

j. Design Change Control

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.

k. Equipment and Components

Materials and parts for equipment and components, classified as QA Category I, are selected which satisfy the requirements of the intended designs, and their applications are reviewed as set forth in established procedures.

17.1.3.5B As-Built Specifications and Drawings

The complete approved design is documented on current revisions of drawings and specifications, including addenda, as well as unincorporated approved change documents. Certain types of Engineering and design changes recorded on approved change documents (e.g. E&DCR's and N&D's) are incorporated into QA Category I drawings and QA Category I specifications by addenda or revision in accordance with approved 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.

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 establishes 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 GSU. 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.

The control of materials and equipment which is designed and manufactured or fabricated to the requirements of ASME Code - Section III, is governed by the procedures of the SWEC QA and QC Manual - ASME Section III.

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.

The use of Test and Inspection Documentation (TID) forms has been discontinued and the TID requirements are specified in the body of the specification. Recording of inspection attributes are done in the inspection report as required in the approved inspection plans.

The TID form, when used, was only a summary of the test, inspection, and document requirements section of the specification. Paragraphs 17.1.4.2B and 17.1.10.1B of the PSAR now cover these requirements and is in conformance with the approved QA Program.

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

17.1.8.1B 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-1975 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 incompleted items 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 their 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 adequacy prior to authorization for use by the 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. Field QC personnel perform surveillance over record activities of subcontractors.

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 Business Operation's BWR Quality Assurance Program Description (NEDO - 11209).