Topical Report
GAI-TR-106
Revision 1A
July 1978

Gilbert/Commonwealth Quality Assurance Program for Nuclear Power Plants

Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading,PA/Jackson,MI

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

JUL 26 1978

Gilbert/Commonwealth
ATTN: Mr. W. H. Traffas
Vice-President and General Manager
Quality Assurance Division
P.O. Box 1498
Reading, Pennsylvania 19603

Dear Mr. Traffas:

SUBJECT: NRC ACCEPTANCE OF TOPICAL REPORT, "GILBERT/COMMONWEALTH QUALITY ASSURANCE PROGRAM FOR NUCLEAR POWER PLANTS," GAI-TR-106

We have evaluated your topical report, "Gilbert/Commonwealth Quality Assurance Program for Nuclear Power Plants," submitted with your letter of February 22, 1978 as amended by your letter of June 30, 1978. The topical report describes the quality assurance program established for the design, procurement, and construction management activities of Gilbert/Commonwealth for nuclear power plants.

Based on our evaluation of the information submitted, we find that the criteria of Appendix B to 10 CFR Part 50 are met. Your topical report is therefore acceptable. Thus, to use the Gilbert/Commonwealth quality assurance program in future license applications, applicants need only reference this topical report in Section 17 of the Safety Analysis Report. We do not intend to repeat our review of this topical report when it is referenced in an application.

Should regulatory criteria or regulations change such that our conclusions about this topical report are invalidated, we will notify you. You will be given the opportunity to revise and resubmit it should you so desire. Programmatic changes by Gilbert/Commonwealth to this topical report are to be submitted to NRC for review prior to implementation. Organizational changes are to be submitted no later than 30 days after announcement.

Please include this letter in each report, number the report Revision 1A of GAI-TR-106 (where the "A" indicates NRC acceptance), date the report July 1978, and provide 36 copies to the NRC. Should you have any questions regarding our review or if we can provide assistance, please contact Mr. Jack Spraul on (301) 492-7741.

Sincerely,

Walter P. Haass

Walter P. Haass, Chief
Quality Assurance Branch
Division of Project Management

Enclosure:
Topical Report Evaluation

TOPICAL REPORT EVALUATION

Report Number: GAI-TR-106, Rev. 1A
Report Title: Gilbert/Commonwealth Quality Assurance Program for Nuclear Power Plants
Report Date: July 1978
Originating Organization: Gilbert/Commonwealth
Reviewed by: Quality Assurance Branch

SUMMARY OF TOPICAL REPORT

Revision 1A of topical report GAI-TR-106 describes the quality assurance program which Gilbert/Commonwealth applies to those design, procurement, and construction management activities involving safety-related structures, systems, and components of nuclear power plants within the Gilbert/Commonwealth scope of work. Revision 1A of GAI-TR-106 commits Gilbert/Commonwealth to comply with the requirements of Appendix B to 10 CFR Part 50 and to follow the regulatory position provided by the NRC in Regulatory Guides 1.28 (June 7, 1972); 1.30 (August 11, 1972); 1.37 (March 16, 1973); 1.38-Revision 2 (May 1977); 1.39-Revision 2 (September 1977); 1.58 (August 1973); 1.64-Revision 2 (June 1976); 1.74 (February 1974); 1.88-Revision 2 (October 1976); 1.94-Revision 1 (April 1976); 1.116 (June 1976); and 1.123-Revision 1 (July 1977), as well as ANSI N45.2.12-1977 (supplemented).

Gilbert/Commonwealth has provided for our evaluation a detailed organizational description of those individuals and groups involved in carrying out activities required by the quality assurance program and a delineation of duties, responsibilities, and authority of those organizational elements involved in the quality assurance program. Revision 1A of GAI-TR-106 contains a description of the measures used to carry out the Gilbert/Commonwealth quality assurance program activities and describes how applicable requirements of Appendix B will be satisfied by the administration and implementation of these measures in quality assurance manuals and procedures.

SUMMARY OF REGULATORY EVALUATION

We have evaluated the quality assurance program and the organizations responsible for quality assurance functions as described in Revision 1A of GAI-TR-106. We find that quality assurance policy and direction originate at an acceptably high management level and are effectively communicated to other parts of the organization. Those performing quality assurance functions have responsibility and authority commensurate with their duties in implementing the quality assurance program. We also find that measures have been established, to be implemented by written procedures and instructions, which address each of the criteria of Appendix B in an acceptable manner.

Based on our review and evaluation of Revision 1A of GAI-TR-106, we conclude that:

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

2. The Gilbert/Commonwealth quality assurance program contains requirements and controls which, when properly implemented, comply with the requirements of Appendix B to 10 CFR Part 50.

3. Revision 1A of GAI-TR-106, "Gilbert/Commonwealth Quality Assurance Program for Nuclear Power Plants" provides an acceptable description of the quality assurance program for use in the design, procurement, and construction management activities associated with nuclear power plants.

ATTENTION

This program document, GAI-TR-106, Revision 1A, has been issued by Gilbert/Commonwealth and, except for regulatory agency users, shall be returned on request. The information contained herein shall not be reproduced, in whole or part, nor used for other than the purpose for which the document has been provided, without the express written consent of Gilbert/Commonwealth.

This document has been assigned to:

Walter P. Haass
(NAME)

Chief, Quality Assurance Branch
(TITLE)

Division of Project Management
(DIVISION)

United States Nuclear Regulatory Commission
(AGENCY OR COMPANY)

Washington, D. C. 20555
(LOCATION)

SERIAL NUMBER: 247 R

Gilbert/Commonwealth engineers and consultants

GILBERT ASSOCIATES, INC., P. O. Box 1498, Reading, PA 19603/Tel. 215 775-2600/Cable Gilasoc/Telex 836-431

J. R. Stoudt
President

September 29, 1978

To Whom It May Concern:

This Topical Report describes requirements of the Quality Assurance Program of the Gilbert/Commonwealth Companies. These requirements have been established to achieve the assurance of requisite quality in design, procurement, and construction of nuclear power plants.

Gilbert/Commonwealth, cognizant of its obligation to its clients and the general public to provide services of the highest professional quality, is committed to this Nuclear Quality Assurance Program. Responsibility for assuring implementation of this program has been delegated to the Quality Assurance Division General Manager through the Utilities Group Vice President.

Revisions or changes to this program shall require prior approval by the Quality Assurance Policy Committee and acceptance by the regulatory agency in accordance with the conditions stipulated in the Nuclear Regulatory Commission letter of acceptance of this Topical Report.

Sincerely,

J. R. Stoudt

JRS:btb

POLICY

The Gilbert/Commonwealth Quality Assurance Program for Nuclear Power Plants, as described in this Topical Report, GAI-TR-106, Revision 1A, is fully endorsed by management. It is the policy of Gilbert/Commonwealth to implement this program on a timely basis and in accordance with contractual and regulatory requirements. Implementation of the program is by division procedures identified in the Topical Report.

This standard Quality Assurance Program has been developed to be responsive to 10CFR50, Appendix B, ANSI N45.2-1971, applicable regulatory guides, and other industry standards, as referenced within the report.

A. F. Smith, III
Group Vice President
Utilities Group

TOPICAL REPORT GAI-TR-106, REVISION 1A

JULY 1978

Gilbert/Commonwealth Quality Assurance Program for Nuclear Power Plants

ABSTRACT

The Gilbert/Commonwealth Quality Assurance Program described in this report is divided into 18 sections conforming in format to the 18 Criteria listed in 10CFR50, Appendix B.

The program is implemented through four divisions assigned to the Utilities Group and covers design, procurement, and construction management activities. These activities are controlled by including applicable quality assurance requirements in corporate/division documents for internal activities and imposing the applicable requirements on contractors/suppliers through procurement documents. With respect to the divisions assigned implementation responsibilities in this report, Gilbert/Commonwealth will not directly employ personnel to perform construction. When required these services will be provided by contractors having acceptable Quality Assurance Programs. Verification of program implementation is accomplished by Quality Assurance Division audits, surveys, and inspections.

The position and interface relationships of the Utilities Group in performing quality related activities are described in Section 17.1. Section 17.2 presents an overview of the Quality Assurance Program describing its operations, controls imposed, and scope of application. The remaining sections address specific areas or activities.

Content of this report was prepared to address the acceptance criteria specified in the U. S. Nuclear Regulatory Commission's "Standard Review Plan," NUREG 75/087. Specifically, the acceptance criteria of Section 17.1, "Quality Assurance During Design and Construction" of NUREG 75/087 have been addressed.

The Quality Assurance Program described in this report is considered to be in compliance with the applicable criteria of 10CFR50, Appendix B.

INTRODUCTION

The Gilbert/Commonwealth Companies include Gilbert Associates, Inc., located in Reading, Pennsylvania, and Commonwealth Associates Inc., located in Jackson, Michigan. Commonwealth Associates Inc., is a wholly owned subsidiary of Gilbert Associates, Inc.; and although both companies maintain separate legal identities, operational direction is provided through a single corporate structure. The two companies are addressed in this Topical Report as "Gilbert/Commonwealth."

The purpose of this Topical Report is to describe Gilbert/Commonwealth's Quality Assurance Program and demonstrate compliance with the regulations of 10CFR50, Appendix B, as further delineated by Section 17.1 of Regulatory Guide 1.70, Revision 2, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants."

This program is applicable to design, procurement, and construction efforts related to domestic nuclear power plants and will be referenced in future Safety Analysis Reports in which Gilbert/Commonwealth is a participant. Although the Gilbert/Commonwealth Quality Assurance Program addresses 10CFR50, Appendix B, for design, procurement, and construction activities, the actual scopes of responsibility undertaken for different clients varies considerably. Accordingly, this program is implemented in whole or in part commensurate with the scope of responsibility assigned by clients for specific projects.

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17.0 QUALITY ASSURANCE DURING DESIGN AND CONSTRUCTION

17.1 GILBERT/COMMONWEALTH

Gilbert/Commonwealth is a group of engineering and consulting firms providing planning, design, construction management, management consulting, and quality assurance services.

Gilbert Associates, Inc., located in Reading, Pennsylvania, and Commonwealth Associates Inc., located in Jackson, Michigan, are the principal companies of the Gilbert/Commonwealth Companies. Although the two companies maintain separate and individual legal identities, operational direction is provided through a single corporate structure as shown in Figure 1-1. The companies will be referred to as Gilbert/Commonwealth in this report.

17.1.1 ORGANIZATION

Gilbert/Commonwealth operating responsibilities are concentrated in two groups reporting to the President and Chief Executive Officer. Responsibility for design, procurement, and construction services activities associated with nuclear power plants is vested in the Utilities Group under the direction of a Group Vice President.

The President and Chief Executive Officer has delegated responsibility for the Gilbert/Commonwealth Quality Assurance Program to the Utilities Group Vice President. The Utilities

Group Vice President has delegated authority for program implementation to each division, consistent with assigned division responsibilities. In the Introduction to Gilbert/Commonwealth's Nuclear Quality Assurance Manual, the Utilities Group Vice President has mandated compliance for Nuclear Projects. The following is an excerpt from the Introduction:

> "The Gilbert/Commonwealth Nuclear Quality Assurance Program, as delineated in this manual, is adopted and fully endorsed by management. The program has been developed in consonance with 10CFR50, Appendix B, ANSI N45.2-1971, applicable regulatory guides, and other industry standards. Implementation of this program, as appropriate to defined scopes of work undertaken by Gilbert/Commonwealth, is mandatory for all nuclear power plant projects requiring compliance with 10CFR50, Appendix B.
>
> This manual is designed to serve the following purposes:
>
> 1. Define corporate policy for compliance with each of the 18 criteria stated in 10CFR50, Appendix B.
> 2. Establish requirements for implementing the policy.
> 3. Assign division responsibilities.
> 4. Describe interdivisional interfaces.

Each division is charged with the responsibility of implementing the program in accordance with approved and controlled division procedures."

Reporting to the Utilities Group Vice President and providing advice and consultation on Quality Assurance Program requirements is the Quality Assurance Division General Manager.

The following divisions within the Utilities Group have responsibility for implementing the Gilbert/Commonwealth Quality Assurance Program:

1. Power Engineering Division (Reading)

2. Power Engineering Division (Jackson)

3. Construction Services Division

4. Quality Assurance Division

The remaining two divisions in the Utilities Group (see Figure 1-1), Management Consulting Division and Energy Transport Division, do not normally provide services which require compliance with the Nuclear Quality Assurance Program. In the event future projects are undertaken by these divisions which require compliance to a Nuclear Quality Assurance Program, the applicable requirement of the Nuclear Quality Assurance Program described in this report will be invoked. Any other division which provides nuclear safety related services is required to comply with Utilities Group procedures or provide commensurate procedures.

17.1.2 Power Engineering Divisions

The Power Engineering Divisions provide complete engineering services, including design engineering, drafting, consulting, licensing, environmental, startup and test, and project management. The Power Engineering Division organizations are depicted in Figures 1-2 and 1-3.

Each Power Engineering Division is managed by a Division General Manager, who has technical and administrative responsibility for division operation and implementation of the Nuclear Quality Assurance Program within their divisions. Power Engineering Division General Managers report to the Utilities Group Vice President.

Each Power Engineering Division General Manager serves as a member of the Quality Assurance Policy Committee, which is responsible for the development of quality assurance policies and has responsibility for approving their respective design control programs.

17.1.2.1 Support Engineering (Reading)

The Manager of Support Engineering is responsible for providing engineering services in the areas of environmental/regulatory engineering, applied engineering analysis, technical support services, startup, and test.

Coordination between the Power Engineering Divisions (Reading and Jackson) in the areas of advanced engineering, computer

engineering, research and development, and technical and licensing policy is also included in these responsibilities. In the performance of this function, the Manager of Support Engineering reports to a committee consisting of the Utilities Group Vice President and the Power Engineering Division General Managers.

17.1.2.2 Engineering (Reading and Jackson)

The Managers of Engineering are responsible for engineering, design, and drafting services in the areas of architecture, building services, chemical, electrical, instrumentation and controls, layout, mechanical, civil, piping, and model shop.

17.1.2.3 Design Control

The Managers of Design Control are responsible for developing and maintaining design control programs responsive to the requirements of the Gilbert/Commonwealth Nuclear Quality Assurance Program, 10CFR50, Appendix A and B, Regulatory Guide 1.28, and Regulatory Guide 1.64.

17.1.2.4 Interdivisional Services

Engineering services may be obtained from Gilbert/Commonwealth organization outside of the Utilities Group. It is the responsibility of the requesting organization to invoke the applicable Nuclear Quality Assurance Program requirements and procedures as part of the request for services.

17.1.3 Project Organization

Because of the wide range of services provided and variety of clients served by Gilbert/Commonwealth, diverse forms of project organization are required. The organization for each project is dependent upon scope, client preference, and participation of other divisions and is structured accordingly. For each project, project teams are formed from qualified individuals selected from appropriate Gilbert/Commonwealth Divisions. A Project Management Manual, which specifies the project organization, is prepared for each project. A typical nuclear project organization is shown in Figure 1-4.

17.1.3.1 Project Management

Within each Power Engineering Division, Managers of Projects are designated for the administration of two or more projects. These managers report to the appropriate Power Engineering Division General Manager (the position title for this position at the Gilbert/Commonwealth Jackson Office is Senior Project Manager).

The responsibilities of Managers of Projects includes supervising project managers, administering procedure conformance, and reviewing and recommending program approvals.

Reporting to the Managers of Projects are the individual project managers. The responsibilities of Project Managers include coordinating, planning, scheduling, and directing project operations. Development of the Project Management Manual and

implementation of procedures to satisfy project and Quality Assurance Program requirements are included in their responsibilities.

17.1.3.2 Project Organization and Reporting Relationships

Project teams, composed of individuals assigned from the various divisions, receive project direction from the Project Managers. However, technical direction, salary review, and position assignment are provided by their respective division management.

17.1.4 Construction Services Division

The Construction Services Division provides construction management and procurement services from initial studies through engineering and design, construction, and commercial operations. The Construction Services Division General Manager reports to the Utilities Group Vice President, and has technical and administrative responsibility for operation of the division and implementation of the Nuclear Quality Assurance Program within the division. Quality related activities conducted by the Construction Services Division are in accordance with division procedures approved by the Construction Services Division General Manager. Organization of the Construction Services Division is as depicted in Figure 1-5.

17.1.4.1 Construction Management

Construction Managers report to the Construction Services Division General Manager and are responsible for administrative

and technical direction of assigned projects in the areas of construction operations. They assure adequate project staffing and organization, as well as implementation of Construction Control Procedures which satisfy Nuclear Quality Assurance Program requirements. A typical construction management project organization chart is shown in Figure 1-6.

The Construction Manager assigned to a Nuclear Generating Station construction site has the responsibility for complying with and implementing the requirements of the Quality Assurance Program. Implementation of the Quality Assurance Program at the construction site has been delegated to the Construction Quality Assurance/ Quality Control Manager, who provides a Quality Assurance/Quality Control staff to perform surveillance, Quality Assurance/Quality Control Engineering, and site inspection services.

17.1.4.2 Procurement Services

The director of Procurement Services reports to the Construction Services Division General Manager and is responsible for planning, organizing, and directing procurement activities, as well as preparing and implementing Procurement Control Procedures which comply with the requirements of the Nuclear Quality Assurance Program. Figure 1-5 depicts the organizational relationship of Procurement Services. Procurement services include the procurement of material, equipment, and service.

The development and maintenance of a corporate record system which meets the requirements of the Nuclear Quality Assurance Program is also a responsibility of Procurement Services.

17.1.5 Quality Assurance Division

Responsibility for assuring effective implementation of the Gilbert/Commonwealth Nuclear Quality Assurance Program has been delegated by the President to the Quality Assurance Division General Manager, through the Utilities Group Vice President.

The Quality Assurance Division General Manager reports to the Utilities Group Vice President. He has technical and administrative responsibility for assuring effective implementation of the Nuclear Quality Assurance Program on safety related activities for design, procurement, and construction. The reporting relationship of the Quality Assurance Division Manager provides independence from cost and scheduling influences. The organizational arrangement shown in Figure 1-7 provides the Quality Assurance Division with independence, freedom, and authority to assess the effectiveness of Gilbert/Commonwealth quality assurance activities.

The Quality Assurance Division General Manager is responsible for reporting to the Quality Assurance Policy Committee on the effectiveness of the Quality Assurance Program. As a member of the Quality Assurance Policy Committee, the Quality Assurance Division General Manager also participates in the development of quality assurance policies.

Quality Assurance Division procedures implementing the requirements of the Nuclear Quality Assurance Manual are

approved by the Quality Assurance Division General Manager. He has sole administrative control for performance review, hire/fire, and position assignment of division personnel. The position of Quality Assurance Division General Manager requires, as a minimum, a bachelors degree in science or engineering from an accredited college or university, or registration as a Professional Engineer. Further requirements include a minimum of 12 years experience in the design, manufacture, construction, test or operation of Nuclear Power Plants, heavy industrial facilities, or other similar facilities. Of the 12 years required experience, five must be related to the nuclear field, three must be related to quality assurance, and three must be in a responsible supervisory capacity.

The Quality Assurance Division General Manager has reporting to him a management staff which includes a Methods and Operations Manager, two Design and Procurement Quality Assurance Managers, a Construction Quality Assurance/Quality Control Manager, and Quality Assurance Program Managers.

17.1.5.1 Methods and Operations Manager

The Methods and Operations Manager is responsible for preparation and control of Quality Assurance Division policies, procedures, and instructions; indoctrination and training of Quality Assurance Division personnel; maintenance and control of Quality Assurance Division documents and records. In addition, the Methods and Operations Manager is responsible for control of

the Nuclear Quality Assurance Manual and performance of corporate internal audits.

17.1.5.2 Design and Procurement Quality Assurance Managers

The Managers, Design and Procurement Quality Assurance, are responsible for assuring compliance with Quality Assurance Program requirements during design and procurement activities. The Design and Procurement Quality Assurance organizations provide support services to the respective Power Engineering Divisions and directly to clients in the areas of quality engineering, manufacturing surveillance, and quality systems.

17.1.5.3 Construction Quality Assurance/Quality Control Manager

The Construction Quality Assurance/Quality Control Manager is responsible for assuring compliance with Quality Assurance Program requirements during construction activities. The Construction Quality Assurance/Quality Control organization provides support services to the Construction Services Division and directly to clients in the areas of site quality assurance surveillance, quality assurance/quality control engineering, and site inspection. These services begin with construction planning and continue through receiving inspection, startup and test, and into the plant operations. Personnel performing duties at the construction site are under the technical and administrative direction of the Quality Assurance Division. These individuals do not perform any non-quality related functions which would interfere with their quality assignments.

17.1.5.4 Quality Assurance Program Managers

The Quality Assurance Division General Manager appoints a qualified individual as Quality Assurance Program Manager to implement the Quality Assurance Program for each Nuclear Plant Project. This selection is based on the individual's managerial and technical capabilities, education, and experience. The Quality Assurance Program Manager reports to the Quality Assurance Division General Manager, as shown in Figure 1-7, and communicates directly with the Owner's Quality Assurance Management for direction on project quality assurance matters. The Quality Assurance Program Manager is responsible for the management and direction of the project's quality assurance scope of responsibility. Position requirements include a bachelor's degree in engineering or science from an accredited college or university. In addition, a minimum of 10 years experience in the design, manufacture, construction, testing, or operation of plant equipment or systems, including a minimum of two years nuclear experience, and one year in quality assurance or quality control is required. Five years additional experience in quality assurance for nuclear applications may be considered an acceptable substitute for a bachelor's degree.

The Quality Assurance Program Manager has the freedom to verify conformance of work to established quality requirements by virtue of the management authority delegated to him by the Quality Assurance Division General Manager. Verification is accomplished by audits of safety related activities within the

project and by audit of manufacturing and construction activities. All audit activities are performed by Quality Assurance Division personnel not engaged in performance of the work being audited. Personnel performing audit activities are qualified and authorized to identify nonconformances to quality requirements, to recommend viable solutions, and to verify accomplishment of approved corrective measures.

The Quality Assurance Program Manager is supported by personnel from the functional organizations of the Quality Assurance Division. Figure 1-7 depicts the Quality Assurance Division organization and the functional groups which provide the manpower for project support. The Design and Procurement Quality Assurance Departments are structured to provide similar and complementary services in both the Reading and Jackson Offices. The Construction Quality Assurance/Quality Control Department provides site surveillance and inspection services to both offices. The Methods and Operations Section provides support in the areas of methods, operations, records, documents, audits, training, and personnel qualification to both locations.

The Quality Assurance Division has personnel with specialized training and experience for quality engineering, materials and welding, manufacturing surveillance, quality control, documentation, procedures, and auditing in both the Reading and Jackson Offices.

17.1.6 Quality Assurance Policy Committee

Gilbert/Commonwealth quality assurance policies are established by a Quality Assurance Policy Committee composed of management representatives from each of the divisions reporting to the Utilities Group Vice President who chairs the Committee. See Section 17.2.2 for the duties and responsibilities of the Quality Assurance Policy Committee.

17.1.7 Subcontracted Services

Any organization subcontracted to perform services, which are within the normal Gilbert/Commonwealth scope of work, is required to institute Quality Assurance measures commensurate with the scope and importance to safety of the subcontracted work. These measures are reviewed by the Quality Assurance Division prior to their implementation. The Quality Assurance Division also conducts audits, as necessary, to verify effective implementation of the Quality Assurance measures.

17.1.8 Stop Work Authority

When conditions indicate that further processing of work may jeopardize the quality of safety related items or services, "Stop Work" action is instituted. The Utilities Group Vice President has delegated Stop Work Authority to Project Managers, Construction Managers, and Quality Assurance Managers.

17.2 QUALITY ASSURANCE PROGRAM

17.2.1 The Gilbert/Commonwealth Quality Assurance Program provides a means of assuring quality in the design, procurement, construction, and testing of nuclear power plant structures, systems, and components which prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. The Quality Assurance Program satisfies the requirements of 10CFR50, Appendix B, ANSI N45.2, and Regulatory Guides 1.28 and 1.74. Changes from commitments made in this Topical Report will not be made without prior notification to and acceptance by the Quality Assurance Branch of the Nuclear Regulatory Commission.

Implementation of this Quality Assurance Program is mandatory for all Gilbert/Commonwealth divisions involved in the design, procurement, construction, startup, or testing of domestic nuclear power plant structures, systems, and components. The Introduction Section of the Nuclear Quality Assurance Manual mandates Quality Assurance Program implementation as follows:

> "Implementation of this program (The Gilbert/Commonwealth Nuclear Quality Assurance Program), as appropriate to the defined scope of work undertaken by Gilbert/Commonwealth, is mandatory for all nuclear power plant projects requiring compliance with 10CFR50, Appendix B."

The Quality Assurance Program provides for the systematic control of activities affecting the quality of structures, systems, and components to an extent consistent with their importance to safety.

The Quality Assurance Program provides the mechanism by which it can be verified that functions affecting quality are performed in accordance with approved procedures, instructions, drawings, or specifications. A main objective of the Quality Assurance Program is to provide a high level of confidence that the items or services satisfy the design requirements for safety and are in accordance with applicable Nuclear Regulatory Commission regulations.

The following are provided to assure effective implementation of the program:

1. A management organization with responsibilities and authorities clearly established and defined.

2. Competent technical personnel to develop and implement procedures.

3. A quality assurance organization possessing the organizational freedom to inspect, audit, report deficiencies and activities affecting the quality of safety related items and services, and implement corrective action.

Each of the eighteen criteria in Appendix B, 10CFR50, as addressed in this report, is included in the Gilbert Commonwealth Quality Assurance Program.

Major elements of the Quality Assurance Program include:

1. Identification of structures, systems, and components to which the Quality Assurance Program is applicable.

2. Control of the design and engineering activities.

3. Control of the procurement of materials, components, systems, structures, and services.

4. Control of the fabrication of components, systems, and structures.

5. Monitoring construction.

6. Records control and storage.

7. Auditing of quality related activities, analysis of audit data for quality trends and effectiveness of the Quality Assurance Program, and reporting to management for review and assessment.

8. Indoctrination and training of personnel.

The primary corporate document describing the Gilbert/Commonwealth Nuclear Quality Assurance Program is the Nuclear Quality Assurance Manual. This manual is maintained, controlled, and approved under direction of the Quality Assurance Policy Committee. Changes to

the manual must also be approved by the Quality Assurance Policy Committee. Distribution and control of the Nuclear Quality Assurance Manual is accomplished by a manual holders list and document control receipt records. The Nuclear Quality Assurance Manual requires that the Nuclear Quality Assurance Program be implemented by division procedures which are prepared and approved prior to the start of work for the activity to be controlled. Accordingly, each division within the Utilities Group has established and implemented division procedures which prescribe how activities are to be performed in order to meet the requirements of the 18 criteria of 10CFR50, Appendix B. Figure 1-8 shows the relationship of the 18 criteria, the Nuclear Quality Assurance Manual, and the division procedures. These procedures are submitted to the Quality Assurance Division for review and are approved by the Quality Assurance Division General Manager prior to final approval by the appropriate Division General Manager. Division procedures are contained in the following manuals:

1. Design Control Procedures Manual (Power Engineering Division - Reading).

2. Design Control Procedures Manual (Power Engineering Division - Jackson).

3. Construction Control Procedures Manual (Construction Services Division).

4. Procurement Control Procedures Manual (Construction Services Division).

5. Quality Assurance Procedures Manual (Quality Assurance Division).

In addition to the above described manuals, a Project Management Manual is prepared under direction of the Project Manager which identifies the specific procedures that apply to a specific project. The Project Management Manual also defines the specific responsibilities and methods of accomplishing project tasks and is the principal interfacing, descriptive, and directive document for a particular project. It also provides the means for incorporation of specific project requirements which may vary from standard procedures. However, any variation from the requirements delineated in the Nuclear Quality Assurance Manual or the implementing procedures shall be approved by the Division General Manager who approved the procedures and the Quality Assurance Division General Manager. This approval is granted after review by a subcommittee of the Quality Assurance Policy Committee.

17.2.2 Management Review and Evaluation (QAPC)

Continuing evaluation of Quality Assurance Program effectiveness is accomplished through the Quality Assurance Policy Committee's quarterly meetings. Each of these meetings is conducted for the purpose of discussing, evaluating, and resolving:

1. Trends and problems identified through the conduct of the internal audit program.

2. Reports from subcommittees that have been established and chartered by the Quality Assurance Policy Committee to review implementing procedures, recommend new or revised policies, and identify unresolved conflicts that need Quality Assurance Policy Committee attention.

3. Feedback to management of adverse conditions identified through audits and evaluations performed by external organizations.

4. Recommendations for program changes in keeping with regulatory and industry changes to keep the program current.

Quality Assurance Policy Committee decisions are documented in meeting minutes and committee members are charged with implementing corrective actions in accordance with those decisions.

Membership of the Quality Assurance Policy Committee includes all of the Division Managers, each of whom has responsibility for establishing and implementing the Quality Assurance Program within their respective divisions.

The Committee is chaired by the Utilities Group Vice President and each member has the responsibility for bringing quality related matters to the attention of the Committee. Committee

decisions are made on the basis of an analysis and evaluation of the information supplied through the above identified sources. All Division General Managers participate in these deliberations and have an equal obligation in providing resolutions with the Utilities Group Vice President having ultimate decision authority.

The Quality Assurance Division is responsible for providing the Quality Assurance Policy Committee the following reports which are used in evaluating effective implementation of the Quality Assurance Program:

1. Audit Status Reports. (Semiannually)

2. The status of corrective action previously identified. (Semiannually)

3. Listing of audits performed. (Semiannually)

4. Any technical or administrative problems encountered in executing the Quality Assurance Program. (As necessary)

17.2.2.1 Subcommittees (QAPC)

Subcommittees of the Quality Assurance Policy Committee have been established to assure appropriate implementation of the Nuclear Quality Assurance Program. Each subcommittee has representation from interfacing divisions and is responsible for:

1. Identifying and recommending to the Quality Assurance Policy Committee the need for new or revised corporate policies.

2. Providing interpretation of policy or requesting clarifications from the Quality Assurance Policy Committee.

3. Reviewing division quality related procedures which affect interdivisional interfaces.

4. Resolving quality related conflicts. (Unresolved items are referred to the Quality Assurance Policy Committee.)

5. Approving variations from the Nuclear Quality Assurance Program and its implementing procedures.

6. Reviewing and approving the index, procedure titles, and purpose of each division procedure manual.

17.2.3 Resolution of Disputes

When differences of opinion or disputes occur between Quality Assurance Division personnel and personnel of other divisions, resolution is first attempted through the next higher level of management. Disputes and conflicts which cannot be resolved at these levels are referred to the Quality Assurance Policy Committee for resolution.

17.2.4 Safety Related Structures, Systems, and Components

The structures, systems, and components to be covered by the Quality Assurance Program are those that have a role in preventing accidents or in mitigating the consequences of accidents which can cause undue risks to the health and safety of the public. Identification of those structures, systems,

and components which are controlled by the Quality Assurance Program is included in the Safety Analysis Report.

17.2.5 Quality Assurance Division Functions

The functions executed by the Quality Assurance Division for the structures, systems, and components identified in a Safety Analysis Report include the following:

1. Perform Quality Assurance evaluations of prospective contractors for procurement purposes.

2. Prepare Quality Assurance Program requirements input to specification for contracts.

3. Review documents such as specifications, proposals, procedures, and instructions to assure inclusion of product quality requirements, references to design basis, technical requirements, regulatory requirements, material compatibility and selection, codes and standards, inspection acceptance criteria, and Quality Assurance Program requirements as appropriate.

4. Conduct audits of Gilbert/Commonwealth design, procurement, and construction activities.

5. Conduct audits of NSSS Supplier during design, procurement, and manufacture of NSSS items.

6. Perform manufacturing surveillance of Owner purchased items.

7. Prepare, distribute, and maintain quality assurance records of Quality Assurance Division activities.

8. Provide orientation and training of Quality Assurance Division personnel.

9. Provide training and qualifications of NDE personnel.

10. Coordinate with and support Construction Services Division on Quality Control site functions, procedures, and implementation.

11. Perform quality assurance surveillance activities during site construction.

12. Develop, coordinate, and administer the Quality Assurance Program.

17.2.6 Quality Assurance Program Assessment

Assessment of Gilbert/Commonwealth's Quality Assurance Program occurs at several levels. The Owner's Quality Assurance Management audits the Gilbert/Commonwealth design, procurement, and quality assurance organizations. Reports of these audits are submitted to all affected organizations. Management assessment of the Quality Assurance Program within Gilbert/Commonwealth is conducted by the Quality Assurance Policy Committee. The Committee is responsible for conducting annual management reviews of the program to evaluate and assess its effectiveness. Further assessment of the Quality Assurance

Program is provided by audits conducted by the Quality Assurance Division of all organizations performing safety related activities. These audits are conducted in accordance with Section 17.18.6 of this Topical Report to assess the implementation and effectiveness of the Quality Assurance Programs and to assure compliance with approved procedures. Audit reports are submitted to responsible management personnel.

17.2.7 Contractor/Vendor Quality Assurance Program

When Gilbert/Commonwealth has procurement responsibility, reviews of contractor/vendor quality programs are performed by the Quality Assurance Division prior to procurement.

Procurement documents require contractors to submit their Quality Assurance program documents with their proposals. Acceptability of submitted Quality Assurance programs is a condition for contract award. The Quality Assurance Division may also perform surveys of contractor activities to assure effective implementation of their Quality Assurance programs.

17.2.8 Indoctrination and Training

Personnel performing quality related activities participate in indoctrination and training programs to become familiar with the purpose and intent of regulations, codes, standards, corporate, and division Quality Assurance documents, etc. Each division has established indoctrination and training requirements which are included in each division's Procedures Manual. Training

programs include formal and informal courses on the practical aspects of the Quality Assurance Program. Division procedures require indoctrination and training records be maintained which identifies program requirements and participation.

Continued proficiency of certified personnel performing quality-affecting activities is maintained by retraining, reexamining, and/or recertifying.

The indoctrination program for personnel assigned to a specific project includes a review of appropriate documents; i.e., Safety Analysis Report, applicable Quality Assurance Plans and Manuals, and other documents identified in writing by Project Management and/or the Quality Assurance Program Manager. Training programs also require the maintenance of proficiency on the requirements of the Quality Assurance Program as the project progresses.

17.2.9 Qualifications

Personnel performing Quality Assurance activities in the areas of design, procurement, construction, and quality assurance possess the required knowledge and experience to effectively perform these activities. The continued evaluation of personnel qualifications is performed by management reviews of personal data, assessment of training programs, and conducting examinations as required.

Personnel who perform NDE methods or evaluate results are qualified and certified to Quality Assurance Division requirements meeting the requirements of American Society for Nondestructive Testing (ASNT), SNT-TC-1A, and Regulatory Guide 1.58.

Personnel who conduct Quality Assurance Audits are qualified and certified to Quality Assurance Division procedures meeting the requirements of ANSI N45.2.12.

Personnel performing inspections, examinations, and tests are qualified and certified in accordance with ANSI N45.2.6.

17.2.10 Controlled Conditions

The Quality Assurance Division confirms that activities affecting quality are performed under suitably controlled conditions, including the use of appropriate equipment, maintenance of proper environment, and compliance with necessary prerequisites through review of contractor documents and the performance of contractor surveillance.

17.2.11 Activities Prior to PSAR Submittal

Quality related activities initiated prior to submittal of a PSAR, such as design, procurement, preparation of the PSAR, and safety related site preparation activities are documented and controlled under the Gilbert/Commonwealth Quality Assurance Program described in this report.

17.2.12 Regulatory Guides

A list of regulatory guides, standards, and codes committed to by the Gilbert/Commonwealth Quality Assurance Program is provided in Figure 1-9.

17.3 DESIGN CONTROL

17.3.1 Gilbert/Commonwealth complies with the design control requirements of 10CFR50, Appendix B, and Regulatory Guide 1.64, as applicable to its scope of work.

17.3.2 General

The Gilbert/Commonwealth Quality Assurance Program for design control requires that design activities be conducted in accordance with approved procedures which provide assurance that designs for safety related items accurately translate established criteria and design bases into specifications, drawings, and other design documents.

Initial design concepts are formulated which provide sufficient information to support fabrication and construction planning. Designs are prepared, reviewed, and approved by qualified Power Engineering Division personnel to assure coverage and/or inclusion of the pertinent requirements. Completed designs are subjected to a design verification to assure that the design is capable of meeting specified requirements. Verification is performed and documented by qualified engineering personnel who have not participated in the original design effort and who are competent in the technical discipline involved. The verification process is defined in approved, controlled procedures which comply with Regulatory Guide 1.64. Methods available for verification include alternate calculations, design review and

qualification testing, and are selected on the basis of an item's complexity, previous operational experience, and importance to plant safety. Qualification tests, when specified, require tests to be commensurate with adverse design conditions anticipated.

Internal and external design interfaces are maintained and documented to assure the necessary interchange of design data between design organizations. The review and approval of design changes is commensurate to that established for the original design document.

Requirements for the performance of design activities as delineated in appropriate division procedures include the following:

1. Carrying out design activities in a planned, controlled, and orderly manner.

2. Correctly translating applicable regulatory requirements, industry standards, specifications, and design bases into design input criteria, specifications, drawings, procedures, or instructions.

3. Specifying design requirements and quality standards in design documents and controlling deviations and changes from these documents.

4. Applying suitable design controls to such activities as:

   a. Seismic, stress, thermal, hydraulic, radiation, and accident analyses.

   b. Compatibility of materials.

   c. Accessibility for in-service inspection, maintenance, and repair.

   d. Safety factors.

5. Reviewing designs to assure that:

   a. Design requirements can be controlled, inspected, and tested.

   b. Inspection and test criteria are identified.

   c. Verification of correct computational methods are used.

   d. Assumptions are valid.

   e. Industry standards and specifications used in the design process are valid for the application.

   f. Qualification tests, when specified, are commensurate with adverse design conditions anticipated.

6. Selecting suitable materials, including consumable and expendable items, parts, equipment, and processes for safety related structures, systems, and components.

7. Verifying designs for adequacy by individuals or groups who did not participate in the original design.

8. Establishing internal and external design interface controls that include the review, comment, approval, release, distribution, and revision of design documents.

9. Identifying and controlling the authority and responsibility of positions or groups responsible for design activities.

10. Reviewing for suitability, prior to selection, materials, parts, component assemblies, and equipment which are standard, commercial (off-the-shelf type), and which have been previously approved for like application.

17.3.3 Design Process

Gilbert/Commonwealth designs are prepared, reviewed, and approved by the Power Engineering Division consistent with the requirements of Section 17.3.2. Specifications and drawings are utilized to specify the design requirements. These documents are reviewed by the Quality Assurance Division for the inclusion of quality requirements prior to release for fabrication or construction. These reviews also verify that design basis technical

requirements, including the applicable regulatory requirements, material and component identification requirements, drawings, specifications, codes and industrial standards, test and inspection requirements, and special process instructions are contained or referenced in the specification.

Errors and deficiencies in the design process are detected during the design verification cycle and/or during the performance of Quality Assurance audits. Resolution of errors and deficiencies is the responsibility of the designer, who must provide documented evidence of resolution to the appropriate levels of management.

17.4 PROCUREMENT DOCUMENT CONTROL

17.4.1 Gilbert/Commonwealth complies with the procurement document control requirements of 10CFR50, Appendix B, and Regulatory Guide 1.123.

17.4.2 Procurement Document Preparation and Review

Control of procurement documents for safety related items and services is implemented during preparation, review, and approval of the documents by Engineering, Purchasing, Quality Assurance, and Owner/Client personnel. The control measures are executed in accordance with approved procedures contained in the Design Control Procedures Manual and the Quality Assurance Procedures Manual to assure that both the technical and quality requirements are adequately specified. These procedures prescribe the review, approval, and issuing responsibilities for procurement documents and also require these documents be reviewed and approved prior to release.

Procurement specifications are utilized to define all technical and quality requirements. Specifications are prepared and reviewed for technical content, as described in Section 17.3 of this Topical Report. A review is also performed by the Quality Assurance Division to assure inclusion of, or reference to, appropriate portions of the Quality Program with which the contractor must comply. Documented reviews are performed by

qualified Quality Assurance personnel with knowledge in the areas being reviewed. Elements included in this review are:

1. Quality requirements are established and are correctly stated.

2. Conformance to requirements can be controlled and inspected.

3. Acceptance criteria are established.

4. Documentation requirements are established; including contents, preparation, retention, and submittal requirements.

5. Rights of access to facilities and records by the procuring agency, their representatives, and regulatory agencies are specified.

6. Requirements are specified for reporting and dispositioning of nonconformances from the procurement documents.

Comments regarding Quality Assurance content in safety related specifications must be resolved before approval by the Quality Assurance Program Manager. The approved specification is included with each solicitation for bids and constitutes all of the technical and Quality Assurance requirements.

Contractor proposals are received and controlled by the Purchasing Department. Proposals for supply of items or

services are evaluated for adherence to specified requirements by both Engineering and Quality Assurance. After contract award, the specification is revised to reflect all contract negotiations agreed upon and becomes a final (Conformed) specification. The final specification supersedes the specification used for solicitation of bids and becomes a part of the purchase order or contract. Final specifications, and any subsequent revisions, are subjected to the same review, approval, and distribution as the original specification, as described in Section 17.3.3 of this Topical Report.

Procurement documents require contractors to have and implement documented Quality Assurance Programs, commensurate with the safety and importance of the items or services being provided. The existence of acceptable Quality Assurance Programs is verified by the Quality Assurance Division prior to order placement through reviews of available historical data and/or performance of pre-award facility surveys. These controls are also applied to the procurement of safety related spares or replacement parts.

Procurement documents are prepared by the Purchasing Department within the Construction Services Division. Technical and required records content is provided by the applicable engineering discipline within the Power Engineering Division. Review of the procurement documents for inclusion of records to be retained, controlled, and maintained by the supplier, and those records to

be delivered to the purchaser prior to use or installation of the hardware, is performed by the Quality Assurance Division.

Retention and storage of procurement documents is the responsibility of the Purchasing Department.

Changes to procurement documents are subjected to the same review and approval as the original documents.

17.5 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

17.5.1 Gilbert/Commonwealth complies with the instructions, procedures, and drawings control requirements of 10CFR50, Appendix B, and Regulatory Guide 1.28, as applicable to its scope of work.

17.5.2 General

The Gilbert/Commonwealth Quality Assurance Program requires that safety related activities applicable to design, engineering, procurement, construction, and Quality Assurance be performed in accordance with approved instructions, procedures, and drawings. The responsibility for preparation, review, approval, and control of instructions, procedures, and drawings for quality related activities is delegated to each division within the Utilities Group.

Project Management is responsible for identifying in the Project Management Manual those instructions, procedures, and drawings applicable to a specific project.

17.5.3 Content of Instructions, Procedures, and Drawings

Procedures prepared by divisions within the Utilities Group provide for the following:

1. Specifying in instructions, procedures, and drawings the method for complying with the applicable criteria of 10CFR50, Appendix B.

2. Prescribing divisional activities affecting quality in instructions, procedures, or other types of documents appropriate to the circumstances and performing such activities in accordance with these documents.

3. Prescribing external activities affecting quality and interface requirements.

4. Prescribing the sequence of actions to be followed in performing quality related activities.

5. Including in each document, the appropriate qualitative or quantitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished.

17.5.4 Reviews and Verifications

The Quality Assurance Division is responsible for:

1. Developing and implementing procedures for review and concurrence of inspection plans; test, calibration, and special process procedures, drawings and specifications, and changes thereto.

2. Verifying during pre-award and post-award visits to contractors' facilities that instructions, procedures, and drawings appropriate to the circumstances are available for use.

3. Reviewing instructions, procedures, drawings, and specifications submitted by contractors for inclusion of measures which provide satisfactory compliance with the applicable criteria of 10CFR50, Appendix B.

17.6 DOCUMENT CONTROL

17.6.1 Gilbert/Commonwealth complies with the document control requirements of 10CFR50, Appendix B, and Regulatory Guide 1.28, as applicable to its scope of work.

17.6.2 Quality Assurance Program Documents

Quality Assurance Program documents are controlled by approved procedures contained in the following Gilbert/Commonwealth Manuals:

Power Engineering Division Design Control Procedures Manuals (Reading and Jackson);

Quality Assurance Division Quality Assurance Procedures Manual; and

Construction Services Division Procurement Control Procedures Manual and Construction Control Procedures Manual.

Each division controls the preparation, review, and required approval of their respective procedures. The Table of Contents for each of the above manuals identifies the most current procedures by their revision number and date. A revised Table of Contents is issued with each procedure revision to provide a list of latest procedures. Designated personnel are responsible for reviewing the procedures for adequacy and approving them, as described in Section 17.2.1 and 17.2.5 of

this Topical Report, prior to issuance and use at the location where the activity is to be performed. Review and approval of procedure revisions are accomplished by the same organization that performed the original review and approval and the revised procedures are distributed to the same individuals who received the previous revision.

17.6.3 Controlled Documents

The controlled procedures described in Section 17.6.2 provide measures for the preparation, review, approval, and control of the following documents:

1. Specifications
2. Drawings
3. Procurement Documents
4. Quality Assurance Program Manuals
5. Safety Analysis Reports and Related Design Criteria Documents
6. Inspection and Testing Procedures
7. Design Change Requests
8. Nonconformance Reports

The procedures identify, for each of these documents, the groups or individuals responsible for reviewing, approving, and issuing the documents and any revisions. Revisions to the above documents require review and approval by the same organizations

that performed the original review, prior to issuance or implementation of the change.

17.6.4 Document Change Control

Status control of documents is maintained by the use of appropriate lists. Controlled documents are distributed in accordance with established distributions, and obsolete or superseded documents by instruction, are to be appropriately destroyed, marked, or returned to prevent inadvertent use.

17.7 CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

17.7.1 Gilbert/Commonwealth complies with the control of purchased material, equipment, and services requirements of 10CFR50, Appendix B, and Regulatory Guides 1.123 and 1.28.

17.7.2 Purchasing Process

Measures employed by Gilbert/Commonwealth to control purchased material, equipment, and services consist of a review of purchase documents, surveys, and inspections. As described in the Nuclear Quality Assurance Manual and division procedures, potential suppliers are evaluated in advance of placing them on the Approved Bidders List. These evaluations are performed by qualified Engineering and Quality Assurance personnel to determine the capability of the supplier to provide critical items or services. The Power Engineering Division is responsible for evaluating the technical capability of suppliers and the Quality Assurance Division is responsible for evaluating the supplier's capability to comply with Quality Assurance requirements. Documented results of these evaluations are retained in the Corporate Vendor History Files.

Suppliers are evaluated based upon one or more of the following:

1. Supplier's capability to comply with the elements of 10CFR50, Appendix B, applicable to the type of material, equipment, or service being procured.

2. Past records and performance to ascertain capability of supplying product manufactured (or services) under an acceptable Quality Assurance system, including Gilbert/Commonwealth past Inspection Services Reports and Pre-Award Surveys.

3. Audits or surveys of contractors'/suppliers' facilities and Quality Assurance Program to determine his capability to supply a product which satisfies the design, manufacturing, and quality requirements.

Active contractors/suppliers are formally evaluated annually to determine the need for a reaudit during the coming year. These evaluations consider performance history, effectiveness of Quality Assurance Program implementation, information obtained through manufacturing surveillance activity, complexity of the item or service, and degree of control required by the processes involved. Results of these evaluations are documented and approved. In addition to this annual evaluation, a reaudit of active contractors/suppliers is performed every three years.

Documentation relative to the purchase of safety related material, equipment, and services is prepared, reviewed, and approved in accordance with the requirements of Section 17.4 of this report.

17.7.3 Manufacturing Surveillance Phase

Subsequent to the award of a purchase order/contract, a Manufacturing Surveillance Plan is prepared by the Quality Assurance Division. This plan is based upon the requirements specified in the purchase order/contract and provides for the verification of contractors'/suppliers' compliance to preestablished quality requirements for fabrication, inspection, testing, packaging, and shipment of safety related materials, equipment, and components. The surveillance plan establishes manufacturing processes to be witnessed, inspected or verified, the method of surveillance and documentation requirements, and takes into account those aspects of the manufacturing process which may not be verified at receipt inspection. Activities specified in the surveillance plan are conducted at the contractors'/suppliers' facilities by qualified Quality Assurance personnel using approved procedures which provide for the following:

1. Reviewing material acceptability, including associated expendable and consumable materials necessary for the functional performance of safety related structures, systems, and components.

2. Witnessing in-process inspections, tests, and NDE.

3. Reviewing qualification of procedures, equipment, and personnel.

4. Verifying Quality Assurance/Quality Control systems to the extent necessary.

5. Reviewing document packages for compliance to procurement document requirements.

6. Reviewing certificates of compliance for adequacy.

The frequency of surveillances at the supplier's plant is specified in the Manufacturing Surveillance Plan and based on the importance and complexity of the procured item(s).

Receipt inspections at the contractor's/supplier's facility are conducted as required by the purchase order/contract by contractor/supplier personnel based on approved procedures which contain quantitative and qualitative acceptance criteria. Manufacturing surveillance by Gilbert/Commonwealth includes verification that receipt inspections performed by contractors/suppliers provide assurance that the areas listed in Section 17.7.4 are properly performed.

Gilbert/Commonwealth Manufacturing Surveillance personnel also perform surveillances at the contractor's/supplier's facility to assure the acceptability of modifications, replacements, rework, and repairs. These surveillance activities assure that rework is verified by reinspecting and retesting as originally inspected and tested and to approved procedures. All such operations must be documented by the contractor/supplier and made available for auditing.

17.7.3.1 Spare or Replacement Parts

All spare or replacement parts of safety related structures, systems, and components are subjected to equivalent controls used for the original procured items or services, including the use of approved procedures.

17.7.4 Construction Phase

The control of purchased material, equipment, and services at the construction site is accomplished by the performance of receipt inspections by trained and qualified personnel in accordance with approved procedures and acceptance criteria prior to installation or use of the item(s) to preclude placement or use of nonconforming item(s). Purchase documents require contractors/suppliers to forward documentation to the construction site prior to, or concurrent with, delivery of the procured items. The following is included in receiving inspections:

1. Reviewing documentation packages for completeness and accuracy.

2. Verifying the traceability of items to the documentation package.

3. Verifying that the inspection status is clearly delineated on the procured item(s) and agrees with information on the documents provided by contractors/suppliers.

4. Inspecting the procured item(s) including expendable and consumable items necessary for the functional performance of safety related structures, systems, and components to reveal any nonconformances.

17.7.5 Certificates of Conformance

When Certificates of Conformance are provided, the validity of these documents is assured through several Quality Assurance Division activities:

1. Surveillance of supplier's quality assurance system during fabrication and testing.

2. Inspection of the products and materials at the point of manufacture.

3. Review of contractor's/supplier's documentation upon receipt by Gilbert/Commonwealth Quality Assurance Division.

4. Receipt inspection at the job site and feedback reporting on a timely basis.

5. Testing in the field before and/or after installation to confirm acceptability and performance capabilities.

17.7.6 Documentation Requirements

Documented, objective evidence such as certifications, chemical and physical analyses, inspection reports, test results,

personnel and process qualification results, code stampings, and nondestructive test reports are required to be evaluated by Gilbert/Commonwealth. This verification will assure conformance to design requirements, drawings, specifications, codes, standards, regulatory requirements, and other applicable criteria. These documents become a part of the quality verification records to be retained as Quality Assurance records.

17.8 IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS

17.8.1 Gilbert/Commonwealth complies with the identification and control of materials, parts, and components requirements of 10CFR50, Appendix B, and Regulatory Guide 1.28, as applicable to its scope of work.

17.8.2 Identification and Control Requirements

The method of identification and control to be applied to purchased materials, parts, and components is specified as part of the procurement documents.

Identification must be applied in locations and by methods that will not affect the fit, function, or quality of the item being identified. The system of identification must also indicate whether the materials are acceptable or unacceptable for intended use.

Verification of the correctness of the identification requirements is accomplished as part of the specification verification. This verification is performed by personnel other than those responsible for originating the specification. All reviews are documented, filed, and retained by the Gilbert/Commonwealth division responsible for originating the document containing the identification requirements.

17.8.3 Manufacturing Phase

The supplier is responsible for maintaining traceability of parts and components through manufacture and shipment.

The Gilbert/Commonwealth Quality Assurance Division is responsible for reviewing procurement documents for the inclusion of identification requirements and conducting surveillance of the supplier to confirm that the proper identification method is being utilized and is providing positive control of the items. The Quality Assurance Division provides surveillance based on approved Manufacturing Surveillance Plans.

Where physical identification is either impractical or insufficient, physical separation, procedural control, or other approved means are employed. These other means must be approved by the design engineer prior to start of fabrication. Identification must be either on the item (permanent) or on records traceable to the item (controlled system).

17.8.4 Construction Phase

Receipt inspection at the construction site verifies that identification for received items is complete and accompanied by appropriate documentation. This identification is maintained throughout storage, handling, and installation of the items. Quality Assurance verifies that identification and traceability is maintained through surveillance and audit.

Gilbert/Commonwealth Procedures provide for:

1. Incorporating identification and traceability requirements into procurement documents.

2. Reviewing supplier procedures for identification and control of items.

3. Conducting surveillance of suppliers to ensure compliance to identification requirements.

17.9 CONTROL OF SPECIAL PROCESSES

17.9.1 Gilbert/Commonwealth complies with the special process control requirements of 10CFR50, Appendix B, and Regulatory Guides 1.28, 1.37, 1.39, and 1.54, as applicable to its scope of work.

17.9.2 Special Process Requirements

The Gilbert/Commonwealth Quality Assurance Program requires that written procedures be prepared and implemented to provide assurance that special processes, including welding, heat treating, special coating applications, and nondestructive testing, are accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, and specifications. These procedures must describe the operations to be performed, the sequence of operations, the characteristics involved, the limits of these characteristics, measuring and test equipment to be used, and documentation requirements. Nondestructive examinations are performed either by Gilbert/Commonwealth Quality Assurance personnel or by suppliers.

17.9.3 Supplier Controls

Gilbert/Commonwealth specifies in procurement documents the special process control requirements which must be complied with by suppliers. Provisions are also included in the procurement documents to require that procedures, personnel, and equipment qualification records are maintained to indicate current qualification status in accordance with applicable codes and standards. Existence of control measures is verified during

source selection, proposal review, and supplier evaluations performed by Gilbert/Commonwealth Quality Assurance Division. Gilbert/Commonwealth also requires that special processes be accomplished in accordance with written process sheets, or their equivalent. Supplier special process procedures and qualification data are subject to review of Gilbert/Commonwealth Quality Assurance Division.

Gilbert/Commonwealth Quality Assurance Division assures the implementation of procedures by auditing and surveillance of the supplier or contractor. Representatives performing the surveillance are qualified in accordance with applicable codes and standards.

17.9.4 Qualification Records

Qualification records for Gilbert/Commonwealth personnel, procedures, and equipment utilized in the performance of special processes are maintained by the Quality Assurance Division.

17.10 INSPECTION

17.10.1 Gilbert/Commonwealth complies with the inspection requirements of 10CFR50, Appendix B, and Regulatory Guides 1.30, 1.58, 1.94, 1.116, and 1.123, as applicable to its scope of work.

17.10.2 Inspection Program

Gilbert/Commonwealth's inspection program includes the following provisions:

1. Inspections are conducted by personnel who are independent of the individuals or groups that performed the activity.

2. The inspection organization is separated from the pressures of production and scheduling by lines of authority and assigned tasks.

3. Inspection reports identify the inspector and the results of inspection.

4. Approved procedures, instructions, or checklists are utilized which identify the characteristics to be inspected, the inspection methods, the acceptance and rejection criteria, the methods for recording inspection results, and the groups responsible for the inspection.

5. Repairs, modifications, and replacements are inspected in accordance with original inspection requirements or acceptable alternatives.

6. Inspections are performed by qualified personnel using appropriate equipment in accordance with codes, standards, and procedures.

7. Adequate tests and inspections are performed to assure that operations meet the predetermined quality requirements.

8. Indirect process monitoring controls are utilized when inspection is impossible or disadvantageous.

9. Inspection and process monitoring are both utilized when control is otherwise inadequate.

10. Quality documents are reviewed and verified to assure that they are complete and accurate.

11. Mandatory inspection hold points or witness points are established.

Inspections are performed in accordance with directions contained in the surveillance plans. Procedures or instructions referenced or contained within the surveillance plan require the use of necessary drawings and specifications. Availability of procedures, instructions, drawings, and specifications is confirmed during pre-surveillance briefings, and use is verified during review of surveillance results.

17.10.3 Supplier Inspection

Suppliers are required to implement inspection programs through Gilbert/Commonwealth procurement documents. The supplier's

procedures, instructions, or checklists are reviewed by Quality Assurance personnel during pre-award supplier evaluations, post-award reviews, and manufacturing surveillance activities. When a supplier proposes the use of sampling inspection procedures, Gilbert/Commonwealth assures that the sampling plans are consistent with recognized standard practices.

Subsequent to contract award, Gilbert/Commonwealth Quality Assurance personnel prepare Manufacturing Surveillance Plans based on procurement document requirements and the supplier's manufacturing sequence. These plans delineate the manufacturing surveillance to be performed by Gilbert/Commonwealth; identify applicable codes, standards, specifications, and procedures to be utilized; and specify the mandatory hold or witness points.

Supplier inspection programs are required to meet the provisions of Section 17.10.2.

17.10.4 Construction Site Inspection

Inspection services at the construction site are provided by the Quality Assurance Division as a support to the Construction Services Division. These inspections include receipt inspection, in-process inspection, and final inspection and are performed in accordance with the provisions of Section 17.10.2. The construction site inspection staff is responsible to the Construction Manager for scheduling and project direction, but report to Quality Assurance Division Management for technical and administrative direction.

When construction site inspections are performed by contractors, the Quality Assurance Division provides surveillance over the contractor's activities to assure compliance with contract requirements. This surveillance function is performed in accordance with surveillance plans and controls similar to those utilized in the manufacturing surveillance activity described in Section 17.10.3.

17.10.5 Personnel Qualification

All personnel performing inspections and examinations, or accepting the results of inspections and examinations, must be qualified in accordance with governing codes, standards, and regulations. Gilbert/Commonwealth personnel performing these functions are trained and qualified accordingly. Qualification records are maintained by the Quality Assurance Division. Personnel who are indirectly involved in inspection, but do not inspect, examine, or accept results receive training and are qualified in accordance with Gilbert/Commonwealth procedures to assure understanding of the appropriate inspection methods.

Supplier and contractor qualification records are reviewed by Gilbert/Commonwealth during surveillance activities to assure that personnel are appropriately qualified and that adequate records are maintained.

17.11 TEST CONTROL

17.11.1 Gilbert/Commonwealth complies with the test control requirements of 10CFR50, Appendix B, and Regulatory Guides 1.30, 1.58, 1.94, and 1.116, as applicable to its scope of work.

17.11.2 Testing Requirements

The Gilbert/Commonwealth Quality Assurance Program requires that design and procurement documents specify testing requirements, including those tests performed under the construction permit, to demonstrate that structures, systems, and components will perform satisfactorily in service. Suppliers and contractors performing tests are required to submit their proposed test program and procedures for Gilbert/Commonwealth review prior to their being utilized. As appropriate, suppliers and contractors are required to submit test data to Gilbert/Commonwealth for engineering evaluation.

The quality assurance requirements for test control require that tests be conducted in accordance with approved written test procedures which incorporate directly, or by reference, the following requirements:

1. Performance of tests by trained personnel who are qualified in accordance with applicable codes and standards.

2. Verification of test prerequisites such as:

   a. Calibrated instrumentation

b. Adequate and appropriate testing equipment

c. Trained, qualified, and certified personnel

d. Provisions for data collection and storage

e. Completeness of item(s) to be tested

f. Suitable and controlled environmental conditions.

3. Identification of acceptance or rejection criteria.

4. Methods for recording of test data and results.

5. Instructions for performing the test.

6. Mandatory hold points or witness points.

7. Documentation, evaluation, and acceptance of test results by qualified individuals or groups.

8. Testing of modifications, repairs, and replacements in accordance with original requirements or acceptable alternatives.

17.11.3 Test Surveillance

Gilbert/Commonwealth Quality Assurance reviews design and procurement documents to verify incorporation of test requirements; reviews supplier and contractor procedures to assure compliance with procurement documents; and witnesses the performance of tests in accordance with surveillance plans. These activities include verification of supplier and

contractor adherence to the requirements delineated in Section 17.11.2.

The Gilbert/Commonwealth Power Engineering Division is responsible for specifying test requirements and acceptance criteria; identifying test procedures which must be submitted for review and reviewing them as submitted; and evaluating test results when specified in the design documents.

17.12 CONTROL OF MEASURING AND TEST EQUIPMENT

17.12.1 Gilbert/Commonwealth complies with the measuring and test equipment control requirements of 10CFR50, Appendix B, and Regulatory Guide 1.28, as applicable to its scope of work.

17.12.2 Requirements

The Gilbert/Commonwealth Quality Assurance Program provides measures for the control of measuring and test equipment Requirements are incorporated in design and procurement documents and also apply to Gilbert/Commonwealth activities. These requirements specify provisions for written procedures which include:

1. Calibration methods and frequency, maintenance, and control of measuring and test equipment used to determine acceptability of safety related items.

2. Identification of equipment and traceability to calibration data.

3. Labeling and marking of equipment to indicate due date for next calibration.

4. Calibration intervals are based on required accuracy, use of equipment, stability characteristics, or other factors affecting the measurement.

5. Provisions for determining the validity of previous measurements when equipment is determined to be out of calibration.

6. Use of calibration standards with an uncertainty (error) of no more than 1/4th the tolerance of equipment being calibrated, within the state-of-the-art.

7. Traceability of reference and transfer standards to nationally recognized standards. When national standards do not exist, the basis for calibration is documented.

8. Maintenance of a status system for all equipment requiring calibration.

17.12.3 Supplier and Contractor Control

Suppliers of items and contractors at the construction site are required to implement measuring and test equipment controls meeting the requirements of Section 17.12.2, as specified the procurement documents. Gilbert/Commonwealth Quality Assurance verifies existence of these controls through review of procedures and measures compliance with procedures during surveillance activities.

17.12.4 Gilbert/Commonwealth Controls

When Gilbert/Commonwealth is responsible for performance of inspections, examinations, or tests at the construction site, procedures meeting the requirements of Section 17.12.2 will be implemented. Actual calibration of equipment may be performed on site or by qualified laboratories.

17.13 HANDLING, STORAGE, AND SHIPPING

17.13.1 Gilbert/Commonwealth complies with the handling, storage, and shipping requirements of 10CFR50, Appendix B, and Regulatory Guide 1.38, as applicable to its scope of work.

17.13.2 Controls

Gilbert/Commonwealth specifies in design and procurement documents the requirements for special handling, preservation, storage, cleaning, and shipping. Any special environmental considerations such as inert gas atmospheres, temperature, and humidity levels are also included. Suppliers and contractors are required to establish written procedures to implement these requirements prior to the start of their work. These procedures are reviewed by Quality Assurance personnel and when found to meet the stated requirements, including environmental conditions relative to packaging, storage, and shipping, are accepted for use. Surveillance is conducted by the Quality Assurance Division to ascertain adherence to approved procedures during manufacturing and construction.

Surveillance and inspection procedures include adequate qualitative criteria for, and control of, marking and labeling for packaging, shipment, and storage of items. Marking must be adequate and sufficiently permanent to maintain item identification during shipment and storage. Surveillance includes verification that special environments are maintained.

17.14 INSPECTION, TEST, AND OPERATING STATUS

17.14.1 Gilbert/Commonwealth complies with the inspection, test, and operating status requirements of 10CFR50, Appendix B, and Regulatory Guide 1.28, as applicable to its scope of work.

17.14.2 Requirements

Requirements for identifying inspection, test, and operating status of structures, systems, and components are incorporated in the design and procurement documents. The Quality Assurance Division reviews these documents to assure that requirements are specified These requirements include:

1. Maintenance of item status throughout manufacturing and installation.

2. Use of status indicators such as stamps, tags, markings, or labels either on the items or on documents traceable to the items.

3. Identification of authority for application and removal of status indicators.

4. Provisions for controlling the bypassing of required inspections, tests, and other critical operations under Quality Assurance cognizance.

Control of the above is to be maintained in accordance with documented procedures.

ufacturing Phase

Gilbert/Commonwealth Quality Assurance reviews supplier procedures to ascertain the existence of inspection, test, and operating status controls commensurate with procurement document requirements. The supplier's compliance with these requirements is monitored throughout the manufacturing cycle during manufacturing surveillance visits. Control of bypassed inspections, tests, and other critical operations must be under the cognizance of the supplier's Quality Assurance organization. Any bypassing of hold points or witness points specified by Gilbert/Commonwealth requires prior notification by the supplier.

17.14.4 Construction Phase

Gilbert/Commonwealth procedures provide for the control of items at the construction site to preclude the inadvertent use of nonconforming, inoperative, or malfunctioning items. Identification is verified upon receipt of items from suppliers and maintained throughout storage, handling, and installation. Items are identified to indicate whether they are awaiting inspection, acceptable for use, unacceptable, or in a hold status pending further evaluation.

When contractors are responsible for maintaining identification systems, Gilbert/Commonwealth Quality Assurance provides reviews and controls similar to those described for suppliers in Section 17.14.3.

17.15 NONCONFORMING MATERIALS, PARTS, OR COMPONENTS

17.15.1 Gilbert/Commonwealth complies with the nonconforming materials, parts, or components control requirements of 10CFR50, Appendix B, and Regulatory Guide 1.28, as applicable to its scope of work.

17.15.2 Requirements

The Gilbert/Commonwealth Quality Assurance Program incorporates measures for the identification and control of nonconforming items. Control of nonconforming material requirements are specified for contractors and suppliers in procurement documents, while Quality Assurance procedures delineate controls utilized by Gilbert/Commonwealth. These controls include the following:

1. Written procedures to control the identification, documentation, segregation, review, disposition, and notification to affected organizations for nonconforming items.

2. Identification of individuals or groups authorized to review and approve nonconforming item dispositions is provided.

3. Nonconforming items are either physically segregated from acceptable items or positively identified as nonconforming until properly dispositioned.

4. Nonconformance documentation includes:

   a. Identification of the item

   b. Description of the nonconformance

   c. Nonconformance disposition

   d. Reinspection and retesting requirements

   e. Disposition approval signatures.

5. Nonconformance reports dispositioned "accept-as-is" or "repair" are included as part of the Quality Assurance records which are forwarded to the utility.

6. Nonconformance reports are analyzed to determine quality trends and results are reported for management review and assessment.

7. Nonconforming items dispositioned as "repair" or "rework" are reinspected and retested in accordance with original or equivalent methods.

8. Procedures utilized for repair, rework, inspection, and test of nonconforming items are documented.

17.15.3 Manufacturing Phase

Suppliers are required to implement controls of nonconforming items in accordance with the requirements of Section 17.15.2. The existence of these controls is verified during Gilbert/Commonwealth's supplier surveys and review of procedures.

Suppliers are also required by the procurement documents to submit all proposed "accept-as-is" and "repair" dispositions to Gilbert/Commonwealth for prior approval.

During the course of a supplier's performance, the implementation of nonconforming item controls are reviewed through Gilbert/Commonwealth's Manufacturing Surveillance. This surveillance activity also includes verification that the supplier has received Gilbert/Commonwealth approval for any nonconformances dispositioned "accept-as-is" or "repair." Should conditions indicate that a supplier is not effectively implementing his nonconformance procedures, Gilbert/Commonwealth initiates corrective action measures as specified in Section 17.16 of this Topical Report.

17.15.4 Construction Phase

Control of contractors at the construction site is affected by measures that are equivalent to those specified in Section 17.15.3 for suppliers.

When Gilbert/Commonwealth's scope of work includes the performance of inspections or tests at a construction site, written procedures commensurate with the requirements of Section 17.15.2 will be implemented.

17.16 CORRECTIVE ACTION

17.16.1 Gilbert/Commonwealth complies with the corrective action requirements of 10CFR50, Appendix B, and Regulatory Guide 1.28, as applicable to its scope of work.

17.16.2 Controls

The Gilbert/Commonwealth Quality Assurance Program requires that measures be established and implemented to assure that conditions adverse to quality are promptly identified, reported, and corrected. Procedures require that conditions adverse to quality (such as nonconformances, failures, malfunctions, deficiencies, deviations, and defective items) are evaluated to determine the need for corrective action. When these conditions are judged to be significant, the cause and corrective action is reported to responsible management for review and assessment. Implementation of prescribed corrective actions is monitored to assure timeliness and to preclude repetition.

Corrective action measures are initiated through Gilbert/Commonwealth audits, surveillances, and inspection activities. Suppliers and contractors are required to implement their own corrective action systems which are reviewed and monitored by Gilbert/Commonwealth. When surveillance indicates that a supplier or contractor is not complying with

requirements, Corrective Action Requests are imposed on the supplier/contractor. These must be resolved prior to acceptance of the work.

Implementation of prescribed corrective action is monitored to assure followup and closeout in a timely manner and to preclude repetition.

17.17 QUALITY ASSURANCE RECORDS

17.17.1 Gilbert/Commonwealth complies with the records requirements of 10CFR50, Appendix B, and Regulatory Guide 1.88, as applicable to its scope of work throughout the life of the project contract.

17.17.2 Record Requirements

The Gilbert/Commonwealth Quality Assurance Program requires a quality record system which will provide documentary evidence of performance of activities affecting quality. These records are accumulated and handled in a controlled manner in accordance with approved procedures which provide the assurance that record transmittals, retention, and maintenance is effective and consistent with applicable codes and standards. These requirements include the following:

1. Sufficient records are maintained to provide documentary evidence of the quality of items and activities affecting quality.

2. Records are identifiable and retrievable.

3. Requirements and responsibilities for record transmittals, retention, and maintenance are consistent with applicable codes and standards.

4. Records are protected from deterioration, destruction, and loss through construction of protective storage facilities or through duplicate storage.

5. Inspection and test records include:

   a. A description of type of observation

   b. Evidence of manufacturing, inspection, or test operation completion

   c. Date and results of inspection or test

   d. Information related to nonconformances

   e. Identification of inspector or data recorder

   f. Evidence of result acceptability.

6. Quality Assurance records include the following:

   a. Operating logs

   b. Results of reviews, inspections, tests, audits, and material analyses

   c. Monitoring of work performance

   d. Qualification of personnel, procedures, and equipment

   e. Specifications and drawings

   f. Procurement documents

   g. Calibration procedures and reports

   h. Nonconformance reports

   i. Corrective action reports.

17.17.3 Record Maintenance

Each division of Gilbert/Commonwealth maintains files of documents and records applicable to their scope of work. A separate record retention center is maintained within the Construction Services Division. The record retention center has responsibility for:

1. Coordinating methods of record identification, maintenance, and transmittal for all divisions.

2. Receiving, storing, preserving, and safeguarding records within the retention center.

3. Providing master logs or listings of records which correlate with division logs.

4. Reviewing records for legibility and authentication.

5. Providing timely retrieval of records from the retention center.

6. Dispositioning of records upon termination of contracts.

Each Gilbert/Commonwealth division establishes a record system comprised of records generated by the division. These record systems include record identification and filing; maintenance of record logs and indexes; identification of record custodians; and methods of record authentication. As a document becomes a record, through dating and authentication, a legible copy is

forwarded to the record retention center. A copy is retained within the division, thereby establishing duplicate storage.

17.17.4 Record Classification and Turnover

The classification of records for retention periods is normally the responsibility of the power plant owner. The point in time which differentiates a permanent record from a non-permanent record is the date of power plant commercial operation; and since Gilbert/Commonwealth's normal scope of work does not extend beyond that point, all records are maintained for the duration of contract without differentiation of retention periods. During the course of Gilbert/Commonwealth's activities, copies of records are transmitted to the owner as they are generated. These are also considered to be duplicates which preclude total loss of a record. At completion of a contract, all records are offered to the owner for future use and retention.

17.18 AUDITS

17.18.1 Gilbert/Commonwealth complies with the audit requirements of 10CFR50, Appendix B, and ANSI N45.2.12, as applicable to its scope of work.

17.18.2 Audit Program

The Gilbert/Commonwealth Quality Assurance Program requires that planned audits be performed to verify compliance with all aspects of the Quality Assurance Program. Audit schedules are prepared annually utilizing information from sources listed in paragraph 17.18.4, to assure coverage of areas anticipated to be active during the schedule period. The Quality Assurance Division performs internal audits of Gilbert/Commonwealth activities and external audits of supplier and contractor activities. These audits include the objective evaluation of work areas, activities, processes and items, and the review of documents and records. They are conducted to provide an objective evaluation of Quality Assurance Program effectiveness, to determine that the programs are in compliance with established requirements, methods and procedures, and to verify implementation of corrective action.

17.18.3 Personnel Training

Audits are performed by personnel who are trained and qualified to requirements defined in Quality Assurance Division Procedures. These requirements provide the means to assure that audits are performed in a thorough and professional manner. Training

programs are organized to provide auditors the necessary training and knowledge of regulatory requirements, codes, standards, procedures, etc., applicable to the activities being audited. Training and qualification records of audit personnel are maintained by the Quality Assurance Division.

17.18.4 Internal Audits

Internal audits within Gilbert/Commonwealth are performed by an internal audit staff under direction of the Manager, Methods and Operations. In accordance with approved Quality Assurance Division Procedures, a master schedule is provided which assures that systematic, documented, and meaningful audits are conducted on those activities subject to the requirements of 10CFR50, Appendix B. The following sources of information are utilized in preparing the audit schedule:

1. Regulatory Requirements
2. Codes
3. Standards
4. NRC Reports
5. Client Correspondence
6. Quality Assurance Policy Committee and/or Subcommittee Decisions

7. Division Managers

8. Other sources, as applicable.

Internal quality assurance audits are conducted in accordance with approved Quality Assurance Procedures and/or checklists by qualified auditors who are not responsible for the activity being audited. The audit system provides for notification to affected organizations, written audit reports to management, and follow-up to assure implementation of corrective action.

17.18.5 External Audits

External audits of contractors and suppliers are conducted by qualified auditors in a manner similar to that of internal audits. However, these audits are scheduled and conducted under direction of the Quality Assurance Program Manager.

17.18.6 Scheduling

Audits are regularly scheduled on the basis of the status and safety importance of the activities being performed. The audits are initiated early enough to assure effective quality assurance during design, procurement, and construction activities. Unscheduled audits are also performed when requested by management or when conditions indicate the need.

Areas subject to Gilbert/Commonwealth quality assurance audits include:

1. Early site preparations which affect plant safety.

2. Preparation, review, approval, and control of early procurement actions.

3. Indoctrination and Training Programs.

Reaudits are scheduled upon evaluation of the significance of audit results and safety importance of activities being performed.

17.18.7 Audit Reports

Upon completion of the audit, results are reviewed with management of the audited organization. Audit reports are prepared and distributed to designated levels of management, as well as to the audited organization. The report identifies deficiencies or nonconformances found during the audit and requests responses from the audited organization which describe corrective actions taken, planned corrective actions, and implementation schedules.

Audit data is analyzed to determine quality trends and measures of Quality Assurance Program effectiveness. The results are reported to the Quality Assurance Policy Committee for review and assessment.

17.18.8 Audit Follow-Up

Audit follow-up is conducted by the Quality Assurance Division to monitor and verify the implementation of corrective action.

Verification of corrective action and close out of the audit report is performed by one or more of the following:

1. Evaluation and acceptance of written response.

2. Verification of corrective action at the audit location.

3. Reaudit.

Closed-out audit reports result in notification to the same groups or individuals that received the original audit report.

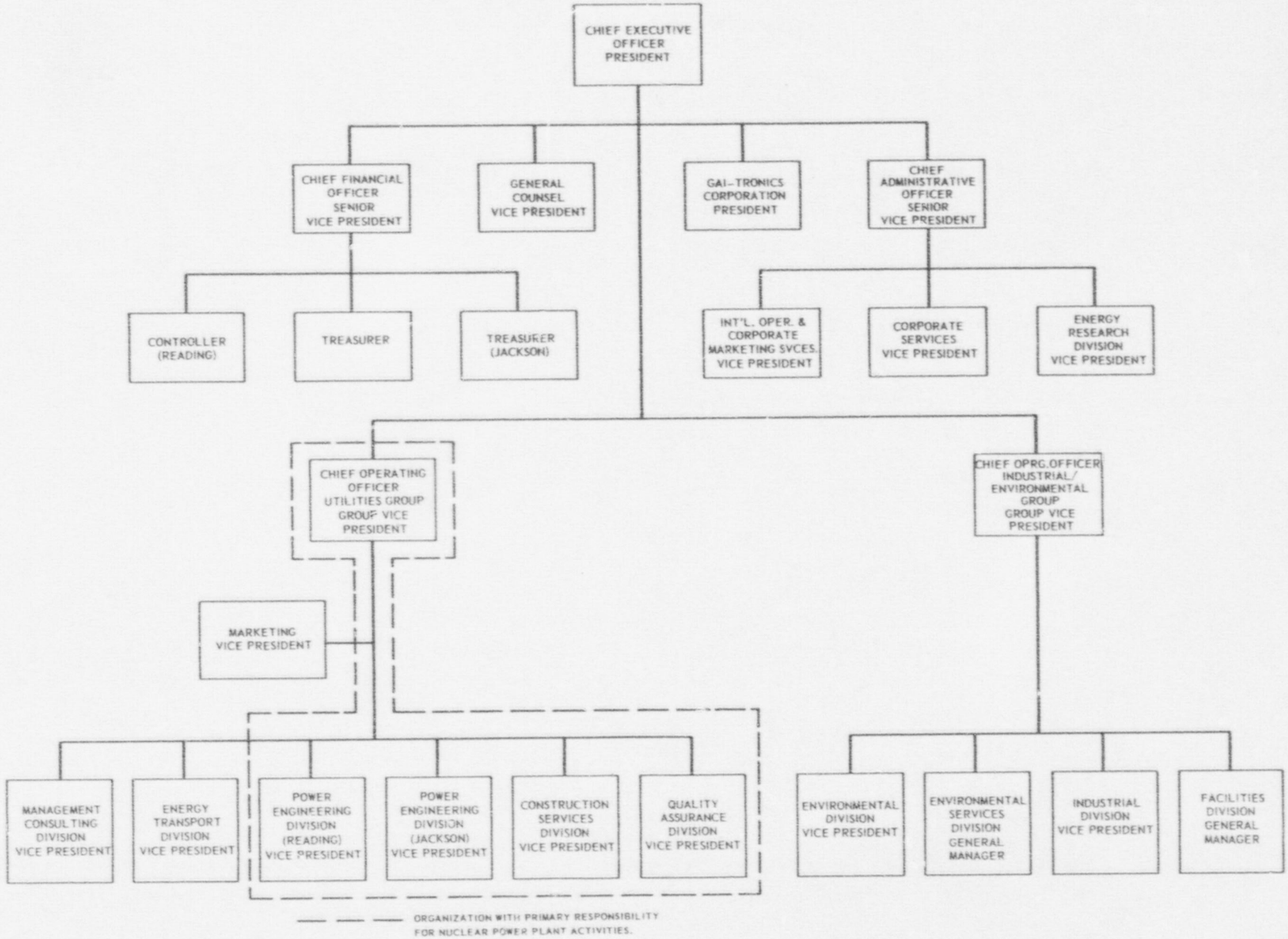

FIGURE 1-1
GILBERT/COMMONWEALTH
CORPORATE ORGANIZATION

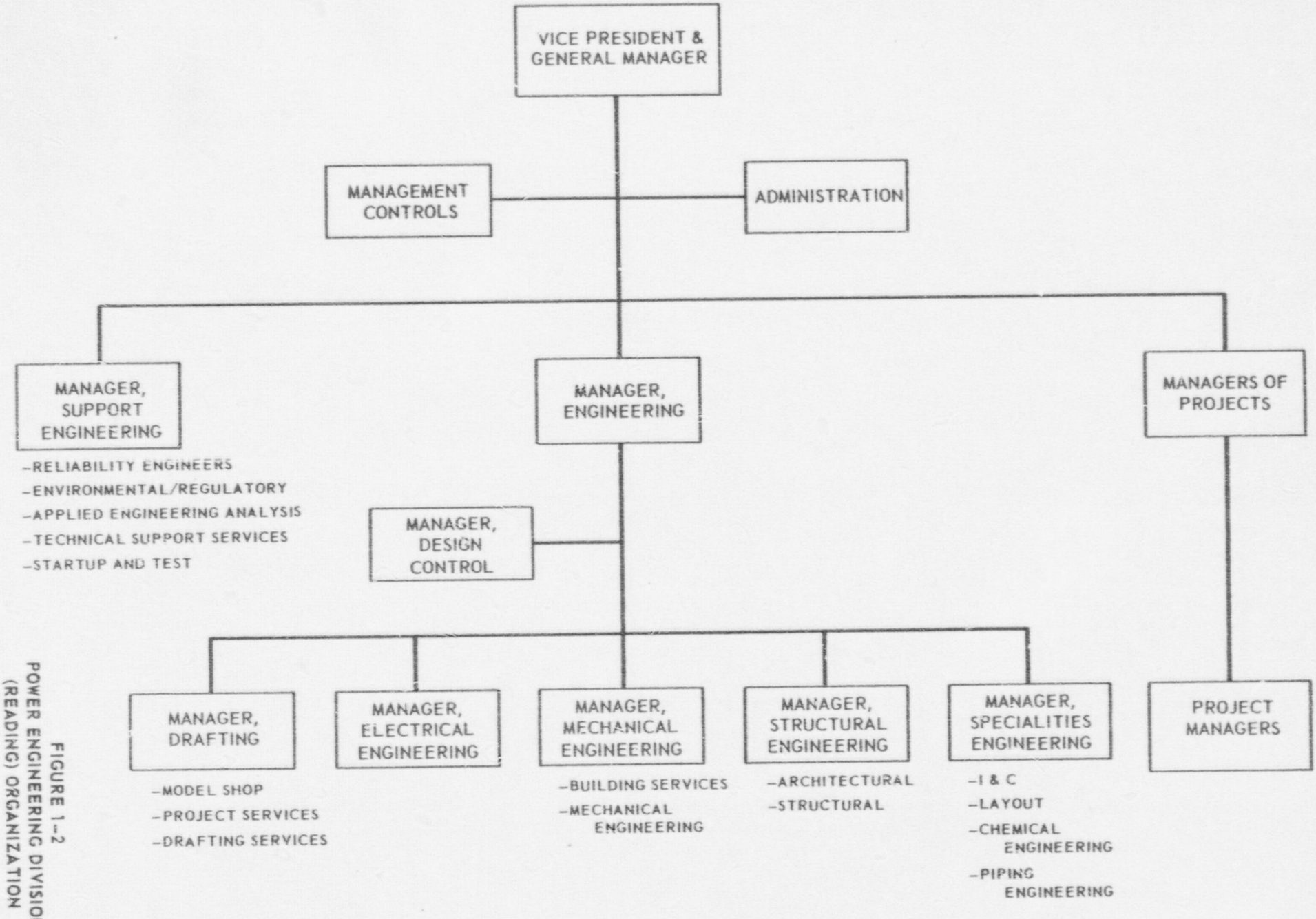

FIGURE 1-2
POWER ENGINEERING DIVISION
(READING) ORGANIZATION

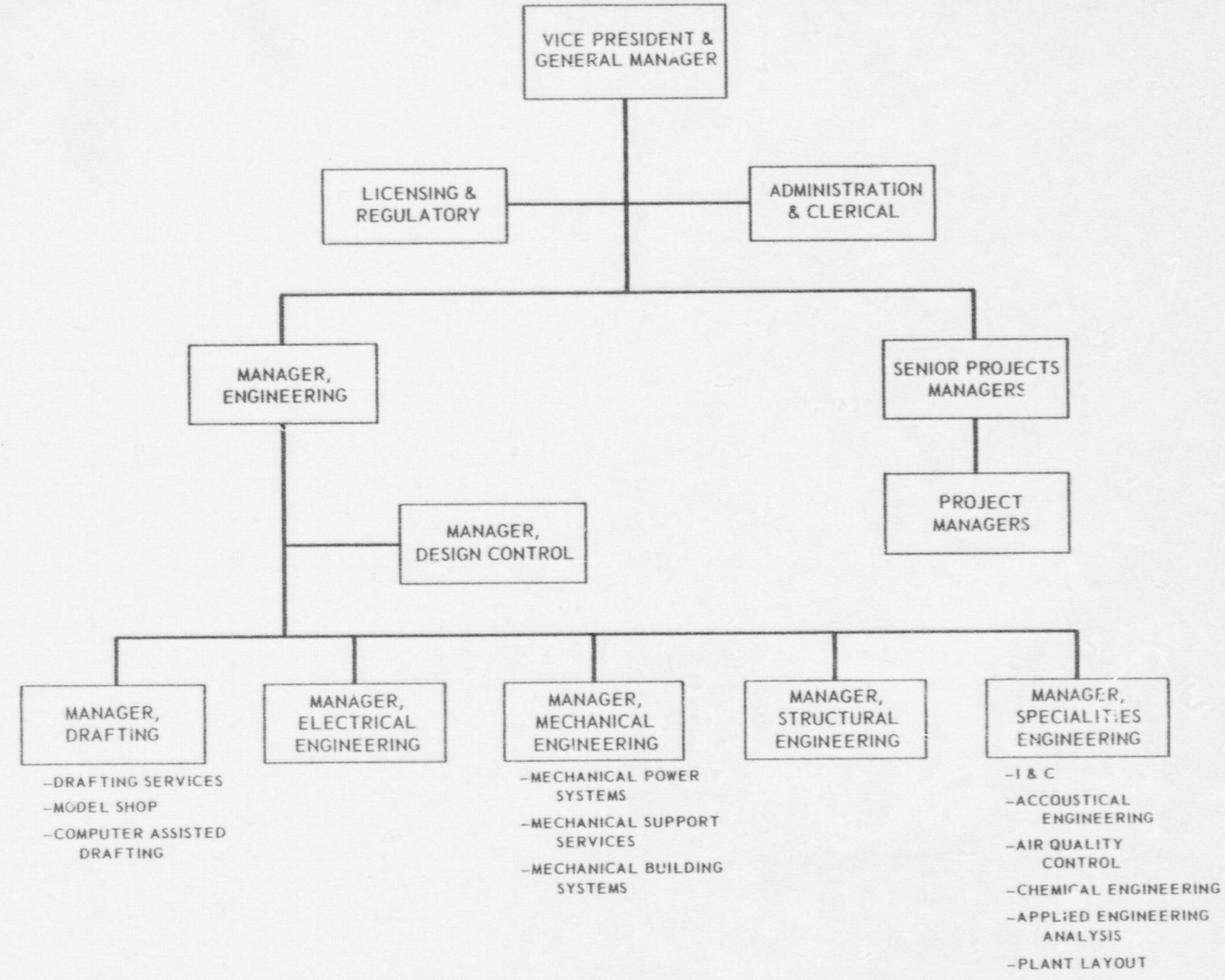

FIGURE 1-3
POWER ENGINEERING DIVISION
(JACKSON) ORGANIZATION

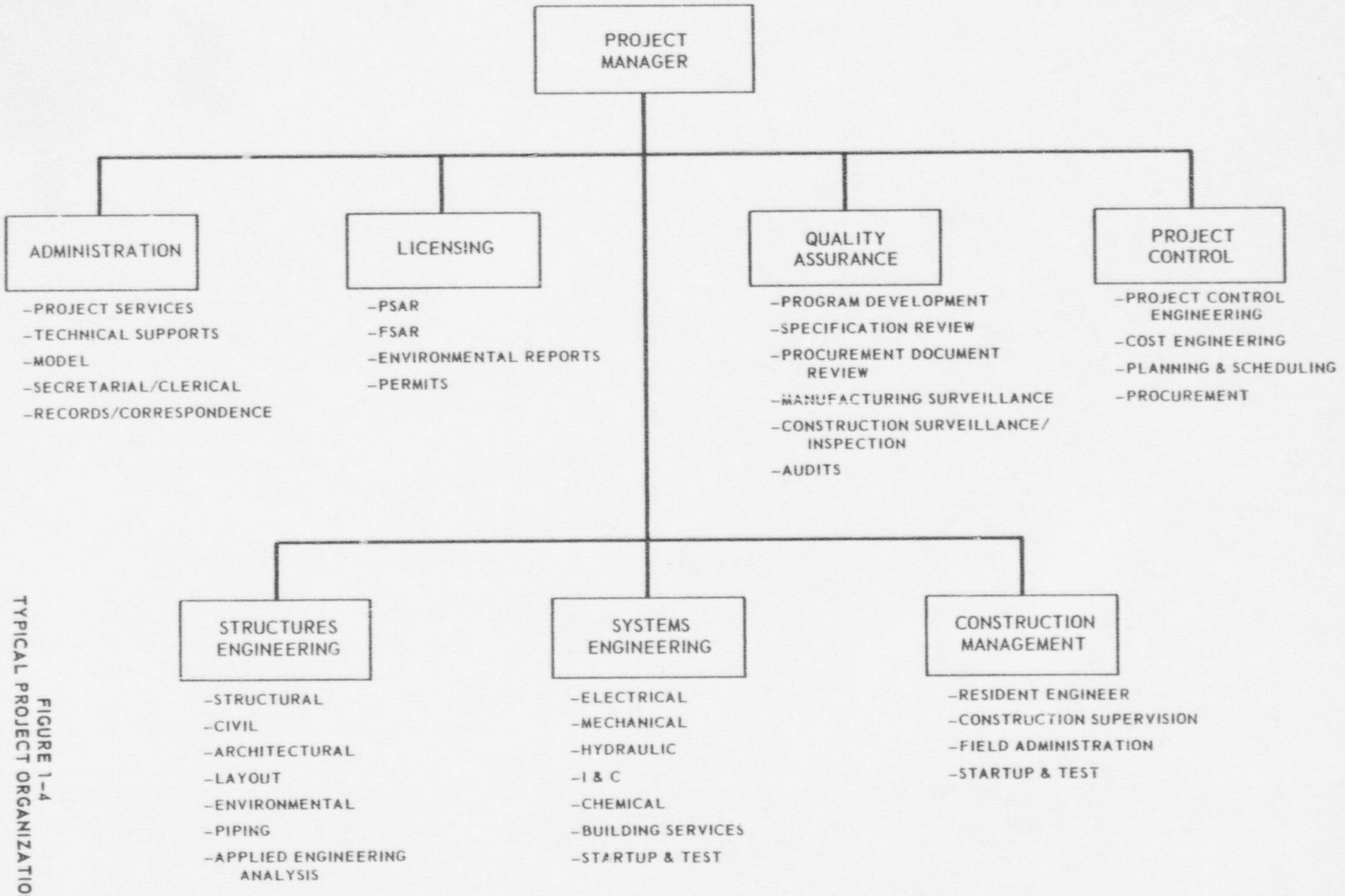

FIGURE 1-4
TYPICAL PROJECT ORGANIZATION

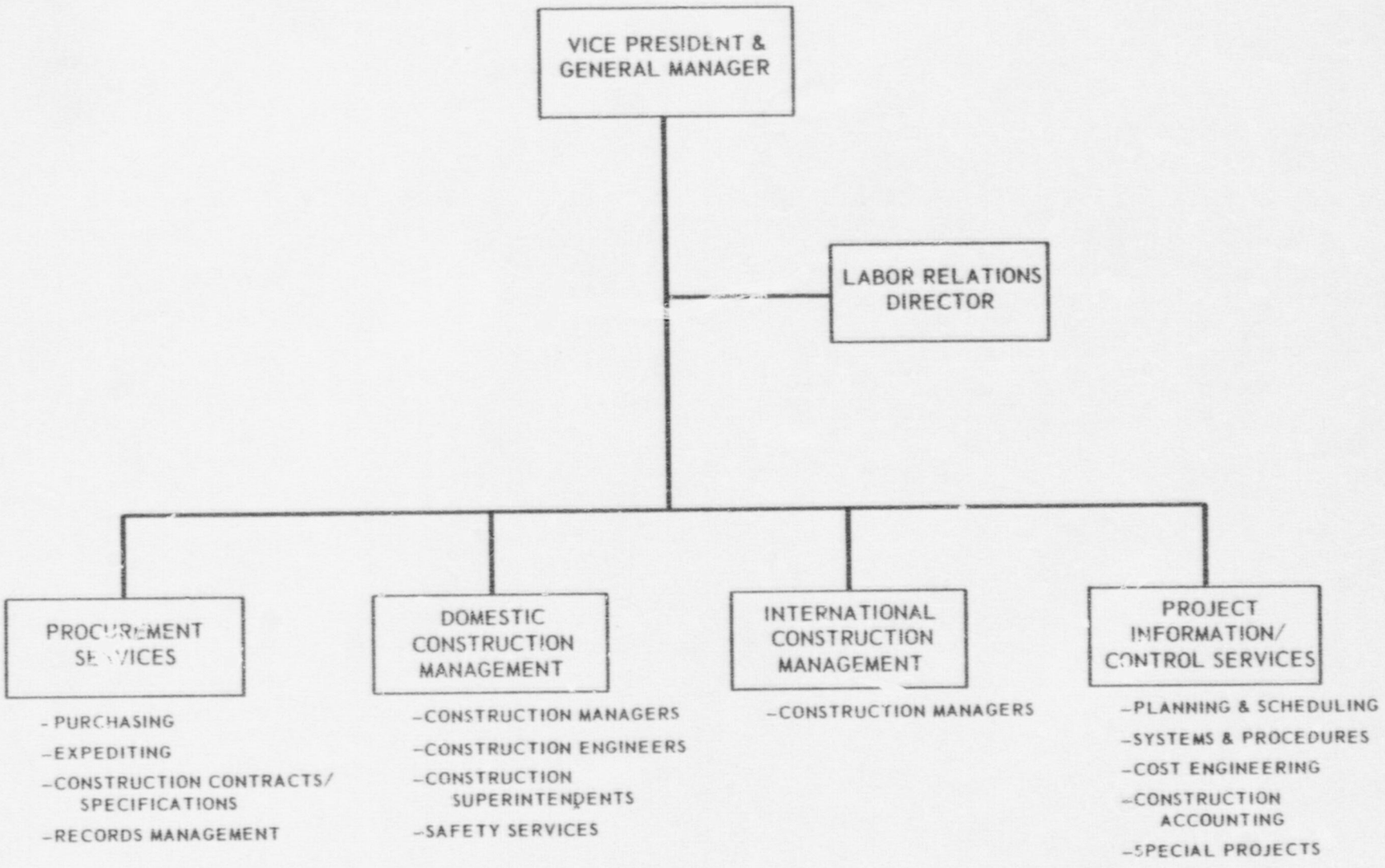

FIGURE 1-5
CONSTRUCTION SERVICES
DIVISION ORGANIZATION

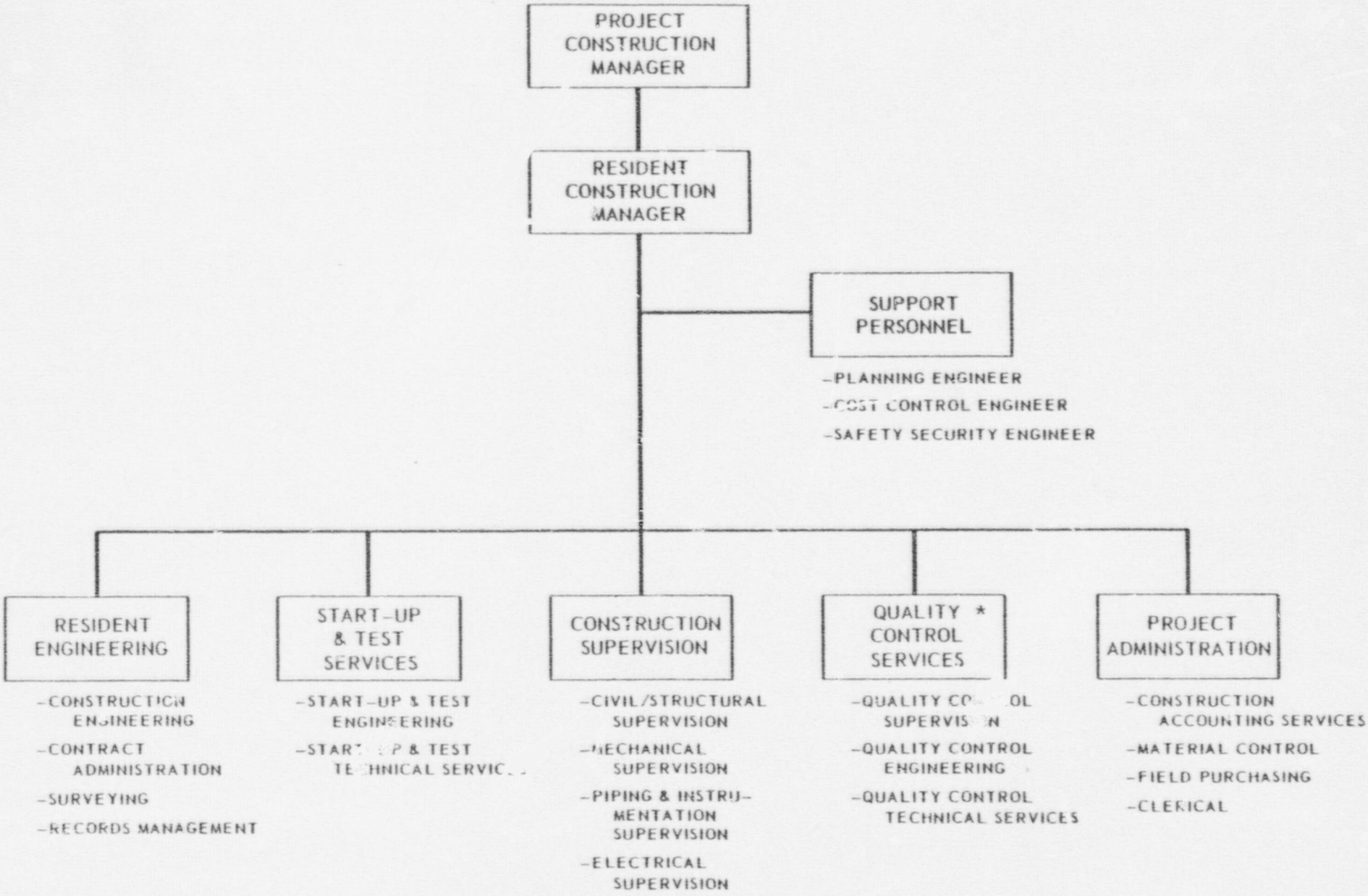

FIGURE 1-6
TYPICAL CONSTRUCTION MANAGEMENT
PROJECT ORGANIZATION

* *Reports to Quality Assurance as shown in Figure 1-4*

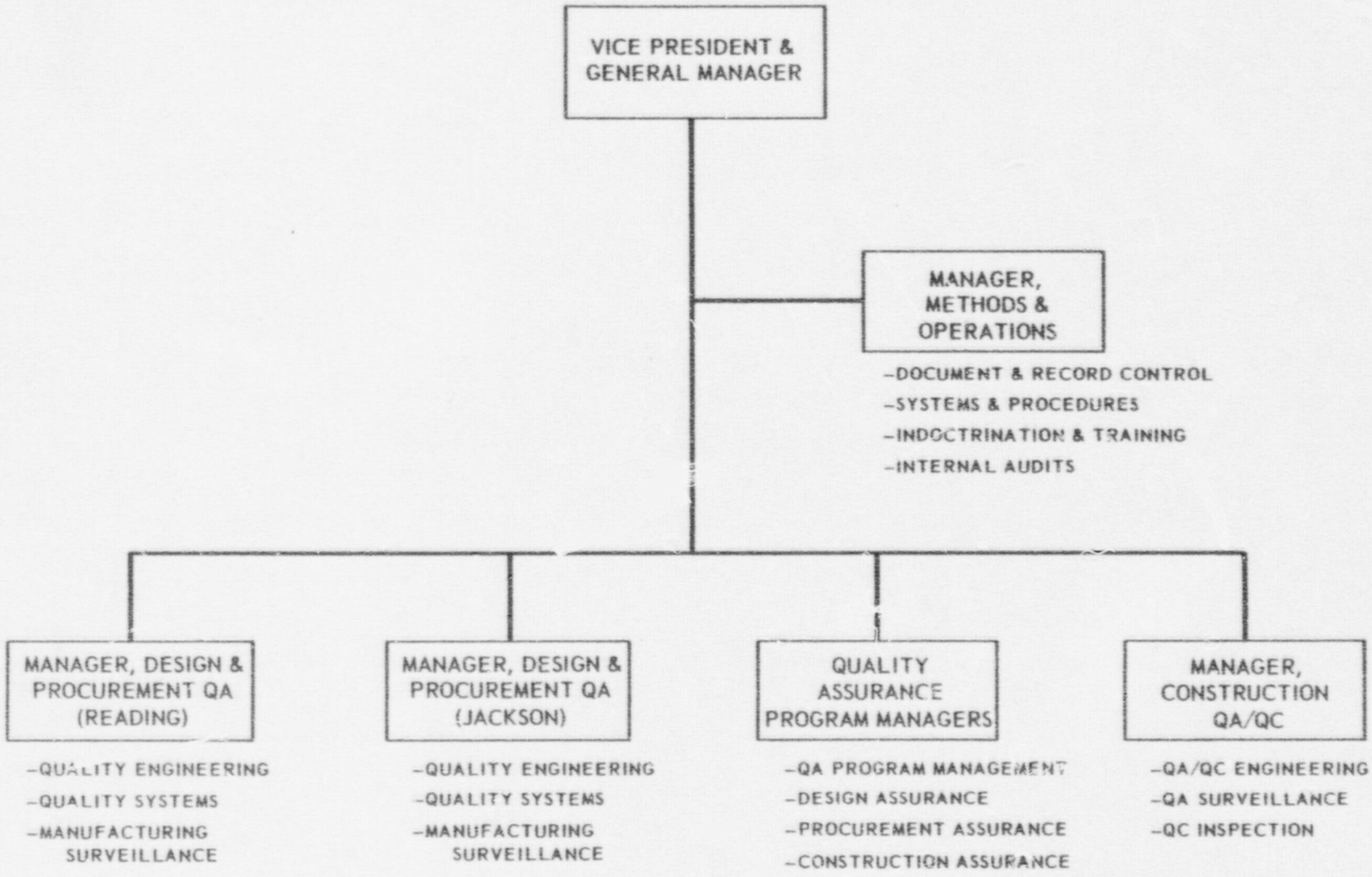

FIGURE 1-7
QUALITY ASSURANCE
DIVISION ORGANIZATION

GILBERT/COMMONWEALTH DOCUMENTS[1]

QA PROGRAM DOCUMENTS / 10 CFR 50 APPENDIX B CRITERIA	NUCLEAR QUALITY ASSURANCE MANUAL	POWER ENGINEERING DIVISION (READING) DESIGN CONTROL PROCEDURES (DCPS)	POWER ENGINEERING DIVISION (JACKSON) DESIGN CONTROL PROCEDURES (DCPS)	CONSTRUCTION SERVICES DIVISION PROCEDURES		QUALITY ASSURANCE DIVISION PROCEDURES (QAPS)
				PROCUREMENT CONTROL PROCEDURES (PCPS)	CONSTRUCTION CONTROL PROCEDURES (CCPS)	
I ORGANIZATION	SECTION 1.0 ORGANIZATION	Appendix B, DCP Manual-Organization	Appendix B, DCP Manual-Organization	Introduction Section & Exhibit 1 Organization	*	QAP 1.1 Organization
II QA PROGRAM	ALL	All	All	All	*	All
III DESIGN CONTROL	SECTION 3.0 DESIGN CONTROL	All	All			QAP 3.1 Drawing, Specification and Technical Document Review QAP 3.2 Review of the Safety Analysis Report QAP 3.3 Preparation of Quality Assurance Specifications
IV PROCUREMENT DOCUMENT CONTROL	SECTION 4.0 PROCUREMENT DOCUMENT CONTROL	DCP 3.05 Vendor Drawings DCP 3.20 Project Lists DCP 4.10 Technical Bid Evaluations DCP 4.15 Procurement Documents DCP 5.20 Subcontracted Technical Services	DCP 1.55 Design Specifications for Nuclear Power Plants 3.05 Vendor Drawing Control 4.05 Proposal and Supplier Evaluations 4.10 Procurement Documents 5.20 Subcontracted Technical Services	All	*	QAP 4.3 Review of Proposals QAP 4.4 Review of Conformed Specifications, Bills of Materials, and Technical Services Contracts
V INSTRUCTIONS, PROCEDURES AND DRAWINGS	SECTION 5.0 INSTRUCTIONS, PROCEDURES AND DRAWINGS	All	All	All	*	All

FIGURE 1-8
GILBERT/COMMONWEALTH
PROCEDURES VERSUS
10 CFR 50, APPENDIX B CRITERIA

GILBERT/COMMONWEALTH DOCUMENTS[1]

QA PROGRAM DOCUMENTS / 10 CFR 50 APPENDIX B CRITERIA	NUCLEAR QUALITY ASSURANCE MANUAL	POWER ENGINEERING DIVISION (READING) DESIGN CONTROL PROCEDURES (DCPS)	POWER ENGINEERING DIVISION (JACKSON) DESIGN CONTROL PROCEDURES (DCPS)	CONSTRUCTION SERVICES DIVISION PROCEDURES		QUALITY ASSURANCE DIVISION PROCEDURES (QAPS)
				PROCUREMENT CONTROL PROCEDURES (PCPS)	CONSTRUCTION CONTROL PROCEDURES (CCPS)	
VI DOCUMENT CONTROL	SECTION 6.0 DOCUMENT CONTROL	DCP 1.30 CAI Drawings DCP 2.10 Review and Approval DCP 2.20 Change Notices DCP 3.05 Vendor Drawings DCP 3.10 Project Correspondence DCP 3.15 Design Records DCP 3.20 Project Lists DCP 4.15 Procurement Documents DCP 5.10 Project Management Manual DCP 6.05 Safety Analysis Reports	DCP 1.20 Calculations DCP 1.2 Fluid System and Instrument Loop Diagrams DCP 1.30 Drawings DCP 1.35 System Logic Diagrams DCP 1.40 One Line and Relay Diagrams DCP 1.45 System Design Descriptions DCP 2.10 Engineering Change Notices DCP 2.20 Startup and Test Procedures DCP 3.05 Vendor Drawing Control DCP 3.10 Project Correspondence Control DCP 3.15 Project Records Control DCP 4.10 Technical Specifications and Bills of Material DCP 5.10 Project Management Manual DCP 6.05 Safety Analysis Reports	Part A-1 Preparing and Maintaining the Procurement Control Procedures Manual Part A-5 Quality Assurance Records Control Program Part II 1.2 Developing & Maintaining Standard Project Contractual Documents Part II 1.4 Technical Specifications and Drawings for Contract Documents Part V 1.1 Processing Specifications and Bills of Materials	*	QAP 2.1 Preparation of Quality Assurance/ Quality Control Plans QAP 2.2 Forms Control QAP 3.3 Preparation of Quality Assurance Specifications QAP 7.1 Preparation, Review, and Revision of Quality Assurance Procedures Manual QAP 7.2 Control and Distribution of Quality Assurance Procedures Manual QAP 9.1 Classification, Control, and Maintenance of Quality Assurance Records

FIGURE 1-8
GILBERT/COMMONWEALTH
PROCEDURES VERSUS
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GILBERT/COMMONWEALTH DOCUMENTS[1]

QA PROGRAM DOCUMENTS / 10 CFR 50 APPENDIX B CRITERIA	NUCLEAR QUALITY ASSURANCE MANUAL	POWER ENGINEERING DIVISION (READING) DESIGN CONTROL PROCEDURES (DCPS)	POWER ENGINEERING DIVISION (JACKSON) DESIGN CONTROL PROCEDURES (DCPS)	CONSTRUCTION SERVICES DIVISION PROCEDURES		QUALITY ASSURANCE DIVISION PROCEDURES (QAPS)
				PROCUREMENT CONTROL PROCEDURES (PCPS)	CONSTRUCTION CONTROL PROCEDURES (CCPS)	
VII CONTROL OF PURCHASED MATERIAL, EQUIPMENT AND SERVICES	SECTION 7.0 CONTROL OF PURCHASED MATERIAL, EQUIPMENT AND SERVICES	DCP 2.30 Manufacturer's Stress Reports DCP 3.20 Project Lists DCP 4.05 Technical Qualification of Vendors DCP 4.10 Technical Bid Evaluation DCP 4.20 Nonconformances to CAI Design Documents	DCP 2.15 Manufacrurer's Stress Reports DCP 4.05 Proposal and Supplier Evaluation DCP 4.15 Nonconformances to Procurement Documents - Technical DCP 5.20 Subcontracted Technical Services DCP 5.30 Technical Support Services	PCP II 1.3 Preparing Bidders List PCP III 1.2 Requested Bidders List PCP III 1.4 Processing Procurement Documents PCP III 1.9 Establishment and maintenance of a Corporate Vendor History File	*	QAP 4.1 Quality Assurance Evaluation of Qualification of Potential Contractors/ Vendors QAP 4.2 Pre Award Surveys of Procurement Sources QAP 5.1 Review and Control of Contractor/Vendor Submittals QAP 5.3 Performance of Manufacturing Surveillance
VIII IDENTIFICATION & CONTROL OF MATERIAL, PARTS AND COMPONENTS	SECTION 8.0 IDENTIFICATION AND CONTROL OF MATERIAL, PARTS AND COMPONENTS	DCP 3.20 Project Lists DCP 4.15 Procurement Documents DCP 4.20 Nonconformance to CAI Design Documents DCP 5.10 Project Management Manual	DCP 1.55 Design Specifications for Nuclear Power Plants DCP 4.10 Technical Specifications and Bills of Material DCP 4.15 Nonconformance to Procurement Documents - Technical DCP 5.10 Project Management Manual	PCP II 1.7 Preparation and Administration of Construction Contracts	*	QAP 4.4 Review of Conformed Specifications, Bills of Materials, and Technical Services Contracts QAP 5.3 Performance of Manufacturing Surveillance QAP 6.2 Surveillance at Construction Site

FIGURE 1-8
GILBERT/COMMONWEALTH
PROCEDURES VERSUS
10 CFR 50, APPENDIX B CRITERIA

GILBERT/COMMONWEALTH DOCUMENTS[1]

QA PROGRAM DOCUMENTS / 10 CFR 50 APPENDIX B CRITERIA	NUCLEAR QUALITY ASSURANCE MANUAL	POWER ENGINEERING DIVISION (READING) DESIGN CONTROL PROCEDURES (DCPS)	POWER ENGINEERING DIVISION (JACKSON) DESIGN CONTROL PROCEDURES (DCPS)	CONSTRUCTION SERVICES DIVISION PROCEDURES		QUALITY ASSURANCE DIVISION PROCEDURES (QAPS)
				PROCUREMENT CONTROL PROCEDURES (PCPS)	CONSTRUCTION CONTROL PROCEDURES (CCPS)	
IX CONTROL OF SPECIAL PROCESSES	SECTION 9.0 CONTROL OF SPECIAL PROCESSES	DCP 4.15 Procurement Documents	DCP 4.10 Technical Specifications and Bills of Material	PCP 11 1.7 Preparation and Administration of Construction Contracts	*	QAP 4.4 Review of Conformed Specifications, Bills of Materials, and Technical Services Contracts QAP 5.1 Review and Control of Contractor/Vendor Submittals QAP 5.2 Preparation of Manufacturing Surveillance Plans QAP 5.3 Performance of Manufacturing Surveillance QAP 6.1 Review and Control of Contractor/Vendor Submittals for Construction Activities QAP 6.2 Surveillance at Construction Site
X INSPECTION	SECTION 10.0 INSPECTION	DCP 1.10 Design Input DCP 4.15 Procurement Documents	DCP 1.10 Design Input DCP 4.10 Technical Specifications and Bills of Material DCP 4.15 Nonconformance to Procurement Documents - Technical DCP 5.30 Technical Support Services	PCP 11 1.7 Preparation and Administration of Construction Contracts	*	QAP 4.4 Review of Conformed Specifications, Bills of Materials, and Technical Services Contracts QAP 5.1 Review and Control of Contractor/ Vendor Submittals QAP 5.2 Preparation of Manufacturing Surveillance Plans QAP 5.3 Performance of Manufacturing Surveillance

FIGURE 1-8
GILBERT/COMMONWEALTH
PROCEDURES VERSUS
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GILBERT/COMMONWEALTH DOCUMENTS[1]

QA PROGRAM DOCUMENTS / 10 CFR 50 APPENDIX B CRITERIA	NUCLEAR QUALITY ASSURANCE MANUAL	POWER ENGINEERING DIVISION (READING) DESIGN CONTROL PROCEDURES (DCPS)	POWER ENGINEERING DIVISION (JACKSON) DESIGN CONTROL PROCEDURES (DCPS)	CONSTRUCTION SERVICES DIVISION PROCEDURES		QUALITY ASSURANCE DIVISION PROCEDURES (QAPS)
				PROCUREMENT CONTROL PROCEDURES (PCPS)	CONSTRUCTION CONTROL PROCEDURES (CCPS)	
X INSPECTION (CONTINUED)						QAP 6.1 Review and Control of Contractor/ Vendor Submittals for Construction Activities QAP 6.2 Surveillance at Construction Site
XI TEST CONTROL	SECTION 11.0 TEST CONTROL	DCP 2.35 Startup and Test Procedures DCP 4.15 Procurement Documents	DCP 4.10 Technical Specifications and Bills of Material	PCP 11 1.7 Preparation and Administration of Construction Contracts	*	QAP 2.1 Preparation of Quality Assurance/Quality Control Plans (Project) QAP 3.1 Drawing, Specification and Technical Document Review QAP 3.3 Preparation of Quality Assurance Specifications QAP 4.3 Review of Proposals QAP 4.4 Review of Conformed Specifications, Bills of Materials, and Technical Service Contracts QAP 5.1 Review and Control of Contractor/Vendor Submittals QAP 5.3 Performance of Manufacturing Surveillance QAP 6.1 Review and Control of Contractor/Vendor Submittals for Construction Activities QAP 6.2 Surveillance at Construction Site

FIGURE 1-8
GILBERT/COMMONWEALTH
PROCEDURES VERSUS
10 CFR 50, APPENDIX B CRITERIA

GILBERT/COMMONWEALTH DOCUMENTS[1]

QA PROGRAM DOCUMENTS / 10 CFR 50 APPENDIX B CRITERIA	NUCLEAR QUALITY ASSURANCE MANUAL	POWER ENGINEERING DIVISION (READING) DESIGN CONTROL PROCEDURES (DCPS)	POWER ENGINEERING DIVISION (JACKSON) DESIGN CONTROL PROCEDURES (DCPS)	CONSTRUCTION SERVICES DIVISION PROCEDURES		QUALITY ASSURANCE DIVISION PROCEDURES (QAPS)
				PROCUREMENT CONTROL PROCEDURES (PCPS)	CONSTRUCTION CONTROL PROCEDURES (CCPS)	
XII CONTROL OF MEASURING AND TESTING EQUIPMENT	SECTION 17.0 CONTROL OF MEASURING AND TESTING EQUIPMENT	DCP 2.35 Test Procedures DCP 4.15 Procurement Documents	DCP 4.10 Technical Specifications and Bills of Material DCP 5.30 Technical Support Services	PCP 11 1.7 Preparation & Administration of Construction Contracts	*	QAP 5.3 Performance of Manufacturing Surveillance QAP 6.2 Surveillance at Construction Site
XIII HANDLING, STORAGE AND SHIPPING	SECTION 13.0 HANDLING, STORAGE AND SHIPPING	DCP 1.10 Design Input DCP 4.15 Procurement Documents	DCP 1.10 Design Input DCP 4.10 Technical Specifications and Bills of Material	PCP 11 1.7 Preparation & Administration of Construction Contracts	*	QAP 4.4 Review of Conformed Specifications, Bills of Materials, and Technical Services Contracts QAP 5.1 Review and Control of Contractor/Vendor Submittals QAP 5.3 Performance of Manufacturing Surveillance QAP 6.1 Review and Control of Contractor/Vendor Submittals for Construction Activities QAP 6.2 Surveillance at Construction Site

FIGURE 1-8
GILBERT/COMMONWEALTH
PROCEDURES VERSUS
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GILBERT/COMMONWEALTH DOCUMENTS[1]

QA PROGRAM DOCUMENTS / 10 CFR 50 APPENDIX B CRITERIA	NUCLEAR QUALITY ASSURANCE MANUAL	POWER ENGINEERING DIVISION (READING) DESIGN CONTROL PROCEDURES (DCPS)	POWER ENGINEERING DIVISION (JA/KSOM) DESIGN CONTROL PROCEDURES (DCPS)	CONSTRUCTION SERVICES DIVISION PROCEDURES		QUALITY ASSURANCE DIVISION PROCEDURES (QAPS)
				PROCUREMENT CONTROL PROCEDURES (PCPS)	CONSTRUCTION CONTROL PROCEDURES (CCPS)	
XIV INSPECTION, TEST AND OPERATING STATUS	SECTION 14.0 INSPECTION TEST AND OPERATING STATUS	DCP 1.10 Design Input DCP 4.15 Procurement Documents	DCP 1.10 Design Input DCP 2.20 Startup and Test Procedures DCP 4.10 Technical Specifications and Bills of Material DCP 5.30 Technical Support Services	PCP II 1.7 Preparation & Administration of Construction Contracts	*	QAP 4.4 Review of Conformed Specifications QAP 5.1 Review and Control of Contractor/Vendor Submittals QAP 5.3 Performance of Manufacturing Surveillance QAP 6.1 Review and Control of Contractor/Vendor Submittals for Construction Activities QAP 6.2 Surveillance at Construction Site
XV NONCONFORMING MATERIALS, PARTS OR COMPONENTS	SECTION 15.0 NONCONFORMING MATERIALS, PARTS OR COMPONENTS	DCP 2.15 Noncompliance with Procedures DCP 4.15 Procurement Documents DCP 4.20 Non Conformance to GAI Design Documents	DCP 2.25 Nonconformance to Procedures DCP 4.15 Nonconformance to Procurement Documents - Technical	PCP II 1.7 Preparation & Administration of Construction Contracts	*	QAP 4.4 Review of Conformed Specifications, Bills of Materials, & Technical Service Contracts QAP 5.1 Review and Control of Contractor/Vendor Submittals QAP 5.3 Performance of Manufacturing Surveillance QAP 6.1 Review & Control of Contractor/Vendor Submittals for Construction Activities QAP 6.2 Surveillance at Construction Site QAP 8.1 Reporting & Resolution of Contractor/Vendor Non Conformances

FIGURE 1-8
GILBERT/COMMONWEALTH
PROCEDURES VERSUS
10 CFR 50, APPENDIX B CRITERIA

GILBERT/COMMONWEALTH DOCUMENTS[1]

QA PROGRAM DOCUMENTS / 10 CFR 50 APPENDIX B CRITERIA	NUCLEAR QUALITY ASSURANCE MANUAL	POWER ENGINEERING DIVISION (READING) DESIGN CONTROL PROCEDURES (DCPS)	POWER ENGINEERING DIVISION (JACKSON) DESIGN CONTROL PROCEDURES (DCPS)	CONSTRUCTION SERVICES DIVISION PROCEDURES		QUALITY ASSURANCE DIVISION PROCEDURES (QAPS)
				PROCUREMENT CONTROL PROCEDURES (PCPS)	CONSTRUCTION CONTROL PROCEDURES (CCPS)	
XVI CORRECTIVE ACTION	SECTION 16.0 CORRECTIVE ACTION	DCP 2.15 Non Compliance with Procedures DCP 2.20 Change Notices DCP 4.15 Procurement Documents DCP 4.20 Non Conformance to GAI Design Documents	DCP 2.10 ECN's DCP 2.25 Nonconformance to Procedures DCP 4.10 Tech. Specs. & Bills of Material DCP 4.15 Nonconformance to Procurement Documents - Tech.	PCP A-3 Responding to Audits & Corrective Action Reports	*	QAP 8.3 Issue & Processing of Corrective Action Request QAP 8.5 Reporting & Resolution of Contractor/Vendor Deviation/Waiver Request
XVII QUALITY ASSURANCE RECORDS	SECTION 17.0 QUALITY ASSURANCE RECORDS	DCP 3.15 Design Records DCP 4.15 Procurement Documents	DCP 3.15 Project Records Control DCP 4.10 Technical Specifications and Bills of Material	Records Management Manual PCP A-5 Quality Assurance Records Control Program	*	QAP 17.1 Classification, Control, and Maintenance of Quality Assurance Records
XVIII AUDITS	SECTION 18.0 AUDITS	DCP 5.25 Audit Responses	DCP 5.25 Audit Responses	PCP A-3 Responding to Audits & Corrective Action Reports	*	QAP 10.1 Audits QAP 10.2 Responses to External Audits QAP 10.3 Planning, Scheduling, and Coordination of Internal Audits

NOTE:

* Gilbart/Commonwealth is not presently engaged in any Site Construction Activities which require compliance with a Quality Assurance Program as Specified in 10 CFR 50, Appendix B. Construction Control Procedures are presently under development and will be available prior to the start of any Construction Activity.

(1) Subject to annual revision.

FIGURE 1-8
GILBERT/COMMONWEALTH
PROCEDURES VERSUS
10 CFR 50, APPENDIX B CRITERIA

REFERENCES

LIST OF REGULATORY GUIDES, STANDARDS, AND CODES

COMMITTED TO BY THE GILBERT/COMMONWEALTH QA PROGRAM

Reg. Guide 1.28 - Quality Assurance Program Requirements (Design and Construction) (June 7, 1972)

Reg. Guide 1.30 - Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment (August 11, 1972)

Reg. Guide 1.37 - Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants (March 16, 1973)

Reg. Guide 1.38 - Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants (Revision 2, May 1977)

Reg. Guide 1.39 - Housekeeping Requirements for Water-Cooled Nuclear Power Plants (Revision 2, September 1977)

Reg. Guide 1.58 - Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel (August 1973)

Reg. Guide 1.64 - Quality Assurance Requirements for the Design of Nuclear Power Plants (Revision 2, June 1976)

Reg. Guide 1.74 - Quality Assurance Terms and Definitions (February 1974)

Reg. Guide 1.88 - Collection, Storage, and Maintenance of Nuclear Power Plant Quality Assurance Records (Revision 2, October 1976)

FIGURE 1-9
REGULATORY GUIDES, STANDARDS, AND CODES

REFERENCES

LIST OF REGULATORY GUIDES, STANDARDS, AND CODES

COMMITTED TO BY THE GILBERT/COMMONWEALTH QA PROGRAM

Reg. Guide 1.94	-	Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel during the Construction Phase of Nuclear Power Plants (Revision 1, April 1976)
Reg. Guide 1.116	-	Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems (June 1976)
Reg. Guide 1.123	-	Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants (Revision 1, July 1977)
ANSI N45.2.12	-	Requirements for Auditing of QA Programs for Nuclear Power Plants (April 1977) and as supplemented by paragraph 17.7.2 and paragraphs 17.18.2 through 17.18.5
ANSI N45.2.23	-	Qualification of QA Program Audit Personnel for Nuclear Facilities (April 1978)
USNRC 10CFR50, Appendix B	-	Quality Assurance Criteria for Nuclear Power Plants (February 1975)

FIGURE 1-9
REGULATORY GUIDES, STANDARDS, AND CODES