

QUALITY ASSURANCE MANUAL
FOR
NUCLEAR POWER PLANTS

Page iv

Revision 9

Date _____

BALTIMORE GAS AND ELECTRIC COMPANY

Quality Assurance Policy
for the
Calvert Cliffs Nuclear Power Plant

Approved _____
C. H. Poindexter
Vice President
Engineering and Construction

Approved _____
A. E. Lundvall, Jr.
Vice President
Supply

Approved _____
N. J. Bowmaker
Vice President
General Services

Approved _____
J. W. Gore, Jr.
Vice President
Electric Interconnection
and Operations

8412120462 841128
PDR ADOCK 05000317
P PDR

QUALITY ASSURANCE MANUAL
FOR
NUCLEAR POWER PLANTS

Page v

Revision 9

Date _____

BALTIMORE GAS AND ELECTRIC COMPANY

QUALITY ASSURANCE POLICY

(SECTION 1B OF THE FINAL SAFETY ANALYSIS REPORT

FOR THE

CALVERT CLIFFS NUCLEAR POWER PLANT)

Baltimore Gas and Electric Company
 Calvert Cliffs Nuclear Power Plant
 Updated Final Safety Analysis Report
 Chapter 1B - Individual Page Revisions

<u>Page No.</u>	<u>Rev. No.</u>	<u>Page No.</u>	<u>Rev. No.</u>
1B-1	3	1B-31	0
1B-2	3	1B-32	0
1B-3	3	1B-33	0
1B-4	3	1B-34	4
1B-5	3	1B-35	0
1B-6	3	1B-36	2
1B-7	3	1B-37	4
1B-8	3	1B-38	4
1B-9	2	1B-39	4
1B-10	3	1B-40	2
1B-11	0	1B-41	2
1B-12	4	1B-42	0
1B-13	0	1B-43	4
1B-14	4	1B-44	4
1B-15	0	1B-45	0
1B-16	4	1B-46	0
1B-17	4	1B-47	4
1B-18	0	1B-48	0
1B-19	0	1B-49	0
1B-20	0	F1B-1	0
1B-21	0	F1B-2	3
1B-22	0		
1B-23	4		
1B-24	0		
1B-25	0		
1B-26	0		
1B-27	0		
1B-28	0		
1B-29	0		
1B-30	4		

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1B.1 ORGANIZATION AND RESPONSIBILITIES	1B- 1
1B.2 QUALITY ASSURANCE PROGRAM	1B- 7
1B.3 DESIGN CONTROL	1B-12
1B.4 PROCUREMENT DOCUMENT CONTROL	1B-14
1B.5 INSTRUCTIONS, PROCEDURES, AND DRAWINGS	1B-18
1B.6 DOCUMENT CONTROL	1B-18
1B.7 CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES	1B-20
1B.8 IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS	1B-24
1B.9 CONTROL OF SPECIAL PROCESSES	1B-25
1B.10 INSPECTION	1B-27
1B.11 TEST CONTROL	1B-28
1B.12 CONTROL OF MEASURING AND TEST EQUIPMENT	1B-29
1B.13 HANDLING, STORAGE, AND SHIPPING	1B-31
1B.14 INSPECTION, TEST, AND OPERATING STATUS	1B-31
1B.15 NONCONFORMING MATERIALS, PARTS, AND COMPONENTS	1B-32
1B.16 CORRECTIVE ACTION	1B-32
1B.17 QUALITY ASSURANCE RECORDS	1B-33
1B.18 AUDITS	1B-33

LIST OF TABLES

<u>Table No.</u>		<u>Page</u>
1B-1	BG&E COMPANY'S POSITION ON GUIDANCE CONTAINED IN ANSI STANDARDS	1B-35

LIST OF FIGURES

<u>Figure No.</u>	
1B-1	BALTIMORE GAS AND ELECTRIC COMPANY (BG&E) CORPORATE ORGANIZATION
1B-2	BG&E QUALITY ASSURANCE DEPARTMENT ORGANIZATION

General Responsibilities

All levels of organization have definite and unique responsibilities in assuring safe, economical, and reliable operation of the Calvert Cliffs Nuclear Power Plant. Top level management is responsible for ensuring that policies are established, resources are authorized, management philosophy and commitments are communicated to lower levels of the organization, independent verification of management controls are performed, results are reviewed, and appropriate actions taken when necessary.

Middle level management is responsible for translating management policies, philosophy, commitments, and goals; applicable federal, state, and local rules and regulations; Operating Licenses, Technical Specifications, and the Final Safety Analysis Report (FSAR) into control programs for activities such as design, procurement, construction, testing, operation, refueling, maintenance, repair, modification, training, plant security, fire protection, records, independent verification, and corrective action. Middle level management is also responsible for defining, measuring, and modifying the overall effectiveness of control programs; taking appropriate action on the results; and keeping top management informed of the status, adequacy, and effectiveness of control programs, and matters which could have an impact on nuclear safety.

First line craft and non-craft supervisors are individually responsible for ensuring that appropriate procedures are understood and used to implement each activity described in the control programs; identifying problems, seeking solutions, verifying implementation of solutions; investigating root causes of problems and taking preventive actions; ensuring that conditions adverse to plant and personnel safety are promptly identified, reported, and corrected; detecting trends which may not be apparent to a day-to-day observer, recommending generic solutions for adverse trends to management, and taking appropriate actions, to achieve desired results; ensuring that employees assigned to do a job are properly qualified through appropriate training and experience; have properly qualified procedures, tools, equipment, and parts to do the job, and, ensuring that independent inspections of work are conducted in accordance with preestablished requirements. First line non-craft supervisors are responsible to ensure that procedures are written, reviewed, and approved; first line craft supervisors may not have this responsibility. Non-supervisory personnel acting as job directors are responsible for ensuring that properly qualified procedures are understood and used; and ensuring that tools, equipment, and parts are on hand to do the job.

Non-supervisory personnel are responsible for adhering to the established procedures, interpreting them conservatively in case of doubt, and recommending changes when necessary; taking appropriate action so as to minimize personnel injury and damage to the facility and to protect the health and safety of the public in the event of an emergency not covered by an approved procedure.

Corporate Organization and Specific Responsibilities

The Corporate Organization Chart of the Baltimore Gas and Electric Company (BG&E) is shown in Figure 1B-1. Persons responsible for the principal elements of the Company's Quality Assurance Program are as follows:

- Chairman of the Board
- President
- Vice President, Supply
- Vice President, Engineering and Construction
- Vice President, Electric Interconnection and Operations
- Vice President, General Services
- Manager, Quality Assurance
- Manager, Nuclear Power
- Manager, Production Maintenance
- Manager, Electric Engineering
- Manager, Project Management
- Manager, Electric Test
- Manager, Purchasing and Stores
- Manager, Real Estate and Office Services

In addition to these individuals, two advisory groups perform quality-related functions for plant operations. These are the Plant Operations Safety and Review Committee and the Off-Site Safety Review Committee whose makeup and responsibilities are described in the Technical Specifications for the Calvert Cliffs Nuclear Power Plant.

A subcommittee of the Plant Operations Safety and Review Committee, the Plant Operating Experience Assessment Committee reviews the operating experience of Calvert Cliffs and other plants of similar design to determine the applicability of significant events to Calvert Cliffs.

Chairman of the Board and President of the Company

BG&E's Quality Assurance Program for nuclear power plants is established under the authority of the Chairman of the Board and the President of the Company, who are responsible for establishing the overall Quality Assurance Policy. They assign project responsibilities to the organizations shown in heavy-lined boxes in Figure 1B-1.

The Chairman of the Board assigns authority through the President to the Vice President, Engineering and Construction; the Vice President, Supply; the Vice President, General Services; and the Vice President, Electric Interconnection and Operations. Responsibilities for implementing the Quality Assurance Program are delegated to designated Department Managers who report to the Vice Presidents of Engineering and Construction, Supply, General Services, and Electric Interconnection and Operations. Managers delegate their authority as required to implement their responsibilities.

Quality assurance matters that cannot be resolved by the Managers or Vice Presidents are brought to the attention of the President or the Chairman of the Board for resolution.

Vice President, Supply

The Vice President, Supply is responsible for ensuring that the Quality Assurance Program is developed and administered. The authority to develop and administer the Quality Assurance Program is assigned to the Manager, Quality Assurance. The Vice

President, Supply is also responsible for ensuring that the requirements of the Quality Assurance Program that relate to the operation and maintenance of the plant are implemented. This responsibility is carried out through the Manager, Nuclear Power; the Manager, Production Maintenance; and the Manager, Quality Assurance.

Manager, Quality Assurance

The Manager, Quality Assurance is responsible for the detailed development, direction, and overall coordination of the Quality Assurance Program for the Calvert Cliffs Nuclear Power Plant. This responsibility includes

1. Developing, distributing, and revising the Quality Assurance Manual for Nuclear Power Plants
2. Reviewing and approving Quality Assurance Procedures and their revisions before they are issued for use
3. Conducting quality assurance audits to verify that all quality assurance requirements are being implemented
4. Following up audit responses to determine that action has been taken as required to correct noted deficiencies
5. Taking necessary corrective action, which can include the stoppage of work when manufacturing, maintenance, or modification activities fail to comply with approved specifications, plans, or procedures. Such corrective action is arranged through appropriate channels and is delegated when necessary. When a unit is operating, the Manager, Quality Assurance may recommend to the Plant Superintendent that the plant be shut down. The Plant Superintendent has the final responsibility for the overall evaluation of all aspects and implications of shutting down an operating unit.

BG&E has established that the Manager, Quality Assurance should have at least six years of responsible experience in engineering, design, manufacturing, construction, quality assurance, or power plant operation, as well as a knowledge of regulations and standards related to nuclear power plants.

Personnel who report to the Manager, Quality Assurance are independent of departments and employees responsible for performing specific activities, and have sufficient authority and organizational freedom to identify quality problems; to initiate, recommend, or provide solutions through designated channels; and to verify implementation of solutions.

Quality Assurance Organization

The organization of the Quality Assurance Department is shown in Figure 1B-2. The Manager, Quality Assurance delegates responsibilities for accomplishing required quality assurance activities as follows:

1. The Supervisor, Engineering Quality Assurance is responsible for
 - a. Planning and scheduling evaluations of supplier quality assurance programs.

- b. Reviewing and approving the quality assurance provisions of BG&E procurement documents for safety-related materials, components, parts, and services.
- 2. The Supervisor, Internal Audits and Programs is responsible for
 - a. Controlling, distributing, and revising the Quality Assurance Manual for Nuclear Power Plants.
 - b. Coordinating the preparation of Quality Assurance Procedures and Quality Assurance Department Procedures.
 - c. Planning, scheduling, and the performance of internal audits, with the exception of those performed at Calvert Cliffs.
- 3. The General Supervisor, Operations Quality Assurance is responsible for auditing the safety-related activities of Calvert Cliffs personnel and on-site contractors during operation, maintenance, repair, modification, in-service inspection, and refueling of the nuclear power plant. He assigns personnel to audit on-site safety-related activities; to verify by inspection the accomplishment of safety-related activities; and to maintain specified records accumulated during the design, construction, and operation phases.
- 4. The organization of the Operations Quality Assurance Section is shown also in Figure 1B-2. Personnel in this Section are stationed at Calvert Cliffs to accomplish the following activities:
 - a. The Supervisor, Quality Assurance Auditing is responsible to the General Supervisor, Operations Quality Assurance for performing surveillance and audits of safety-related activities associated with plant operation, maintenance, repair, refueling, and modification. He is assisted in this effort by Quality Assurance Specialists.
 - b. The four Supervisors, Quality Control are responsible to the General Supervisor, Operations Quality Assurance for receiving inspection and the inspection, during maintenance, repair, modification, and refueling operations, of instrumentation and controls, electrical equipment and systems, and mechanical equipment and systems. They are assisted in this effort by Receiving Inspectors, by Quality Control Inspectors from within their units, by inspectors from other Departments if technical expertise in a specific area is required, or by outside contractors if additional manpower is needed.

Manager, Nuclear Power

The Manager, Nuclear Power is responsible for directing the operation and the electrical and instrument maintenance of the Calvert Cliffs Nuclear Power Plant in accordance with BG&E and regulatory requirements.

The organization of the Nuclear Power Department is shown in Figures 12-1, 12-2, and 12-3 of the FSAR. The Manager, Nuclear Power delegates responsibilities for accomplishing required activities as follows:

- 1. The Plant Superintendent is responsible for the operation, chemistry, and maintenance of electrical and control equipment at the Calvert Cliffs Nuclear

Power Plant. He must ensure that these activities are conducted in accordance with the plant operating license and Technical Specifications, the FSAR, and the Quality Assurance Manual for Nuclear Power Plants and its implementing Procedures.

The Plant Superintendent delegates responsibilities for accomplishing required activities as follows:

- a. The General Supervisor, Operations is responsible to the Plant Superintendent for the operation of the plant, including the general supervision of all shift operating personnel. This responsibility covers the safety of applicable plant personnel and equipment, all fuel-handling and refueling activities, and adherence to applicable license and regulatory requirements.

The General Supervisor, Operations delegates primary management responsibility to the Shift Supervisor on duty to ensure the safe operation of the plant under all conditions. The Shift Supervisor maintains the broadest possible perspective on operational conditions that affect the safety of the plant. As the senior member of plant management on each shift, he exercises the command authority of his position to take whatever steps he deems necessary during emergency situations to place and maintain in a safe configuration either unit that may be affected.

- b. The General Supervisor, Electrical and Controls is responsible to the Plant Superintendent for the conduct of electrical and instrument maintenance, repair, and modification needed to keep the plant and its facilities, systems, and equipment in safe and efficient working condition. He is responsible for planning and supervising or controlling the electrical and instrument maintenance activities conducted by plant maintenance personnel, also for ensuring that work is performed in accordance with applicable Codes and Standards and that required maintenance records are kept.
 - c. The General Supervisor, Chemistry is responsible to the Plant Superintendent for the chemistry and radiochemistry of the primary and secondary systems, and for maintaining radioactive effluents within accepted limits.
2. The General Supervisor, Planning and Support is responsible for planning and scheduling Nuclear Power Department activities and maintaining the Record Retention and Retrieval System.
 3. The General Supervisor, Radiation Safety is responsible for ensuring the radiation protection of personnel at Calvert Cliffs.
 4. The General Supervisor, Training and Technical Services is responsible for providing technical support, training, operations safety analysis, and Fuel Management Services to the Nuclear Power Department.
 5. Additional details of the responsibilities of personnel who report to the Manager, Nuclear Power are contained in implementing Quality Assurance Procedures, Nuclear Plant Procedures, and Technical Specifications for the Calvert Cliffs Nuclear Power Plant.

Manager, Production Maintenance

The Manager, Production Maintenance is responsible for directing the mechanical maintenance of and the installation of major modifications to the Calvert Cliffs Nuclear Power Plant in accordance with Company and regulatory requirements.

Vice President, Engineering and Construction

The Vice President, Engineering and Construction is responsible for ensuring that the requirements of the Quality Assurance Program that relate to the design of safety-related structures, systems, and components are implemented. This responsibility is carried out through the Manager, Electric Engineering and the Manager, Project Management.

Manager, Electric Engineering

The Manager, Electric Engineering is responsible for directing the efforts of personnel involved in design, modification, and engineering licensing activities for the Calvert Cliffs Nuclear Power Plant. These activities include nuclear, civil, mechanical, electrical, transmission, and environmental engineering.

Manager, Project Management

The Manager, Project Management is responsible for planning, organizing, directing, and controlling the engineering, procurement, and construction of selected major modification projects at the Calvert Cliffs Nuclear Power Plant.

Vice President, Electric Interconnection and Operations

The Vice President, Electric Interconnection and Operations is responsible for ensuring that the requirements of the Quality Assurance Program that relate to the calibration of test equipment and the testing of protective relaying and metering controls for safety-related electrical power equipment are implemented. This responsibility is carried out through the Manager, Electric Test.

Manager, Electric Test

The Manager, Electric Test is responsible for directing the efforts of personnel involved in the calibration of test equipment and the testing of protective relaying and metering controls for the electrical power equipment of the Calvert Cliffs Nuclear Power Plant.

Vice President, General Services

The Vice President, General Services is responsible for ensuring that the requirements of the Quality Assurance Program that relate to the procurement of safety-related structures, systems, and components and to plant security are implemented. This responsibility is carried out through the Manager, Purchasing and Stores and the Manager, Real Estate and Office Services.

Manager, Purchasing and Stores

The Manager, Purchasing and Stores is responsible for directing the efforts of personnel involved in the procurement of structures, systems, components, parts, and services related to the design, construction, fueling, maintenance, and modification of the Calvert Cliffs Nuclear Power Plant.

Manager, Real Estate and Office Services

The Manager, Real Estate and Office Services is responsible for plant security and for maintenance of security systems at the Calvert Cliffs Nuclear Power Plant.

1B.2 QUALITY ASSURANCE PROGRAM

General Controls

The Baltimore Gas and Electric Company's Quality Assurance Program for the Calvert Cliffs Nuclear Power Plant is applied to structures, systems, components, and activities that have been designated safety-related because they prevent accidents or mitigate the consequences of postulated accidents that could cause undue risk to the health or safety of the public.

This Program is governed by the Quality Assurance Manual for Nuclear Power Plants, which specifies assignment of responsibilities for implementation of the Program and establishes responsibilities for controlling and ensuring the quality of safety-related activities.

Controls have been established for specifying on a Quality List (Q-List) all structures, systems, and components that are subject to the requirements of the Quality Assurance Program and also for revising the Q-List.

The Statement of Authority in the Quality Assurance Manual for Nuclear Power Plants, signed by the Chairman of the Board, establishes the overall Quality Assurance Policy of the Baltimore Gas and Electric Company. This Statement sets the goal of safe and reliable operation of Calvert Cliffs; commits the Company to a Quality Assurance Program designed to ensure the plant's compliance with regulatory requirements, BG&E commitments, and established practices for reliable plant operation; and requires every person involved in safety-related activities to comply with the provisions of the Program.

The Policy is developed by the Vice Presidents of Engineering and Construction, Supply, General Services, and Electric Interconnection and Operations and implemented by the Quality Assurance Manager and the Managers of Electric Engineering, Electric Test, Nuclear Power, Production Maintenance, Project Management, Purchasing and Stores, and Real Estate and Office Services, through appropriate control programs.

The Quality Assurance Program has established controls for BG&E and its contractors as required to ensure that the criteria of 10 CFR 50, Appendix B, will be met throughout the operations phase of the plant; i.e., during activities of testing, operation, maintenance, repair, modification, and refueling.

The Manager, Quality Assurance coordinates the development of the Quality Assurance Program and controls the issue and revision of the Quality Assurance Manual for Nuclear Power Plants. Each change to the Manual is issued with a transmittal notice, which is completed by the recipient and returned to the Quality Assurance Department to indicate that the documents listed on the transmittal have been received and incorporated into the recipient's Manual. The Manager, Quality Assurance ensures that the Program is revised as regulations, standards, results, or experience dictate. He also determines and evaluates the degree of compliance of safety-related activities with the requirements of the Quality Assurance Manual for Nuclear Power Plants and its implementing Procedures. Audits are conducted regularly to ensure compliance with established requirements, and the results of these audits are reported to responsible management personnel.

The Vice President, Supply ensures that activities of the Quality Assurance Department are audited regularly by personnel independent of the Department; they assess the effectiveness of the Department's implementation of BG&E's Quality Assurance Program.

The Vice President, Supply evaluates the report of the independent audit to determine if changes are required to the Quality Assurance Program. He is responsible for negotiating such changes with the appropriate level of management and for sending to the Chairman of the Board a copy of the audit report and an account of the corrective action taken.

If a difference of opinion arises between Quality Assurance Department personnel and those of other Departments, the dispute is resolved as follows: The Supervisor of the Quality Assurance Unit involved first tries to resolve the matter with the organization responsible for conducting the activity. If a resolution cannot be obtained, the matter is referred up through the following management personnel until it is resolved:

1. The Manager, Quality Assurance and the Manager responsible for performing the activity
2. The Vice President, Supply and the Vice President responsible for conducting the activity
3. The President or the Chairman of the Board

To ensure that important activities are performed correctly, BG&E conducts formal training programs for Company personnel with significant responsibilities. These programs include both initial and continuing training and are conducted in accordance with written procedures or instructions. Department Managers are responsible for ensuring that the training needs of personnel in their Departments are identified, formal training programs to satisfy those needs are developed, and the training programs in accordance with the requirements of the Quality Assurance Manual for Nuclear Power Plants are implemented.

The Quality Assurance Program was developed to meet the requirements of the industry Standards, and the Regulations and Regulatory Guides of the Nuclear Regulatory Commission (NRC) listed below. Exceptions taken to guidance contained in these documents and equivalent BG&E alternatives are stated in Table 1B-1.

REGULATIONS

10 CFR 50.55a - Codes and Standards

10 CFR 50.59 - Changes, Tests, and Experiments

10 CFR 50, Appendix B - Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants

10 CFR 55 - Operators' Licenses

REGULATORY GUIDES

1.8 - Personnel Selection and Training
(September 1975)**

This endorses ANSI N18.1 (03/08/71)

1.16 - Reporting of Operating Information (as specified in Calvert Cliffs Technical Specifications)

1.30 - QA Requirements for Installation, Inspection, and Testing of Instrumentation and Electric Equipment (08/11/72)*
This endorses ANSI N45.2.4 (03/01/72)

1.33 - QA Program Requirements (Operation, Rev. 2, 02/78)**
This endorses ANS 3.2 (02/19/76)***

1.37 - QA Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants (03/16/73)**
This endorses ANSI N45.2.1 (02/26/73)***

1.38 - QA Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants (Rev. 2, 05/77)**
This endorses ANSI N45.2.2 (12/20/72)***

1.39 - Housekeeping Requirements for Water-Cooled Nuclear Power Plants (03/16/73)*
This endorses ANSI N45.2.3 (03/15/73)***

1.54 - QA Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants (06/73)**
This endorses ANSI N101.4 (11/28/72)***

1.64 - QA Program Requirements for the Design of Nuclear Power Plants (10/73)*
This endorses ANSI N45.2.11, Draft 3, Rev. 1 (07/73)

INDUSTRY STANDARDS

* NRC endorses an industry Standard or draft without reservation

** NRC takes exception to or provides additional guidance in a regulatory position statement

*** BG&E takes exception to guidance offered and states alternatives

ANSI N45.2.6 - Qualifications of Inspection, Examination, and Testing Personnel for the Construction Phase of Nuclear Power Plants (1978)***

REGULATORY GUIDES

1.68 - Preoperational and Initial Startup Test Programs for Water-Cooled Power Reactors (11/73)**

1.144 - Auditing of Quality Assurance Program for Nuclear Power Plants, Rev. 1 (09/80)**
This endorses ANSI N45.2.12 (1977)

1.146 - Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants (Aug. 1980).*
This endorses ANSI N45.2.23 (1978)***

Procedural Controls

The Quality Assurance Program is documented in the Quality Assurance Manual for Nuclear Power Plants. This Manual contains a Quality Assurance Policy that identifies the NRC regulatory requirements, Industry Standards, and specific Codes applicable to the eighteen criteria contained in 10 CFR 50, Appendix B. The Quality Assurance Policy also indicates action that will be taken by BG&E in response to these documents and to commitments made in the FSAR and Technical Specifications for the Calvert Cliffs Nuclear Power Plant. The Policy is approved by the BG&E Vice Presidents of Engineering and Construction, Supply, General Services, and Electric Interconnection and Operations.

The Manual also contains a series of individual Quality Assurance Procedures that implement actions identified in the Quality Assurance Policy. Quality Assurance Procedures cover the major activities related to operating a nuclear power plant, such as plant operation, plant maintenance, training, purchase of spare parts, calibrations, etc. Each

INDUSTRY STANDARDS

ANSI N45.2.5 - Supplementary QA Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants; Draft 3, Rev. 1 (01/74)

ANSI N45.2.8 - Supplementary QA Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems for the Construction Phase of Nuclear Power Plants; Draft 3, Rev. 2 (09/73)

ANSI N45.2.9 - Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants; Draft (10/76)***

ANSI N45.2.13 - QA Requirements for Control of Procurement of Equipment, Materials, and Services for Nuclear Power Plants; Draft 2, Rev. 2, (10/73)

Quality Assurance Procedure is prepared by one or more of the Departments responsible for conducting the activity. The Quality Assurance Procedure and revisions thereto are reviewed and approved by the Managers of all Departments responsible for or affected by any activity described therein. The Manager, Quality Assurance reviews, approves, and issues all Quality Assurance Procedures and revisions thereto.

Quality Assurance Procedures specify interdepartmental relationships and departmental responsibilities as they relate to particular activities, regulatory requirements, and BG&E commitments. One Quality Assurance Procedure controls the distribution and revision of the Manual. Others ensure that

1. The need for special controls, processes, test equipment, tools, and skills is specified when necessary to ensure that required quality is attained in performance of the activity.
2. Quality is verified by inspections and tests.
3. Personnel who perform activities affecting quality achieve and maintain suitable proficiency through appropriate training and experience.

Department or lower-level implementing Procedures are prepared either by Departments such as Electric Engineering and Purchasing and Stores or by groups within Departments, such as personnel who report to the Plant Superintendent at Calvert Cliffs. The controls for review and issue of implementing Procedures are discussed in Sections 1B.5 and 1B.6.

Review of Operations

Procedures require that the Calvert Cliffs Nuclear Power Plant shall be operated and maintained in accordance with the plant Technical Specifications and operating license. The following organizations review plant operations to ensure that these Procedures are followed.

1. The General Supervisor, Operations Quality Assurance assigned to the Calvert Cliffs Plant provides independent verification that the requirements contained in the Plant's operating license, FSAR, Technical Specifications, and Plant Procedures are met. This is accomplished through quality assurance audits.
2. The Off-Site Safety Review Committee (OSSRC) provides independent verification by review that the Calvert Cliffs Nuclear Power Plant is operated in accordance with established requirements. The OSSRC, which functions under a written Charter, is composed of on-site and off-site personnel knowledgeable of in-plant operations, nuclear engineering, chemistry and radiochemistry, metallurgy, radiological safety, instrumentation and control systems, mechanical and electrical systems, quality assurance, and environmental factors. The proceedings of all meetings are documented and sent to the Vice President, Supply, Committee members, and others designated by the Committee Chairman.
3. The on-site Plant Operations and Safety Review Committee (POSRC) reviews matters pertaining to nuclear plant safety. This Committee screens subjects of potential concern to the OSSRC and performs preliminary investigations under the direction of the Calvert Cliffs Plant Superintendent. The POSRC, which functions under a written Procedure, is chaired by the Plant Superintendent of the Calvert Cliffs Plant. The results of all meetings are documented and sent to the Manager, Nuclear Power, members of the OSSRC, and others designated by the Committee Chairman.

Safety-related maintenance and repair are performed by plant maintenance personnel under the direction of the General Supervisor, Electrical and Controls, Nuclear Power Department, and the General Supervisor, Production Maintenance Department according to written Procedures or instructions prepared by the maintenance force and approved as stated in the Quality Assurance Manual for Nuclear Power Plants. These Procedures

1. Ensure that quality-related activities, such as inspection and test, are performed with appropriate equipment and under suitable environmental conditions
2. Indicate inspections and checks that must be made and records and data that must be kept
3. Show where independent verifications of inspections or checks should be performed by specified personnel other than those performing the work

When necessary, non-plant Company personnel or outside contractors are brought in to supplement the plant work force. In such instances, the approval of work procedures and the tagging of equipment are coordinated by a member of the BG&E organization responsible for the performance of the work.

Controls are established in the Quality Assurance Manual for Nuclear Power Plants to ensure that materials and parts used in the repair, maintenance, and modification of safety-related portions of the plant are appropriate for the service intended. Written Procedures are prepared for the storage and identification of materials and parts to ensure that they do not deteriorate in storage and can be correctly identified before installation or use.

Equipment manufacturers and contractors used for the repair, maintenance, and modification of safety-related structures, systems, and components are required to have quality assurance programs consistent with the importance of the end-product to safety.

1B.3 DESIGN CONTROL

Control

Plant modifications described in the FSAR and considered significant for nuclear safety are controlled by the Quality Assurance Manual for Nuclear Power Plants, which is written to ensure compliance with Regulatory Guide 1.64 and 10 CFR 50.59.

Alterations to the Operating License, including Technical Specifications, the FSAR, and the Emergency Response Plan, are subject to the same controls as are alterations to changes, tests, and experiments defined in 10 CFR 50.59.

Controls for changes, tests, and experiments conducted at Calvert Cliffs vary according to the following:

1. As the item or activity affected is or is not described in the FSAR
2. As the item or activity affected has been classified safety-related or non-safety-related.
3. As a safety analysis is or is not required

4. As the proposed change, test, or experiment does or does not constitute an Unreviewed Safety Question or require a change to the Technical Specifications.

To ensure compliance with 10 CFR 50.59, changes, tests, or experiments have been divided into categories. Three methods of treatment are allowed:

1. Implementing the change, test, or experiment according to Company practice for operating power plants, or according to Procedures required by the Quality Assurance Manual for Nuclear Power Plants.
2. Implementing the change, test, or experiment according to Company practice for operating power plants by using Procedures required by the Quality Assurance Manual for Nuclear Power Plants but controlling the change, test, or experiment with a Facility Change Request so that the preparation and reporting of safety analyses are controlled.
3. Controlling the change, test, or experiment with a Facility Change Request and not allowing the implementing activity to begin until the review requirements of 10 CFR 50.59 and 10 CFR 50, Appendix B, have been met.

Changes, tests, or experiments which require approval by the Nuclear Regulatory Commission (NRC) are approved by the Plant Operations Safety and Review Committee (POSRC) and by the Off-Site Safety Review Committee (OSSRC).

Controls have been established to ensure that design changes to safety-related structures, systems, and components are reviewed either by the organization that made the original design or by a Responsible Design Organization that meets requirements specified in ANSI N45.2.11, Section 8.0.

Responsible Design Organizations

Responsible Design Organizations, either on contract or within BG&E, ensure that

1. Applicable regulatory requirements and design bases are correctly translated into specifications, drawings, written procedures, and instructions.
2. Appropriate standards for quality are specified in design documents, and deviations and changes from such standards are controlled.
3. Suitable design controls are used in applying principles of reactor physics; making seismic, stress, thermal, hydraulic, radiation, and accident analyses; ensuring compatibility of materials; and providing accessibility for in-service inspection.
4. Designs are reviewed to ensure that design characteristics can be controlled, inspected, and tested, and that inspection and test criteria are identified.
5. Interfaces, both external and internal, are controlled for the activities of all participating organizations.
6. Methods for verifying or checking, such as design reviews, alternative calculations, and qualification testing, are properly chosen and followed; the most adverse design conditions are specified for test programs used to verify the adequacy of designs.
7. Individuals or groups responsible for design verification are other than the original designer and the designer's immediate supervisor.

8. Design and specification changes are subject to design controls and approvals applicable to the original design.
9. Design documents and revisions thereto are distributed to responsible individuals and controlled to prevent inadvertent use of superseded material.
10. Design errors and deficiencies that adversely affect safety-related structures, systems, and components are documented, and appropriate corrective action is taken.
11. Design documents and reviews, records, and changes thereto are collected, stored, maintained, and controlled systematically.
12. Standard off-the-shelf commercial or previously approved materials, parts, and equipment essential to the safety-related functions of structures, systems, and components are reviewed for suitability of application before they are selected.
13. The persons or groups responsible for design reviews and other design verification activities and their authority and responsibilities are identified.
14. Design changes to non-safety-related items initiated and approved at the plant are controlled to ensure compliance with 10 CFR 50.59.
15. Processes used to select suitable materials, parts, equipment, and processes for safety-related structures, systems, and components includes the application of pertinent industry standards and specifications, material and prototype hardware testing programs, and design reviews.
16. Computer programs used in design are subject to design controls and program verification.

1B.4 PROCUREMENT DOCUMENT CONTROL

Methods of Purchase

Controls have been established to specify the sequence of actions to be followed in the preparation, review, approval, and control of procurement documents.

The acquisition and purchase of items or services by BG&E for the Calvert Cliffs plant are subject to controls that depend on

1. The classification of each item or service as safety-related or non-safety-related according to controls established by Electric Engineering personnel
2. The method used for acquisition or purchase

Acquisition and purchase of safety-related and non-safety-related items are initiated by a store order or requisition. Items classified non-safety-related and some non-safety-related services may be acquired or purchased in the same manner as items or services required for fossil plants, but copies of store orders or requisitions are sent to the Electric Engineering Department or the Quality Assurance Department for verification of the non-safety-related classification.

Controls for Specification Purchase

Controls have been established to ensure that safety-related items or services subject to the controls of the Specification Method are obtained only from vendors who have been approved by BG&E Responsible Design Organizations and Quality Assurance personnel.

BG&E Responsible Design Organizations ensure that, when applicable, the purchase specification

1. Contains or references technical requirements for the basis of design, including the applicable regulatory requirements, component and material identification requirements, drawings, specifications, Codes and industrial standards, test and inspection requirements, and special process instructions for such activities as welding, heat treating, nondestructive testing, and cleaning.
2. Identifies applicable requirements of 10 CFR 50, Appendix B, that must be complied with and described in the supplier's quality assurance program.
3. Requires that major contractors designated as BG&E agents to purchase safety-related items or services must have procurement controls to ensure that they purchase or acquire these items or services in compliance with applicable sections of ANSI N45.2.13.
4. Identifies required documentation (i.e., drawings, specifications, procedures, inspection and fabrication plans, inspection and test records, personnel and procedure qualifications, and material chemical and physical test results) to be prepared, maintained, and submitted, as applicable, to BG&E or the purchaser for review and approval.
5. Identifies records that must be retained, controlled, maintained, or delivered to BG&E or the purchaser before use or installation of hardware.
6. Specifies BG&E's or the procuring agency's right of access to supplier facilities and records for source inspection and audits.

Assigned quality assurance personnel review procurement specifications to verify the adequacy of quality requirements therein. This review determines that quality requirements are correctly stated, inspectable, and controllable; that there are adequate acceptance and rejection criteria; and that these procurement documents have been prepared, reviewed, and approved in accordance with quality assurance program requirements. Records of the quality assurance review and approval of procurement documents are made and kept available for verification.

Changes made to procurement specifications are subject to the levels of review, approval, and audit that were applied in preparing and processing the original documents.

The procurement documents for spare or replacement parts of safety-related structures, systems, and components are subject to controls at least equivalent to those applied for the original equipment.

Controls for Commercial Quality Purchase

Controls have been established to ensure that items or services available to the general industry will be sufficiently controlled to perform their safety-related function.

BG&E Responsible Design Organizations evaluate and document if an item or service is suitable for the Commercial Quality Method of purchase by evaluating:

1. The safety-related function of the item or service.
2. Critical operating requirements such as temperature, pressure, flow, seismic criteria, structural, power supply, cycling, and including environmental qualification testing as applicable.
3. Applicable National Codes or Standards.
4. Traceability or documentation requirements.
5. Circumstances which reduce the possibility of variation in quality among items such as:
 - tools, equipment, or processes used in the manufacture of the item which reduce the possibility of variations between finished products.
 - availability of identical or similar items from several suppliers.
 - use of the item in the general industry and length of period used.
 - use of identical items in non-safety-related applications with similar critical operating or reliability requirements.

The above evaluation is reviewed by the Quality Assurance Department.

Verification Method

The following controls have been established for conducting tests or measurements when it is not possible to specify controls to be applied during the manufacture of an item:

1. BG&E Responsible Design Organizations determine and document
 - a. Critical characteristics that must be controlled to ensure that the item can fulfill its safety-related function.
 - b. Tests or measurements required to establish that critical characteristics have been controlled.
 - c. Applicable handling, storage, and shipping requirements.
2. When tests or measurements are to be conducted by the supplier or another organization outside BG&E, the purchase of these services are treated as a Safety-Related (SR) Specification purchase, and thus subject to all the requirements of SR Specification purchase method.
3. When tests or measurements are to be conducted by BG&E, Responsible Design Organizations in BG&E shall document the applicable requirements and send the document to the Quality Assurance Department for review of the quality assurance requirements.

1B.5 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

Controls delineate the sequence of actions to be performed in the preparation, review, approval, and control of instructions, procedures, and drawings.

Controls require that

1. Methods for complying with each of the applicable criteria of 10 CFR 50, Appendix B, must be specified in instructions, procedures, and drawings.
2. Instructions, procedures, and drawings must specify appropriate quantitative (such as dimensions, tolerances, and operating limits) and qualitative (such as workmanship samples) acceptance criteria for verifying that important activities have been satisfactorily accomplished.

Controls ensure that

1. A Quality Assurance Policy is approved by the Vice Presidents of the Engineering and Construction, Supply, General Services, and Electric Interconnection and Operations Divisions.
2. Quality Assurance Procedures are developed by Departments responsible for conducting particular activities, reviewed and approved by the responsible Department Managers (including the Manager, Quality Assurance), and controlled by the Manager, Quality Assurance.
3. Department Procedures are approved and controlled by the responsible Department and are approved for quality assurance content by a member of the Quality Assurance Department.
4. Plant, Section, and Unit Procedures that control the topics, contents, review, approval, issue, distribution, and revision of Plant, Section, and Unit Procedures that specify how activities are to be performed are approved by a member of the Quality Assurance Department.
5. Other Plant, Section, or Unit Procedures that specify how activities are to be performed are controlled by the responsible organization and reviewed and approved within the responsible organization.

1B.6 DOCUMENT CONTROL

Controls have been established for documents required to control the conduct of safety-related activities. Controlled documents include the FSAR for the Calvert Cliffs Nuclear Power Plant; Quality Assurance Procedures in the BG&E Quality Assurance Manual for Nuclear Power Plants; Department, Section, Unit, and Plant Procedures that implement the Quality Assurance Procedures; specifications; and drawings.

Suppliers of materials, equipment, and services are required by procurement specifications to provide for control of documents, including instructions for manufacturing, inspection, and testing.

Quality Assurance Procedures are required to

1. Establish controls to ensure that regulatory requirements and BG&E commitments will be implemented

2. Describe interdepartmental interfaces and establish controls for interdepartmental activities
3. Specify how important activities, such as plant maintenance or in-service inspection, are to be performed, and give sufficient detail to control the performance of the activity or to ensure that requirements for lower-level procedures are clearly specified
4. Be prepared and controlled in accordance with one Quality Assurance Procedure that describes the format, sequence of topics, contents, review and approval, issue and distribution, and requirements for revision and record retention

During the review of each Quality Assurance Procedure, compliance with applicable criteria specified in 10 CFR 50, Appendix B, is verified and documented.

The Manager, Quality Assurance Department is responsible for issuing, revising, and controlling Quality Assurance Procedures.

Quality Assurance Procedures are developed by one of the departments responsible for the subject activities. Each Procedure is given a technical review by a member of one of these departments and a quality assurance review by a member of the Quality Assurance Department. Each is approved by the Manager, Quality Assurance and by the Managers of Departments to which responsibility is assigned or which are affected by the Procedure.

Department Procedures are prepared when interfaces or activities within a Department are not defined in a Quality Assurance Procedure or when they are needed to specify the content of Plant, Section, or Unit Procedures.

As needed, Department Procedures describe how requirements delineated in a Quality Assurance Procedure will be implemented at the Department level. They describe the interfaces between groups or units within a Department and specify requirements to be met by lower-level documents.

Individual Departments are responsible for preparing, issuing, revising, and controlling Department Procedures. These are prepared and controlled according to a Department Procedure that describes format, sequence of topics, contents, review and approval, issue and distribution, and requirements for revision and record retention.

Each Department Procedure is given a technical review by a member of the Department and a quality assurance review by a member of the Quality Assurance Department.

Plant, Section, or Unit Procedures are prepared to describe how requirements delineated for subgroups within a department will be implemented when these requirements are not delineated in sufficient detail in Quality Assurance Procedures or Department Procedures.

Functional groups within departments prepare, issue, revise, and control the Procedures that control their work. Group Procedures must be reviewed by a member of the Group, but are not reviewed by the Quality Assurance Department unless performance of the activities in question requires that a quality-control witness attest to compliance with the Procedures.

Group Procedures are prepared and controlled according to Control Procedures that describe format, sequence of topics, contents, review and approval, issue and

distribution, and requirements for revision and record retention. Control Procedures are reviewed and approved by a member of the Quality Assurance Department.

Organizations that issue instructions, procedures, specifications, or drawings are required to establish controls that ensure the following:

1. Changes to a document are reviewed and approved by the organization that performed the original review and approval unless the Control Procedure designates another qualified responsible organization.
2. Approved changes are promptly incorporated into instructions, procedures, drawings, and other documents associated with the change.
3. Obsolete or superseded documents are controlled to reduce the possibility of inadvertent use. Superseded documents retained for reference are marked and stored in separate files. Other superseded documents are removed from the files.

When changes to drawings or specifications are required, change requests are prepared by the organization that desires the change. Requests are reviewed and approved by BG&E Responsible Design Organizations.

1B.7 CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

Responsibility

Personnel in the Electric Engineering and Quality Assurance Departments determine whether contractors and suppliers who provide safety-related materials, components, equipment, and services are able to provide products and services of acceptable quality.

The quality of purchased material, equipment, components, and services is controlled by procurement documents, supplier selection, supplier surveillance, and receipt inspection.

Reviews, inspections, surveillance, and audits are conducted by personnel competent in establishing whether or not a supplier is capable of providing products of acceptable quality.

BG&E procurement documents require that

1. Certification must be furnished to identify
 - a. Purchased material or equipment by purchase order number
 - b. Specific procurement requirements (codes, standards, specifications, etc.) met by items
2. Non-conformances to the requirements of procurement documents or BG&E-approved documents that consist of one or more of the following must be submitted to BG&E for approval of the recommended disposition:
 - a. Technical or material requirements are violated.
 - b. Supplier documents approved by BG&E are violated.

- c. Non-conformances cannot be corrected by continuation of the original manufacturing process or by rework.
- d. The item does not conform to the original requirements even though it can be restored to a condition in which its capability to function is unimpaired.

Evaluation

BG&E Responsible Design Organizations coordinate the review and approval of non-conformances reported to BG&E by suppliers and ensure that dispositions of non-conformances are reviewed by the organizations responsible for the requirements that have been violated. For example, if a Quality Assurance program requirement has been violated, the Quality Assurance Department must review the supplier's disposition of the non-conformance.

Purchase orders placed by BG&E personnel for safety-related items or services controlled by procurement specifications are not placed with a supplier unless documents sent to Purchasing and Stores Department with the specification indicate that the supplier has been investigated as follows and found to have a satisfactory program or record:

- 1. The Engineering Quality Assurance Unit has verified that the supplier has an implemented quality assurance program that complies with either quality assurance program requirements specified in the procurement specification or proposed procurement specification, or applicable sections of ANSI N45.2.13 or other nationally recognized standards and regulations, as appropriate.

The Quality Assurance Department evaluates the suppliers' overall quality assurance organization and program in accordance with applicable codes and standards or parts of 10 CFR 50, Appendix B. Reviews include consideration of company organization, quality assurance procedures, qualification of quality assurance personnel, procedures for review and control of design documents, manufacturing procedures, calibration practices, acceptance criteria, required quality assurance records and their retention, and quality assurance requirements and controls imposed by the supplier on his subcontractors. Supplier evaluation is conducted by means of procedures or checklists that identify the quality assurance requirements of applicable codes or regulations.

Suppliers' quality assurance programs are evaluated in terms of at least one of the following:

- a. The supplier's history of supplying items or services to meet procurement requirements. If BG&E has had no experience with a supplier in the past two years, this supplier is asked to submit information for evaluation on a similar item or service (such as applicable drawings) or date of recent contracts with other utilities, with contractors to other utilities, or with the NRC or other government agencies or contractors working for such agencies.
- b. The supplier's current quality records, supported by documented qualitative and quantitative information that can be objectively evaluated by a review and evaluation of his quality assurance program, manual, and procedures as appropriate.
- c. The supplier's technical and quality capability as determined by an audit made at his plant to verify the extent to which his quality assurance program complies with regulatory requirements and the extent to which it is implemented.

2. BG&E Responsible Design Organizations have verified that the supplier is capable of supplying the goods or services specified in the procurement specification or proposed procurement specification.

The depth of supplier evaluation varies according to the complexity and importance to safety of the item involved. For example, for certain mass-produced or off-the-shelf items, only a check of past performance on similar items may be necessary. On the other hand, for complex, important items, a very thorough review is performed.

Surveillance

Supplier surveillance is performed if conformance with the requirements of the procurement specification for a particular item cannot be determined when the item is received. The purpose of such surveillance is to provide a sampling review of the implementation of the supplier's quality assurance program or of the conformance of his product to requirements of the purchase specification. BG&E Responsible Design Organizations and the Quality Assurance Department together determine the degree of supplier surveillance (including review, inspection, or audit) required during design, fabrication, inspection, testing, and shipping.

The BG&E policy on supplier surveillance is as follows:

1. If it is determined that supplier surveillance is required during the manufacture of a safety-related item or the performance of a safety-related service, the item or service may be obtained only by the Specification Method.
2. Surveillance or audits are not normally conducted on suppliers who are making replacements for safety-related items originally supplied by them, unless BG&E Responsible Design Organizations and Quality Assurance personnel agree that the impact of the item on plant safety requires BG&E verification that the requirements of the procurement specification are being met. When a supplier did not supply the original part and if the purchase of a safety-related replacement item requires the controls of the Specification Method of purchase, the ability of the supplier to supply the item to the requirements of the specification and the need for supplier surveillance are evaluated when the procurement specification is approved.
3. If it is determined that supplier surveillance or audits are required, these activities are conducted either by BG&E or by another organization approved by BG&E.
4. Surveillance of suppliers during fabrication, inspection, testing, and shipment of materials, equipment, and components is planned and performed in accordance with written procedures to ensure conformance to requirements of the purchase order. These procedures provide for instructions that specify the characteristics or processes to be witnessed, inspected or verified, and accepted; the method of surveillance and the extent of documentation required; and persons responsible for implementing these instructions.
5. When surveillance is required, the purchase order requires the supplier to interface with the designated surveillance organization to ensure that the requirements of the specification are met.
6. If a deviation from purchase order requirements is noted during surveillance, the BG&E representative has the authority to inform the supplier that a particular item is unacceptable.

Receipt

The Purchasing and Stores Department is responsible for receiving and storing materials, parts, and components.

Receiving inspection of material, equipment, and services is performed in accordance with the following:

1. It is verified that the material, component, or equipment is properly identified and that this identification corresponds with the documentation received.
2. Unless other procedures are specified in the shipping documents, items are visually inspected to verify that stated packaging and shipping requirements have been maintained.
3. Items are inspected upon receipt to verify that procurement requirements have been met.
4. Procurement records are inspected and judged acceptable in accordance with pre-determined inspection instructions before installation or use of material, components, or equipment.
5. Additional inspections or examinations are made if the item was not inspected at the source.

Documents supplied with received items are reviewed to verify compliance with the requirements of the purchase documents.

Inspection Procedures require that

1. Inspection records or certificates of conformance attesting to acceptance must be available at the nuclear power plant before material, components, and equipment may be released for installation or use. However, an unacceptable item may be given a "Conditional Release" if it can be made acceptable after installation but before the system that contains it is considered operational. Items released under "Conditional Release" must be controlled under the NCR system.
2. The inspection status of items accepted and released must be identified before the items are sent to a controlled storage area or released for installation or further work.

A written record of the results of receiving inspection and the disposition of received items is maintained as part of the permanent plant records. All safety-related items issued bear an acceptance tag and have documentation to support their acceptability. If traceability is lost or the documentation review is unsatisfactory, an item becomes subject to the controls established for non-conforming safety-related items.

Non-conforming items are handled according to documented procedures and, when practicable, are placed in a segregated area to prevent inadvertent installation or use until proper disposition is made.

IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTSPurchase

Controls established in procurement documents ensure that safety-related materials, parts, and components, including partially fabricated sub-assemblies, are identified to prevent the use of incorrect or defective material. They include the following:

Requirements for identification by use of heat number, part number, or serial number, or by other appropriate methods, are stated in procurement documents, drawings, procedures, guidelines, checklists, or store orders. The identification is placed on the item or on records traceable to the item so that the function and quality of the item are not affected. This identification is maintained throughout fabrication, storage, erection, installation, and use. Requirements for identification are determined during design or design-change activities, with input as appropriate from operations personnel.

The Manager, Purchasing and Stores assigns personnel within his Department to purchase, identify, store, and issue items as specified by the procurement controls and to provide for maintaining the integrity of items and their traceability to associated documents during storage and issue.

BG&E contractors and their sub-contractors are responsible for establishing programs for identifying and controlling materials, parts, and components under their jurisdiction.

Identification of materials and parts important to the function of safety-related structures, systems, and components can be traced to appropriate documentation such as drawings, specifications, purchase orders, manufacturing and inspection documents, deviation reports, and physical and chemical mill-test reports.

Organizations that fabricate safety-related items are made responsible for verifying that correct identification of materials, parts, and components is documented before items are released for fabrication, assembly, shipping, or installation.

Calvert Cliff's plant personnel are responsible for maintaining the same level of traceability of safety-related items during operation of the plant that was required during construction of the plant.

Receipt

Purchased safety-related items received at Calvert Cliffs are inspected to verify that all requirements of the procurement documents have been met. If a discrepancy is observed, such as damage or missing documentation, information to this effect is recorded on the receiving inspection report, and the discrepant item is tagged to indicate the non-conformance and placed in a separate "hold" area when practicable. If the item is acceptable, it is identified with a tag to indicate that it is approved for storage or installation and use. When groups of items in storage are subdivided, each subgroup is tagged.

If an item is found to be or is made discrepant during processing, a prominent "hold" tag is attached to the item, which is placed in a separate area when practicable.

Acceptance tags show traceability to a purchase order, drawing, specification, store order, or assembly and installation record. As individual items are assembled, installed, and inspected, their acceptance-tag numbers are recorded in plant maintenance and operation records.

After satisfactory completion of all required tests and inspections, acceptance tags and associated records that verify traceability are kept as part of the plant records.

1B.9 CONTROL OF SPECIAL PROCESSES

Controls

Controls have been established for writing, qualifying, approving, and issuing Procedures to control such special processes as welding, heat treating, and nondestructive testing used during the operation of Calvert Cliffs. Special Process Procedures

1. Are prepared in accordance with applicable codes, standards, specifications, criteria, and other special requirements
2. Ensure that special processes are performed by qualified personnel according to qualified Procedures that comply with applicable regulatory requirements
3. Specify requirements for control, parameters to be considered, acceptable methods of documentation, and the codes, standards, specifications, or criteria which govern the qualification
4. Define the necessary qualification of personnel, Procedures, or equipment when special processes are not covered by existing codes or standards or when quality requirements for an item exceed the requirements of established codes or standards.

BG&E contractors and their sub-contractors are responsible for controlling special processes used by them and for maintaining records to verify that special processes are performed in accordance with requirements established by the portions of their quality assurance programs that apply to special processes.

Qualification of Methods

Procedures, equipment, and personnel connected with special processes are qualified in accordance with applicable codes, standards, specifications, or supplementary requirements as follows:

1. Welding activities conducted by BG&E are performed according to welding procedure specifications qualified in accordance with applicable welding requirements of the ASME Code. Each welding procedure specification is written, qualified, and approved in accordance with a controlling documented procedure. Copies of welding procedure specifications are made available to welders and when required, to Authorized Inspectors. Before contracting for welding, the Principal Metallurgist reviews and approves non-BG&E welding procedure specifications and procedure qualification records in accordance with a written Procedure.
2. Heat-treating requirements included in welding procedure specifications are established in conformance with heat-treating requirements of the applicable ASME Code.

3. Nondestructive Examinations are performed to written Procedures proved by actual demonstration, when practicable, to the satisfaction of the Principal Metallurgist and, when required, the Authorized Inspector. These Procedures are prepared according to appropriate sections of the ASME Code for particular examination methods. Procedures, personnel qualifications, and the records that verify the Performance of Nondestructive Examinations are kept as nuclear plant records.

Nondestructive Examination Procedures describing methods not described in the ASME Code and/or SNT-TC-1A and its Supplements are at least equivalent to those recognized by the American Society of Mechanical Engineers and the American Society for Non-destructive Testing. Training programs acceptable to the Principal Metallurgist are developed to complement these alternative methods and to establish the capability of personnel to perform the required examination according to BG&E Procedures and to the level of performance to which the individual will be certified.

Methods of Nondestructive Examination include, but are not restricted to, radiographic, ultrasonic, liquid-penetrant, magnetic-particle, eddy-current, visual, and leak-testing examinations. Procedures are prepared to cover these examinations in accordance with a Quality Assurance Procedure that details the specific examination, requirements for approval, and contents of the Procedure, such as certification level, accept/reject criteria, examination coverage and sequence, surface preparation, test equipment, records required, permissible marking, cleanup requirements, and reference to applicable sections of the ASME Code.

Qualification of Personnel

Special processes are performed by certified personnel using written process sheets, shop procedures, checklists, and travelers (or equivalent), with recorded evidence of verification as follows:

1. BG&E welders, and welders under contract to BG&E, are qualified and certified in accordance with the requirements of Section IX of the ASME Code and the welding procedure specifications they will be using when welding. The Principal Metallurgist maintains records of the welding procedure specifications, including essential variables under which the welders are examined, and the results of the examinations. A welder is not permitted to weld safety-related items until an appropriate performance qualification record, a letter of certification, or, in an emergency, verbal clearance from the Principal Metallurgist, is on file at Calvert Cliffs. Each welder is required to be requalified as specified in the applicable code.
2. Non-BG&E welders are not permitted to weld safety-related items until they are qualified and certified in accordance with Section IX of the ASME Code to the welding procedure specification they will be using.
3. Nondestructive Examination personnel employed by or responsible to BG&E are certified according to applicable sections of the ASME Code and/or SNT-TC-1A and its Supplements. BG&E employees are trained and certified in accordance with a written Procedure. Non-BG&E personnel are qualified to Procedures approved by BG&E, and their qualifications and certifications of personnel are verified according to written Procedures.

Qualification records of procedures, equipment, and personnel associated with special processes conducted by BG&E are filed and kept current by the Principal Metallurgist.

The General Supervisor, Operations Quality Assurance provides independent verification that special processes are performed by qualified personnel.

Activities that affect the quality of safety-related items are inspected as specified in approved instructions, procedures, and plans which set forth requirements and acceptance criteria to ensure that work is done in conformance with particular requirements.

Controls exercised during inspections ensure that

1. Personnel who perform quality control inspections are independent of the personnel who performed the activity being inspected
2. Inspection procedures or instructions, with necessary drawings and specifications for use, are available before inspection operations are performed
3. In the case of special processes, inspectors are qualified, and their qualifications comply with applicable codes and standards
4. Test and measuring equipment is calibrated within required limits
5. Inspection Procedures, as applicable, specify objective acceptance criteria, prerequisites for performing inspections, limiting conditions, requirements for special equipment and quality control hold-points at which inspections are to be witnessed
6. Appropriate inspection requirements are established for modification, repair, and replacement
7. Quality Assurance Department inspectors are qualified in accordance with appropriate codes, standards, and Company training programs, and their qualifications and certifications are kept current
8. Procedures for maintenance, modification, and receipt inspections are reviewed by quality control personnel to determine the need for independent inspection and the degree and method if such an inspection is required, and to ensure the identification of inspection personnel and the documentation of inspection results
9. Procedures for Nondestructive Examination and Nuclear Fuel Inspection are reviewed by qualified personnel in the Nuclear Power and Production Maintenance Departments to determine the need for independent inspection and the degree and method if such an inspection is required, and to ensure the identification of inspection personnel and the documentation of inspection results
10. Inspection results are recorded, evaluated, and retained

Inspection procedures, instructions, and checklists used by quality control personnel provide the following:

1. Identification of characteristics to be inspected
2. Identification of individuals or groups responsible for performing the inspection
3. Acceptance and rejection criteria
4. Description of the method of inspection

5. Identification (including revision number) of required procedures, drawings and specifications
6. Identification of inspector or data recorder
7. Verification of completion and certification of inspection
8. Record of results of inspection
9. Provision for identifying mandatory inspection hold-points for witness for an authorized inspector or BG&E inspection personnel
10. Provision for indirect control by monitoring processing methods, equipment, and personnel if direct inspection is not possible
11. Specification of necessary measuring and test equipment including requirements for accuracy.

The General Supervisor, Operations Quality Assurance is responsible for the preparation and implementation of Procedures for surveillance and inspection activities conducted by BG&E personnel in their areas of responsibility.

Other inspections are conducted randomly to verify that overall plant operations are being conducted according to approved Procedures and to ensure that the use of jumpers is properly documented; that equipment is returned to operating status after test, modification, or repair; that instruments are properly calibrated; and that personnel who perform tests are properly trained and qualified.

In-service inspections are performed on pressure-containing components within the reactor coolant system boundary according to requirements of the Technical Specifications.

In-service inspections and examinations on components designated Class I or Class II by the ASME Code are witnessed or otherwise verified by an authorized Code Inspector who is responsible for ensuring that the work is performed by qualified personnel according to written qualified Procedures. Records of in-service inspections, results, corrective action required and taken, inspection standards required for repair, and results of inspection of repairs are maintained and compared with the results of subsequent examination.

1B.11 TEST CONTROL

To demonstrate the ability of safety-related structures, systems, and components to function as designed, they are subjected to a program of surveillance and operational testing. Procedures specify the systematic development, review, approval, and conduct of tests and review of test results. Conditions such as failures, malfunctions, deficiencies, deviations, and non-conformances discovered during testing are documented and evaluated.

Whenever testing is required to demonstrate that safety-related material, parts, components, or systems will perform satisfactorily in service, a test program is established and Procedures are used that have been written and approved in accordance with basic requirements.

The Nuclear Power Department conducts tests to verify that plant behavior conforms to design criteria, ensure that failure and substandard performance are identified and controlled, and demonstrate satisfactory performance after plant modification and maintenance activities.

Written Test Procedures are developed, reviewed, and approved before testing is performed. They specify instructions for testing, methods of test, test equipment, and instrumentation; and for the following as applicable:

1. Adequate and appropriate equipment
2. Preparation, condition, and completeness of item to be tested
3. Suitable and controlled environmental conditions
4. Mandatory inspection hold-points for witness by BG&E inspection or authorized inspector personnel
5. Provision for data collection and storage
6. Acceptance and rejection criteria
7. Methods of documenting or recording test data and results
8. Provision for ensuring that test prerequisites have been met

Test results are documented and evaluated; they are accepted or rejected by a qualified, responsible individual or group.

With the exception of completed surveillance tests performed without malfunctions or out-of-specification data, results of tests are reviewed and evaluated by the Plant Operations and Safety Review Committee and accepted and approved by the Plant Superintendent. Test records are kept in sufficient detail to make possible an evaluation of test results and to show how individual tests demonstrate that safety-related structures, systems, and components and the plant as a unit can operate safely and as designed. Safety-related test records are retained as plant history records.

IB.12

CONTROL OF MEASURING AND TEST EQUIPMENT

Calibration controls have been established to prescribe the technique and frequency of calibration, maintenance, and control of measuring and test instruments, tools, gauges, fixtures, reference and transfer standards, and nondestructive test equipment used in measuring, inspecting, and monitoring safety-related components, systems, and structures during the operations phase of Calvert Cliffs.

Personnel of the following functional organizations control, calibrate, and adjust measuring and test equipment:

Electric Test Department

Nuclear Power Department --Electrical and Controls
--Operations
--Radiological Support

Production Maintenance
Department

--Mechanical Maintenance

Calibration controls require each group to identify measuring and test equipment and calibration test data related to it.

Written procedures are prepared and implemented to ensure that tools, gauges, instruments, and related test and measuring devices are of proper accuracy to verify conformance to established requirements.

Manufacturer's Procedures are used for calibration when available; otherwise; a Procedure is prepared for each category of measuring and test equipment as necessary. These Calibration Procedures contain the following information:

1. Identification of the item to be calibrated and its period of calibration
2. Standards to be used, specific test-points, and checks, tests, and measurements to be made
3. Acceptance criteria to be used and special precautions to be taken when necessary.

Measuring and test equipment that require calibration are assigned an identifying serial number. Instruments are calibrated at specified intervals according to the required accuracy, purpose, degree of usage, stability characteristics, and other conditions that affect the measurement.

When equipment is found out of calibration, an evaluation is made by the Supervisor responsible for that equipment to determine any adverse effect on items previously accepted on the basis of using that equipment.

Test and measuring equipment that cannot be adjusted to required tolerances during calibration is identified and placed in a designated segregated area; if the equipment can be used in limited applications, the limitations are identified.

The status of each item controlled under the calibration system is recorded and maintained. Equipment is marked or records of calibrations are maintained to indicate calibration status. An interval of calibration is established for each item of measuring and test equipment and recorded on a master record of calibrations prepared as a calibration schedule.

Measuring and test equipment is controlled to prevent the use of uncalibrated or defective equipment, the spread of radioactive contamination, the introduction of impurities into high-purity systems, and damage to or loss of equipment. Identification tags are placed on measuring and test equipment to indicate such special conditions as radioactive cleanliness, special limitations, or failure to meet established calibration requirements.

Measuring and test equipment is calibrated and adjusted at specified intervals, or before use, against certified standards. Reference and transfer standards are traceable to nationally recognized standards; or, where national standards do not exist, provisions are established to document the basis for calibration.

1B.13

HANDLING, STORAGE, AND SHIPPING

Appropriate and special requirements for handling, preservation, storage, cleaning, packaging, and shipping of safety-related items are specified in procurement documents.

Procedures have been established to ensure that the handling, preservation, storage, cleaning, packaging, and shipping of safety-related items are performed in accordance with specified requirements to reduce the likelihood of damage, loss, or deterioration by such environmental conditions as temperature or humidity.

Special handling, preservation, storage, cleaning, packaging, and shipping activities associated with safety-related items are performed by suitably trained personnel in accordance with specific written procedures.

Controls have been established for the safe storage of hazardous materials. Items with a limited shelf-life are controlled to ensure that they will not be used in safety-related applications after expiration of designated shelf-life periods.

1B.14

INSPECTION, TEST, AND OPERATING STATUS

Controls have been established for the application and removal of status indicators such as tags, markings, labels, and stamps to ensure that the inspection, test, and operating status of safety-related structures, systems, and components is clearly indicated at all times.

Procedures are prepared to identify and control inspection, testing, and operating status by the use of logs, forms, and tags that identify the inspection, test, and operating status of structures, systems, and components; control the use of indicators, including the authority for their application and removal; control bypassing operations, such as jumping or temporary removal of electrical leads; and identify non-conforming, inoperative, or malfunctioning structures, systems, or components.

Incoming materials and parts are inspected, tested, and controlled according to written procedures. Materials and parts are inspected for quality of physical characteristics and compliance with documentation; those that meet acceptable criteria are appropriately identified.

Senior Shift Personnel are responsible for aligning, isolating, and appropriately tagging equipment and systems so that activities affecting quality can be performed.

The Supervisor, Operations Quality Assurance performs surveillance to verify that the inspection, testing, and operating status of structures, systems, and components are properly identified and controlled during operation, maintenance, and testing of the plant.

The bypassing of required inspections, tests, and other critical operations is controlled to ensure that bypassed inspections or tests are properly documented and that the effect of bypassing the inspection or test is evaluated by the organization responsible for specifying the inspection or test. Controls have been established to ensure that the status of non-conforming, inoperative, or malfunctioning safety-related structures, systems, or components is identified to prevent inadvertent use.

1B.15

NON-CONFORMING MATERIALS, PARTS, AND COMPONENTS

Controls have been established for identifying, documenting, segregating, reviewing, reporting, and disposing of non-conforming materials, parts, components, or services.

All persons involved who recognize Conditions Adverse to Quality are responsible for reporting such conditions promptly to supervisory or Quality Assurance personnel. Conditions Adverse to Quality are evaluated to determine whether work shall be stopped or the condition reported to the NRC.

Non-conformance controls require preparation by Quality Assurance personnel of a Non-conformance Report that describes the non-conformance. Non-conformance Reports are submitted to Responsible Departments for resolution. Designated Quality Assurance personnel have responsibility and authority for approving the resolution of non-conformances.

A Non-conformance Report is not closed out until the Quality Assurance Department has verified that the Responsible Department has specified and completed corrective and preventive action as necessary.

The acceptability of rework, repair, or replacement of materials, parts, components, systems, and structures is verified by reinspecting the item as originally inspected or by using a method at least equivalent to the original inspection method, and such inspection, rework, and repair procedures are documented.

Items classified as non-conforming are identified by non-conformance tags and segregated when practicable, to prevent inadvertent installation or use until the non-conformance has been properly dispositioned. Only Quality Assurance Department personnel are authorized to attach, remove, or alter a non-conformance tag. Tags are removed only after satisfactory resolution of the non-conformances.

Non-conformance Reports are periodically analyzed by personnel of the Operations Quality Assurance Section to show quality trends; results are sent to the Off-Site Safety Review Committee.

1B.16

CORRECTIVE ACTION

Controls have been established to ensure that Conditions Adverse to Quality are identified and that corrective action is initiated to preclude recurrence.

Non-conformances are evaluated to determine the need for corrective action. The Plant Superintendent is informed of a non-conformance that might require the NRC to be notified. He evaluates the information and reports it as necessary. To preclude the recurrence of conditions adverse to plant safety, prompt corrective action is initiated when a non-conformance is identified. Non-conformances are documented on Non-conformance Reports that cannot be closed out until Responsible Departments specify appropriate corrective and preventive action and the Quality Assurance Department verifies that such action has been taken.

Non-conformances found during audits or surveillances conducted by BG&E are documented by Quality Assurance Department personnel, who verify that Responsible Departments have taken adequate corrective action to prevent recurrence.

The foregoing controls ensure that adverse conditions significant to quality, the cause of the conditions, and the corrective and preventive action taken are reported to appropriate levels of both off-site and on-site management.

1B.17 QUALITY ASSURANCE RECORDS

Controls have been established to ensure that Quality Assurance records are maintained to provide documentary evidence of the quality of safety-related items and activities. Applicable design specifications, procurement documents, test Procedures, Operational Procedures, QA Procedures, Technical Specifications, and other documents specify records that should be generated, supplied, or maintained by and for BG&E.

Quality Assurance records are classified as lifetime or non-permanent.

Lifetime records, maintained for particular items for the life of the Calvert Cliffs plant, for particular items have significant value in relation to demonstrating capability for safe operation; maintaining, reworking, repairing, replacing, or modifying an item; determining the cause of an accident or malfunction of an item; and providing required baseline data for in-service inspection.

Non-permanent records, which show evidence that a safety-related activity was performed in accordance with applicable requirements, are retained for periods sufficient to ensure BG&E's ability to reconstruct significant events and to satisfy applicable regulatory requirements. Retention periods are specified in the Technical Specifications or in Procedures that control the performance of activities.

Procurement documents specify supplier responsibilities for the generation, retention, and submission to BG&E of Quality Assurance documentation related to the fabrication, inspection, and test of safety-related items and services.

Inspection and test records contain the following as appropriate:

1. Description of the type of observation
2. Date and results of inspection or test
3. Information related to noted discrepancies, including action taken to resolve them
4. Identification of inspector or recorder of data
5. Statement as to acceptability of results.

Controls have been provided to ensure that records are protected from possible destruction. Within established time-intervals, completed lifetime records are transmitted to the Nuclear Plant Documents Unit for incorporation into the Record Retention and Retrieval System.

1B.18 AUDITS

Internal audits are performed by the BG&E Quality Assurance Department to ensure that activities and Procedures established to implement the requirements of 10 CFR 50, Appendix B comply with BG&E's overall Quality Assurance Program. These audits

provide a comprehensive independent verification and evaluation of quality-related activities and Procedures. Audits ensure the effective and proper implementation of BG&E's Quality Assurance Program. They are scheduled on the basis of the importance to safety of activities being performed.

Supplier audits are performed to evaluate quality assurance programs, procedures, and activities. Audits of major suppliers are made early enough to ensure compliance with all aspects of BG&E's procurement documents. Additional audits are performed as required to ensure that all requirements of BG&E's Quality Assurance Program are properly implemented according to procurement documents.

Audits of designated activities as required by the Technical Specifications are performed under cognizance of the Off-Site Safety Review Committee.

Audits are performed in accordance with pre-established written procedures or checklists by qualified Quality Assurance personnel who have no direct responsibility for the work being audited. Technical specialists from other BG&E departments and outside consultants may assist as necessary in performing audits. Audits include objective evaluation of quality-related practices, procedures, instructions, activities, and items, as well as review of documents and records.

Reports of audits are analyzed and documented. Results that indicate the Quality Assurance Program to be inadequate, ineffective, or improperly implemented, including the need for re-audit of deficient areas, are reported to the Manager and Supervisor of the audited activity. Controls have been established for verifying that corrective action is taken promptly to correct noted deficiencies.

To ensure that BG&E's Quality Assurance Department complies with the requirements of BG&E's Quality Assurance Program, an independent management audit of Quality Assurance Department activities is performed annually by a Joint Utility Management Audit Team.

TABLE 1B-1

BALTIMORE GAS AND ELECTRIC COMPANY'S POSITION ON GUIDANCE CONTAINED IN ANSI STANDARDS

Revision of Industry Standards Applicable to the BG&E C/A Program

Requirement

Some of the Industry Standards listed in Section 1B.2 identify other Standards that are required, and some Regulatory Guides define the revisions of those Standards that are acceptable to the NRC.

Response

The Baltimore Gas and Electric Company's Quality Assurance Program was developed to respond to the specific revision of the documents listed in Section 1B.2 and is not necessarily responsive to other documents listed in the referenced Industry Standards.

ANS 3.2 - 1976

Item 1

Requirement

Section 2.0 defines "Onsite Operation Organization" and "Operating Activities." Both definitions imply that the same organization performs both operations activities and maintenance activities.

Response

BG&E's Production Maintenance Department performs mechanical maintenance and modification; the operating organization at Calvert Cliffs performs maintenance on electrical equipment and on instrument and control equipment.

Item 2

Requirement

Section 5.2.15 requires that plant procedures shall be reviewed by an individual knowledgeable in the area affected by the procedure every two years to determine if changes are necessary or desirable.

Response

BG&E applies this requirement of a two-year review to all plant procedures except test procedures performed less often than every two years or at unspecified frequencies. These are reviewed no more than 60 days before performance.

Reason

Technical Support Procedures (TSPs) and others like them are written for a one-time-only performance and kept for reference for future similar tests. If they are used again, they are reviewed and modified to meet conditions existing at the time of performance.

Some Surveillance Test Procedures (STPs) are performed every three to five years. They too are reviewed before each performance to ensure that they are compatible with existing conditions and responsive to current needs.

ANSI N45.2.1 - 1973

Requirement

Subsection 3.2 outlines requirements for demineralized water.

Response

BG&E specifications for demineralized water are different than the specifications outlined in the standard.

Reason

BG&E specifications for demineralized water are consistent with guidelines provided by the Nuclear Steam Supply System supplier. BG&E specifications are generally more restrictive than those specified by ANSI N45.2.1.

ANSI N45.2.2 - 1972

Item 1

Requirement

Subsection 2.4 could be interpreted to mean that on-site and off-site personnel who perform any inspection, examination, or testing activities related to the packing, shipping, receiving, storage, and handling of items for nuclear power plants shall be qualified in accordance with ANSI N45.2.6.

Response

Baltimore Gas and Electric Company requires that only persons who are responsible for approving items for acceptance shall be qualified in accordance with ANSI N45.2.6, and that personnel who verify that storage areas meet requirements will be qualified to either ANSI N45.2.6 or ANSI N45.2.23.

Reason

Our receipt inspection procedures require persons who approve items for acceptance to be qualified in accordance with ANSI N45.2.6. QA inspectors or auditors verify

that storage areas meet requirements. All other inspection, examination, and testing activities are subject to review by persons qualified to ANSI N45.2.6.

Item 2

Requirement

The second sentence of Subsection 2.4 requires that

Off-site inspection, examination, or testing shall be audited and monitored by personnel who are qualified in accordance with ANSI N45.2.6.

Response

BG&E uses personnel qualified in accordance with ANSI N45.2.23 to perform auditing and monitoring functions.

Reason

The qualification requirements for auditors cannot always be met by persons qualified to ANSI N45.2.6.

Item 3

Requirement

Subsection 2.7 requires that activities covered by the Standard shall be divided into four levels, though recognizing that within the scope of each level there may be a range of controls depending on the importance of the item to safety and reliability.

Response

1. The level of protective measures defined by Subsection 2.7 are applied to Specification purchases.
2. Personnel of BG&E's Electric Engineering Department will determine the level of protective measures to be applied to Catalog, Commercial Quality, etc., Methods of Purchase.

Reason

BG&E's position is as follows:

1. For Catalog and Commercial Quality items, it is not always possible to assign a level of classification in accordance with ANSI N45.2.2, as most items are purchased after they have been packaged by the manufacturer and shipped to his local agent, the wholesaler.
2. Experience has shown that the level of protection assigned to Catalog and Commercial Quality items by Suppliers is adequate.

Item 4

Requirement

Subsection 3.0 specifies detailed requirements for packing items for each level defined in Subsection 2.7.

Response

BG&E has replaced Section 3.0 with the following:

1. Packaging for Shipment to BG&E

Personnel of BG&E's Electric Engineering Department shall ensure that procurement documents for Specification purchases either indicate that the normal methods of packaging and shipment used by industry in general are acceptable for the items being procured or specify the level of protection assigned to the item and the requirement that the supplier conform to applicable requirements for items in that classification defined in Regulatory Guide 1.38, Rev. 2 - March 1977.

2. The normal methods of packaging used by the industry in general are acceptable for items being procured by Commercial Quality, Catalog, etc., Methods of Purchase.

3. Packaging for Storage by BG&E

In general the packaging used by the supplier to ship items for all types of purchases to BG&E need not be retained after the item is received by BG&E, provided that the item is stored in an area that meets the requirements for a storage area for the level of protection assigned to the item. Special or unique items, however, may require special protective measures. For such unusual items, the Department that initiated the purchase, together with Electric Engineering, shall identify if any of the requirements of Section 6.4.2 of ANSI N45.2.2 - 1977 apply.

Reason

1. This substitution will ensure that the item will receive adequate protection during shipment and storage, thus eliminating unnecessary restrictions and enabling BG&E to use commercial sources to the utmost.
2. Experience shows that industrial practices for packaging Commercial Quality and Catalog items are adequate for most applications.

Item 5

Requirement

Section 4.0 defines shipping requirements related to the protection levels assigned to items.

Response

BG&E has replaced Section 4.0 with the following:

Shipping to BG&E

1. BG&E will invoke the requirements for shipping specified in Section 4.0 of ANSI N45.2.2 - 1972 on Specification purchases only when Electric Engineering Department personnel have specified in procurement documents that the item shall be packaged in conformance with ANSI N45.2.2, Section 3.0.
2. BG&E will not invoke the requirements of ANSI N45.2.2 - 1972, Section 4.0, on Commercial Quality, Catalog, etc., Methods of Purchase.

Shipping from BG&E

Items shipped from BG&E need not conform to any of the requirements of ANSI N45.2.2, but the organization that packs and handles the item shall provide roughly the same level of protection that the item was given during shipment to BG&E.

Reason

If Engineering personnel have determined that the supplier's methods of packaging are acceptable, they have already determined that the supplier's methods of shipping are adequate. As items are shipped from BG&E only for repair, the detailed requirements specified in Section 4.0 of ANSI N45.2.2 are not necessary.

Item 6

Requirement

Subsection 6.4 gives detailed requirements for care of items in storage, according to the protection levels assigned to the items.

Response

BG&E does not require items to be stored in the packing used for shipment if the storage level in the area provides the same protection as the level of packing assigned to the items. Caps, covers, etc., will be required only if specified by Electric Engineering personnel during the procurement process. If an item is taken from one storage area to another, however, the persons who move it are responsible for ensuring, as applicable, that additional packing is supplied to give adequate protection during transportation.

Reason

The degree of protection given an item during storage should be tailored to the importance of the item to safety and the probability of deterioration during storage; to base storage requirements purely on the categories in Subsection 2.7 of ANSI N45.2.2 - 1972 is impractical. BG&E requires Electric Engineering personnel to specify requirements more closely related to the actual function of items and to storage conditions.

Item 7

Requirement

Subsection 7.3.3 requires compliance with a series of ANSI documents.

Response

BG&E controls for the use of hoisting equipment are compatible with the Standards listed in Subsection 7.3.3 of ANSI N45.2.2, although at the discretion of the Plant Superintendent they need not be compatible with documents referred to in these documents.

Reason

Lower-level documents referred to in the documents listed in Subparagraph 7.3.3 will not necessarily affect the ability of BG&E personnel to properly handle Safety-Related items and could lead to confusion.

ANSI N45.2.3 - 1973

Item 1

Requirement

Subsection 2.1 outlines housekeeping cleanness requirements for five designated zones.

Response

BG&E has established three classes for cleanness requirements. There is no class equivalent to the ANSI Zone 1. Requirements of ANSI Zones 4 and 5 have been consolidated into BG&E's class 3.

Reason

1. ANSI Zone 1 level of cleanliness applies to new construction activities.
2. Where required, smoking restrictions are posted for BG&E's class 3 areas.

Item 2

Requirement

Subsection 2.1 requires for Zones I, II, and III, that a written record of the entry and exit of all personnel and material shall be established and maintained.

Response

BG&E has established the following methods for personnel and material accountability:

1. Written accountability.

2. Where possible tethering of tools and materials to permanent plant structures or persons.
3. Post-maintenance closeout inspections.

Reason

BG&E's three methods of accountability offer the same level of control as that required by the standard.

ANSI N45.2.6 - 1978

Item 1

Requirement

Subsection 1.2 states in part,

The requirements of this standard apply to personnel who perform inspection, examination, and tests during fabrication prior to and during receipt of items at the construction site, during construction, during preoperational and start-up testing, and during operational phases of nuclear power plants.

Response-A

Personnel of BG&E's Quality Assurance Department who perform inspections, examinations, and tests at the plant site during operational phases of the nuclear power plant are required to be qualified in accordance with ANSI N45.2.6. All other BG&E personnel who perform inspection, examination, and testing functions associated with normal operations of the plant are qualified either to ANSI N45.2.6 or to ANSI N18.1 - 1971.

Reason-A

1. The individuals who perform inspection, examination, and testing functions associated with normal operation of the plant, such as maintenance and certain technical reviews, are normally qualified to ANSI N18.1 - 1971.
2. Some testing activities conducted during normal operation of the plant, such as surveillance testing, do not require that test personnel meet the requirements specified in Paragraph 4.5.3 of ANSI N18.1 for technicians. Personnel qualified to ANSI N45.2.6 are adequately qualified to conduct such testing.

Response-B

BG&E does not always require supplier personnel performing inspection or test activities to comply with the requirements of N45.2.6 but evaluates the need for invoking N45.2.6 on the supplier during the review of procurement documents. The requirements are not applied to Commercial Quality or Catalog methods of procurement.

Reason-B

BG&E's position is as follows:

1. For replacement items purchased by the Catalog, Commercial Quality, and Verification Methods of procurement, the purchaser is unable to specify the qualification requirements for inspection, examination, and test personnel because the items are manufactured before placement of the Purchase Order.
2. For the Specification Method of procurement, the qualification requirements for inspection, examination, and test personnel are determined by
 - a. item status (new or replacement)
 - b. complexity and importance of item
 - c. manufacturer's QA program approval level (Appendix B, N45.2, etc.)

Response-C

BG&E does not require personnel who perform specific limited and repetitious inspection functions, such as inspection for removal or replacement of snubbers, to be trained as required by N45.2.6.

Reason-C

Inspections, examinations, or tests that are repetitious or of limited scope need not be performed by individuals qualified to the requirements of ANSI N45.2.6 provided that they receive instruction in the following:

1. Activities to be verified
2. Acceptance criteria
3. Method of documenting results
4. Method of reporting deficiencies

The person responsible for the inspection activity ensures that such instruction is given to inspectors before they perform specific inspection functions, and that both this training and the acceptability of the results of the inspection are documented.

Response-D

When it is necessary to monitor the activities of a supplier, BG&E uses personnel qualified as auditors in accordance with ANSI N45.2.23 or inspectors in accordance with ANSI N45.2.6.

Reason-D

Both ANSI N45.2.6 and N45.2.23 establish training requirements suitable for monitoring supplier activities.

Item 2

Requirement

Table 1 specifies that Level III personnel shall be capable of qualifying Level III personnel.

Response

When there is only one Level III position or when a new Level III position is created, BG&E personnel with the title General Supervisor or higher qualify Level III personnel.

Reason

BG&E personnel in these grades are capable of certifying Level III personnel without being trained as Level III inspectors.

ANSI N45.2.9 - 1976

Item 1

Requirement

Section 4.0 titled "Receipt," gives instructions for receipt controls.

Response

BG&E applies these requirements only to the receipt of records by the Plant History File.

Reason

Most records received by such organizations as Incoming Inspection, Engineering, etc., are not shipped in a manner that makes these requirements applicable. These requirements are applicable, however, when the records are finally turned over to the Plant History File.

Item 2

Requirement

Subsection 5.6.1 reads as follows, "Design and construction of a single record storage facility shall meet the following criteria:" Items a) and b) of the subsection state that:

- "a) Reinforced concrete, concrete block, masonry, or equal construction."
- "b) A floor and roof with drainage control. If a floor drain is provided, a check valve (or equal) shall be included."

Response/Reason

Item a

The intent of this requirement is both structural integrity and fire resistance. This vault is entirely enveloped by a structurally sound, fire resistive building. Second, the vault rests on a reinforced slab on grade and its walls extend fully to the underside of the structural deck. Third, the walls of the vault are constructed of gypsum wallboard on metal studs per Underwriters Laboratory Test Number U412, assuring the equivalent of 2 hour fire resistive construction. This is equal construction to concrete block in terms of fire protection. The walls carry no structural load; hence, they provide equivalent structural integrity to that needed of concrete block.¹

Response/Reason

Item b

Again, the vault is contained within an environmentally protected building. As such it has no roof, or need for floor drain.

Item 3

Requirement

Subsection 5.6 allows only the dual facility defined in Subsection 5.6.2 as an alternative to the single facility defined in Subsection 5.6.1.

Response

BG&E allows the following alternative storage requirements for organizations other than the Plant History File:

Organizations that originate records and do not transfer them to the Plant History File within 30 days of completion shall establish one of the following three controls as alternatives to the requirements specified for the Plant History File:

1. Duplicate Storage

Either A or B:

A. Within 30 days of completion of a record, a duplicate record file shall be established. This activity shall be controlled by procedures which provide for the following:

¹These responses have been forwarded to the NRC by the BG&E letter dated 02/11/83 from Robert G. Nichols, Sr. Facilities Project Administrator, Real Estate and Office Services Department, to Terry L. Harpster, Chief QA Branch, Division of QA, Safeguards and Inspection Programs, IE, USNRC. These responses have also been accepted by the NRC in their letter dated 04/22/83 from Walter P. Haass, Deputy Chief, QA Branch, Division of Quality Assurance, Safeguards, and Inspections Programs, Office of Inspection and Enforcement.

1. Assignment of responsibility for records
2. Description of storage area
3. Description of filing system
4. An index of the filing system
5. Rules governing access to and control of files
6. Methods for maintaining control of and accountability for records removed from the file
7. Method for filing supplemental information and disposing of superseded or obsolete records
8. Method for preserving records to prevent deterioration
9. Method for maintaining specially processed records that are sensitive to light, pressure, or temperature
10. Transfer of duplicates to the Nuclear Plant Documents Unit within two years of completion of records

B. Make arrangements with at least one other department that receives a copy of each document to subject this other copy to the controls specified above.

2. Fire-resistant Building Storage

1. Records shall be stored in steel cabinets located in a fire-resistant building or a non-combustible building with a fire suppression system.
2. The procedural controls defined for duplicate storage shall be applied.

3. Non-fire-resistant Building Storage

Within non-fire-resistant facilities, records shall be stored in UL one-hour-minimum fire-rated storage cabinets and be subject to the procedural controls defined for duplicate storage.

BG&E defines a Fire-resistant Building as follows:

A facility constructed to resist the initiation or spreading of fire; non-combustible and/or fire-suppressive materials used; building certified as fire-resistant by the Fire Prevention Unit of BG&E's Finance Department

Reason

Although these alternatives are compatible with standard methods of handling records, they do not materially decrease the level of protection afforded to the records.

ANSI N45.2.23 - 1978

Item 1

Requirement

2.3 Qualification of Lead Auditors

Section 2.3.1 requires prospective Lead Auditors to obtain a minimum of ten credits under the scoring system defined in paragraphs 2.3.1.1-2.3.1.4.

Response

BG&E has revised the scoring system as follows:

Education and Experience

The prospective Lead Auditor shall have accumulated a minimum of ten credits under the following scoring system:

1.0 Education (4 credits maximum)

- 1.1 For the Associate degree for an accredited institution, score one credit, if the degree is in engineering, physical sciences, mathematics, or quality assurance, score two credits. Or, for the Bachelor degree from an accredited institution, score two credits; if the degree is in engineering, physical sciences, mathematics, or quality assurance, score three credits.
- 1.2 For the Master degree in engineering, physical sciences, business management, or quality assurance from an accredited institution, score one credit.
- 1.3 For the successful completion of part of the required curriculum for an Associate, Bachelor, or Master degree, score a corresponding percentage of the credits specified above for the degree.
- 1.4 For the successful completion of Navy Nuclear Training, its equivalent in another armed service, or the training required for becoming a licensed operator in a commercial nuclear power plant, score two credits.

2.0 Experience (9 credits maximum)

2.1 Technical Experience (5 credits maximum)

For experience in engineering, manufacturing, construction, operation, or maintenance, score one credit for each full year.

2.2 Nuclear Experience

If two years of technical experience have been in the nuclear field, score one additional credit.

2.3 Quality Assurance Experience

If two or more years of the technical experience have been in quality assurance or quality control, score two additional credits. Persons whose work activities are controlled by the Quality Assurance Program but who are not full-time members of the QA organization may be awarded half the credits that would be given to a person with specific quality assurance experience.

2.4 Audit Experience

If two or more years of the technical experience have been in auditing, score one additional credit.

2.5 Supplemental Experience

Persons who have a proportion of the experience specified in 2.1-2.4 may be awarded a corresponding percentage of the credits specified.

2.6 Time exclusively spent in training does not apply as credit toward experience requirements for lead auditors.

3.0 Training (2 credits maximum)

Persons who have successfully completed the training requirements of ANSI N45.2.23 may be given two credits.

4.0 Rights of Management (2 credits maximum)

The QA Manager may grant additional credits for other performance factors applicable to auditing as follows:

4.1 For certification of competence in engineering or science related to nuclear power plants, or in quality assurance specialties, issued and approved by a State Agency or National Professional or Technical Society, score two credits.

4.2 For nuclear experience in excess of 2 years, score one credit for each two years experience.

4.3 For practical experience that can be related to power plants, in excess of 5 years, score one credit for each two years of experience.

Reason

BG&E is in agreement with the basic purpose of ANSI N45.2.23--that is, to establish minimum educational or experience requirements for Lead Auditors. We think, however, that the system of credits outlined in ANSI N45.2.23 tends to reduce the size of the pool of potential replacement auditors without making redeeming improvement in the capabilities of persons selected.

We calculated the credit score of 11 of our present Lead Auditors at the time they were appointed Lead Auditors. Six had completed Navy Nuclear Training and spent several years in the Navy Nuclear Program. Four of these scored only 8 credits total,

including 2 credits allowed by paragraph 2.3.1.4 of ANSI N45.2.23 for rights of management based on their having completed the BG&E QA training programs for Lead Auditors.

One of our auditors, with neither nuclear nor power plant experience, had a credit score of 12 because he held a Bachelor's degree in engineering and was a professional engineer with over 5 years design experience.

Because all of these individuals have acted as Lead Auditors satisfactorily for several years, it appears that the credit system should be revised slightly to allow for the differences in education and experience of prospective Lead Auditor candidates.

We consider the flaw in the current system to be the emphasis on educational requirements that will allow a person with a Master's degree and no nuclear or power plant experience to become a Lead Auditor, but will exclude a person who has no degree, even though he may have 20 years' experience in operating or maintaining nuclear or power plant systems.

The practical balance between education and experience will vary with individuals and particular work assignments. Any attempt to establish rigid requirements is likely to allow some unsuitable candidates to meet the qualification requirements while excluding some acceptable candidates.

For these reasons, we think that the supervision of prospective Audit Team Leaders should be given more flexibility in determining whether, for a particular individual, educational or professional qualifications are more significant and valuable than past experience.

The present credit system, while recognizing the Associate degree, gives no credit for completion of the nuclear training programs. We think that someone who has taken Navy Nuclear Training or its equivalent in another armed service, or someone who has completed the training required to become a licensed operator in a commercial nuclear power plant, should receive the same credit as a person who has an Associate degree from an accredited institution in engineering, physical sciences, mathematics, or quality assurance.

The points now awarded for education are related to the effect that formal courses might have on the ability of individuals to comprehend the regulations or the technical aspects of activities being audited. The point system makes no allowance for the fact that such knowledge comes gradually and not upon receipt of a degree. Persons who have completed part of a degree course should receive a percentage of the credits allowed for that course.

The requirements for training specified in ANSI N45.2.23, paragraph 2.3.2, would seem to ensure that prospective Lead Auditors will meet the requirements of paragraph 2.3.1.4 dealing with the rights of management. We think, therefore, that all prospective Lead Auditors should qualify for these two credits.

Similarly, the present system recognizes the effect that working in a QA Program will have on the ability of a person to comprehend regulations and technical requirements. Persons who are not assigned as full-time members of the Quality Assurance Organization, however, receive similar exposure if they perform activities controlled by a QA Program. We therefore allow such persons half the credits specified for quality assurance experience.

Item 2

Requirement

3.3 Requalification

Lead Auditors who fail to maintain their proficiency for a period of two years or more shall be required to requalify. Requalification shall include retraining in accordance with the requirements of paragraph 2.3.3, reexamination in accordance with paragraph 2.3.5, and participation as an Auditor in at least one nuclear quality assurance audit.

Response

BG&E requalifies Lead Auditors on the basis of the satisfactory performance of one audit, as observed by a qualified Lead Auditor.

Reason

The purpose of the training specified in paragraph 2.3.3 of the Standard is to ensure that candidates understand the fundamentals of auditing and the requirements for activities to be audited. The fact that persons have not maintained their proficiency does not mean that they need complete re-training; it means only that they have not been able to review and study the applicable Codes, Standards, Procedures, instructions, and other documents related to Quality Assurance Programs and program auditing. BG&E considers that the satisfactory performance of an audit under the observation and guidance of a qualified Lead Auditor should ensure that persons with lapsed certification will review and understand the pertinent documents.

ANSI N101.4 - 1972

Requirement

Section 1.2 specifies applicability requirements for the Standard.

Response

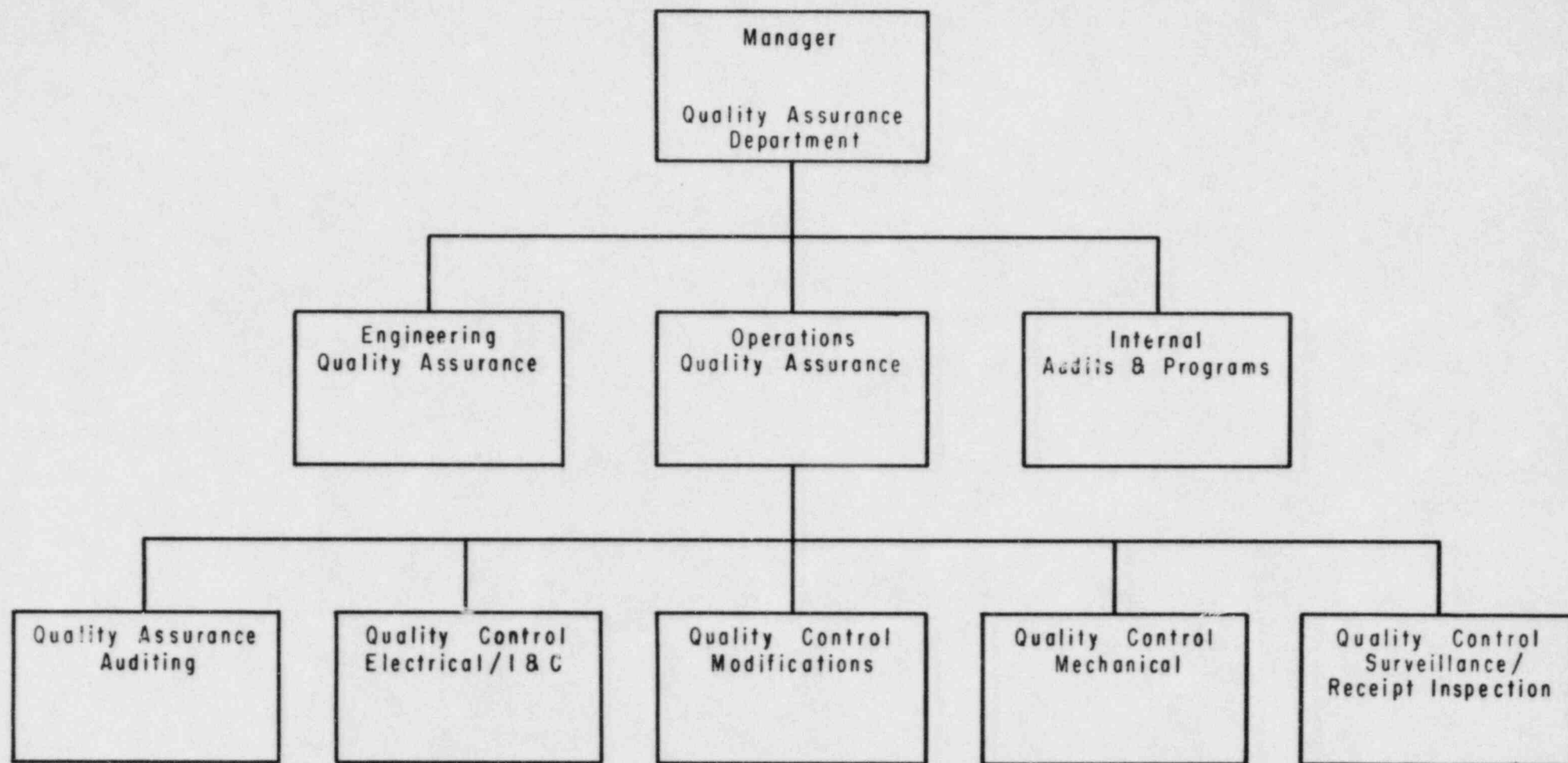
BG&E requires that only activities performed inside containment structures and related to protective coatings applied to ferritic steels, aluminum, stainless steel, zinc-coated (galvanized) steel, concrete, or masonry surfaces shall conform to applicable Sections of ANSI N101.4.

Reason

Deterioration of protective coatings applied to surfaces outside containment structures would have no detrimental effects on the safe operation of the plant.

Baltimore Gas and Electric Company

QUALITY ASSURANCE DEPARTMENT ORGANIZATION



The organizational chart for the Quality Assurance Program is structured as follows:

- Chairman of the Board**
 - President**
 - FINANCE AND ACCOUNTING** (VICE PRESIDENT & SECRETARY)
 - ACCOUNTING** (MANAGER)
 - ECONOMIC RESEARCH** (MANAGER)
 - FINANCE** (MANAGER & RESEARCH SECTION)
 - AUDITS & METHODS** (MANAGER)
 - CONSUMER SERVICES** (VICE PRESIDENT)
 - MERCHANDISE** (MANAGER)
 - CUSTOMERS' ACCOUNTS** (MANAGER)
 - CUSTOMER SERVICE** (MANAGER)
 - CUSTOMER RELATIONS** (MANAGER)
 - ENERGY SERVICES** (MANAGER)
 - GENERAL SERVICES** (VICE PRESIDENT)
 - GENERAL SERVICES** (MANAGER)
 - INFORMATION SYSTEMS** (MANAGER)
 - REAL ESTATE & OFFICE SERVICES** (MANAGER)
 - TRANSPORTATION** (MANAGER)
 - LEGAL** (GENERAL COUNSEL)
 - EMPLOYEE SERVICES** (MANAGER)
 - PUBLIC AFFAIRS** (MANAGER)
 - SUPPLY** (VICE PRESIDENT)
 - FOSIL POWER** (MANAGER)
 - NUCLEAR POWER** (MANAGER)
 - GAS SUPPLY** (MANAGER)
 - QUALITY ASSURANCE** (MANAGER)
 - Chairman of the Board**
 - Engineering & Construction** (VICE PRESIDENT)
 - ENGINEERING & CONSTRUCTION** (MANAGER)
 - PROJECT MANAGEMENT** (MANAGER)
 - ELECTRIC ENGINEERING** (MANAGER)
 - BRANCH WORKS PROJECT** (MANAGER)
 - POWER PLANTING ECONOMICS** (MANAGER)
 - ELECTRIC SYSTEM DESIGN** (MANAGER)
 - ELECTRIC TEST** (MANAGER)
 - ELECTRIC SYSTEM PLANNING** (MANAGER)
 - DISTRIBUTION** (VICE PRESIDENT)
 - NORTHERN DISTRIBUTION** (MANAGER)
 - SOUTHERN DISTRIBUTION** (MANAGER)
 - CENTRAL DISTRIBUTION** (MANAGER)
 - DISTRIBUTION ENGINEERING** (MANAGER)
 - ELECTRIC CONSTRUCTION** (MANAGER)

NOTE: Heavy-lined boxes identify organizations that participate in the Quality Assurance Program.

FIGURE 1B-1