

BURNS AND ROE, INC.
CORPORATE OPERATIONS MANUAL
PART IV - FUNCTIONAL MANUALS

DRAFT

SECTION I
NUCLEAR QUALITY ASSURANCE MANUAL
(B&ROE-COM4-1-NP, REVISION 2)



BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS

700 KINDERKAMACK ROAD
ORADELL, NEW JERSEY 07849

NUCLEAR QUALITY ASSURANCE
MANUAL

No. B&ROE-COM4-1-NP

Revision 2

Page 1 of 1

Subject

NOTICE OF CHANGES

Effective Date

8/29/80

Initiated By

Project Support

Supersedes

NC(IV-1)
dated 2/15/78

Approved By

NOTICE OF CHANGES

Upon completion of change, insert this NOTICE preceding the Index Tab of the Nuclear Quality Assurance Manual (Part IV - Section I).

Manual revised to incorporate changes consistent with Nuclear Regulatory Commission acceptance of Burns and Roe, Inc. Topical Report COM4-1-NP, Revision 2.



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Page 1 of 1

Subject INDEX	Effective Date 8/29/80	Initiated By Quality Assurance Department
	Supersedes Index dated 2/15/78	Approved By Director of Project Support and Quality Assurance

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Subject PREAMBLE	Effective Date 8/29/80	Initiated By Quality Assurance Department
	Supersedes Preamble dated 2/15/78	Approved By Office of the President

PREAMBLE

INTRODUCTION:

Burns and Roe, Inc., as architect/engineer and construction manager of nuclear power plants and associated facilities, has the responsibility to its clients and the public at large to assure that its products are consistent with corporate commitments to safety, reliability, and quality, and in accordance with applicable codes, standards, and regulatory requirements.

In recognition of this responsibility, Burns and Roe, Inc. is committed to a quality assurance program which complies with the requirements of Appendix B to Title 10 of the Code of Federal Regulations, Part 50 (10CFR50) and the guidelines set forth in USNRC Regulatory Guide 1.28 which endorses American National Standards Institute (ANSI) N45.2-1977. A nuclear quality assurance program applicable to Burns and Roe, Inc. organizational elements, excluding the Breeder Reactor Division, has been developed and documented in this Manual.

The Nuclear Quality Assurance Manual is comprised of 18 chapters which correspond to the 18 criteria of 10CFR50, Appendix B. The actual procedures or instructions, which implement the quality assurance program, are tabulated in Chapter II, Exhibit 2.

To assure that the Nuclear Quality Assurance Manual is effectively meeting its intended objectives and complies with the applicable criteria of 10CFR50, Appendix B, an annual audit is performed by representatives assigned by the Office of the President.

ADMINISTRATION OF AND CHANGES TO THE NUCLEAR QUALITY ASSURANCE MANUAL

The Nuclear Quality Assurance Manual has evolved from quality related policy and operational methods defined in the CORPORATE OPERATIONS MANUAL and from applicable regulatory requirements. The Nuclear Quality Assurance Manual will be revised and updated accordingly as elements comprising this manual are changed.

The Manager of Corporate Quality Assurance is responsible for maintaining the content of this Nuclear Quality Assurance Manual. User suggestions and comments on both the form and content of the manual should be brought to the attention of the Manager of Corporate Quality Assurance for evaluation and further action as may be considered appropriate.

Changes to this manual will be processed and distributed by the Administration and Management Department as described in the Preamble to the CORPORATE OPERATIONS MANUAL.



Subject CHAPTER I -- ORGANIZATION	Effective Date 8/29/80	Initiated By Quality Assurance Department
	Supersedes Chapter I dated 2/15/78	Approved By Office of the President

CHAPTER I - ORGANIZATION

1. SCOPE

This chapter describes the organizational structure, functional responsibilities, and levels of authority for the direction and execution of the Burns and Roe, Inc. nuclear quality assurance program. It also outlines the organizational relationships within the corporate structure for the assurance of quality in the design and construction of nuclear power plants.

2. GENERAL DESCRIPTION

- 2.1 To support the effort required for the design and construction of a nuclear power project, Burns and Roe, Inc. establishes a project organization within the Project Operations Division. In assuming certain discrete tasks which involve analysis or studies, the project organization may be within another Burns and Roe, Inc. division (e.g. Power Technology). This organization is designated as the project throughout this document. The project is supplied with the necessary personnel from the various functional divisions and departments including Engineering and Design, Construction, Purchasing, and Quality Assurance to support project activities.
- 2.2 The Corporate Organization Chart, Exhibit I-1, shows that the corporate organization is composed of various divisions and departments reporting directly to the President. The President is responsible for establishing quality assurance policies, goals and objectives, and maintaining a continuing involvement in quality assurance matters.
- 2.3 The activities of Burns and Roe, Inc. organizational elements are governed by a set of formal corporate documents in the Burns and Roe, Inc. CORPORATE OPERATIONS MANUAL. Responsibilities assigned to individuals or organizational elements in this Nuclear Quality Assurance Manual are derived from the CORPORATE OPERATIONS MANUAL.
- 2.4 This Nuclear Quality Assurance Manual is incorporated in the CORPORATE OPERATIONS MANUAL. The Nuclear Quality Assurance Manual identifies those organizational elements and procedural requirements described or contained in the CORPORATE OPERATIONS MANUAL that are applicable to, and must be addressed in, a project quality assurance plan which is developed for each nuclear power

project. The content of this Manual, including all changes, is prepared by the Manager of Corporate Quality Assurance, reviewed by the Director of Project Support and Quality Assurance and other appropriate Division Directors, and approved by the President. Distribution and updating of this Manual is controlled by the Administration and Management Department.

- 2.5 Burns and Roe, Inc. policy on the assurance of quality is established in Project Work Policy PW-006, Exhibit I-2. This Policy delegates to the Director of Project Support and Quality Assurance the responsibility to verify that appropriate quality measures are prescribed, to confirm that actions prescribed are being performed in compliance with applicable requirements, and to develop applicable quality manuals.

3. QUALITY ASSURANCE ORGANIZATION

3.1 Director of Project Support and Quality Assurance

3.1.1 The Director of Project Support and Quality Assurance reports to the President and has overall responsibility for the quality assurance program within Burns and Roe, Inc. as described in Project Work Policy PW-006. In addition, the Director of Project Support and Quality Assurance directs the following support services supplied to projects: purchasing, cost engineering, office services and facilities, planning and scheduling, computer services, information systems and administrative staffing. Although providing personnel, systems, and facilities, he is devoid of responsibility for cost and schedule control which is vested in the individual Project Manager.

3.1.2 Qualification requirements for the Director of Project Support and Quality Assurance and the principal quality assurance management positions include the following:

Director of Project Support and Quality Assurance

- Bachelor of Science in an engineering discipline
- Fifteen or more years of responsible engineering experience of which a minimum of seven are quality assurance
- Detailed familiarity with U. S. Nuclear Regulatory Commission functions and regulations
- Experience in management and personnel supervision
- Extensive skill in technical report writing

Manager of Corporate Quality Assurance

- . Bachelor of Science in an engineering discipline
- . Eleven or more years of responsible engineering experience of which a minimum of three are in quality assurance
- . Detailed familiarity with U. S. Nuclear Regulatory Commission functions and regulations
- . Experience in management and personnel supervision
- . Extensive skill in technical report writing

Manager of Quality Audits, Manager of Vendor Surveillance and Nondestructive Examination, and Project Quality Assurance Managers

- . Bachelor of Science in an engineering discipline or certification as a Professional Engineer in any state or certification by the American Society for Quality Control as Quality Engineer
- . Seven or more years of responsible engineering experience of which a minimum of three are in quality assurance
- . Familiarity with the U. S. Nuclear Regulatory Commission functions and regulations
- . Experience in personnel supervision
- . Skill in technical report writing

These functional managers are classified as Supervising Quality Assurance Engineers in the corporate position structure.

- 3.1.3 The Manager of Corporate Quality Assurance is responsible for assuring that a quality assurance program is established and all quality affecting activities are performed in accordance with the program. Duties of the Manager of Corporate Quality Assurance are limited to those related to quality assurance.

The position of Manager of Corporate Quality Assurance is on the same organizational level as that of the individual Project Managers who are the highest line managers directly responsible for the performance of activities affecting quality.

- 3.1.4 To assure proper direction of the quality assurance program and prompt resolution of quality related problems, the

Manager of Corporate Quality Assurance has the authority to establish direct lines of communication, as may be necessary, with external organizations such as contractors and clients.

- 3.1.5 As described in Project Work Policy PW-006, authority to stop unsatisfactory work or control further processing, delivery, or installation of nonconforming material is delegated to the Director of Project Support and Quality Assurance, who has further delegated this authority to project Quality Assurance personnel.

3.2 Organization and Functions

- 3.2.1 The organizational structure and primary functions of the Quality Assurance Department and the function of each group within the Department are described in the CORPORATE OPERATIONS MANUAL. The Quality Assurance Department is comprised of a special projects staff and three functional groups:

- . Quality Audits
- . Vendor Surveillance and Nondestructive Examination
- . Project Quality Assurance

Each of these groups functions under the direction of a manager who reports to the Manager of Corporate Quality Assurance, who in turn is responsible to the Director of Project Support and Quality Assurance. The Quality Assurance Managers provide technical and administrative direction to their groups through their respective supervising and lead engineers.

- 3.2.2 A description of the Quality Assurance Department is incorporated in the CORPORATE OPERATIONS MANUAL, which defines the responsibilities, organizational relationships, and duties relating to functional work assignments.
- 3.2.3 The quality assurance functions provide controls to assure all elements of 10CFR50, Appendix B are implemented within the Burns and Roe, Inc. quality assurance program. Quality assurance functions are not delegated to outside organizations unless designated in contract documents.
- 3.2.4 All persons and organizational elements performing quality assurance functions are established organizationally to possess sufficient authority and organizational freedom to identify quality problems, to initiate, recommend, or provide solutions through appropriately designated management channels, and to verify implementation of

solutions. All individuals or groups who perform verification of conformance to established quality requirements do not have direct responsibility for performing the work being verified.

3.2.5 When Burns and Roe, Inc. assumes the responsibility for directing and managing the on-site quality assurance program, an appropriately qualified Quality Assurance Engineer is assigned as Site Quality Assurance Manager. This individual functions in an organizational position carrying out the responsibility and exercising the authority as is required for proper control over the quality assurance program. Duties of the Site Quality Assurance Manager are limited to those related to quality assurance.

4. PROJECT ORGANIZATION

4.1 General

4.1.1 A project is established for each nuclear power project in accordance with Project Work Policy PW-001. The Directors of the various Burns and Roe, Inc. Divisions report to the President, as shown in the Corporate Organization Chart, Exhibit I-1.

4.1.2 A typical project, including supporting organizational elements, is shown in the Nuclear Project Organization Chart, Exhibit I-3.

4.1.3 Overall responsibility for all phases of the project, with the exception of the independent quality verification function, is assigned to the Project Manager who reports directly to the Project Operations Division Director. Included in the duties of the Project Manager is the responsibility for assuring that all quality affecting functions are executed in accordance with project procedures. The Project Manager has the organizational freedom and authority to detect problem areas in any facet of the project and to initiate appropriate corrective action. Engineering and design personnel are furnished to the project from the Engineering and Design Division.

4.2 Engineering and Design Division

4.2.1 Burns and Roe, Inc. engineering and design effort is assigned to the Engineering and Design Division. The departments under the overall direction of the Engineering and Design Division Director are: Engineering, Design and Drafting, and Engineering Development and Evaluation.

4.2.2 The Engineering and Design Division is responsible for the development of design criteria, issuance of a project cri-

teria document, the translation of project requirements into working documents, such as specifications and drawings, and the verification of the technical adequacy of their work.

4.3 Construction Division

The Resident Construction Manager is responsible to the Project Manager for the proper execution of the construction of the plant and for the project direction of all Burns and Roe, Inc. site personnel. Under the construction management method of construction, the Resident Construction Manager coordinates and oversees the contractors performing the work, anticipates and takes action to correct interference and interface problems between contractors, and as a complement to the formal quality assurance effort, takes appropriate action to assure that the construction work is performed in accordance with the contract documents. Duties of the Resident Construction Manager include obtaining interpretation of Burns and Roe, Inc. construction specifications and drawings from the Site Project Engineer; liaison between contractor, Burns and Roe, Inc. engineering, and quality assurance; and the disposition of nonconforming material within the limits established in applicable project procedures. The Resident Construction Manager receives functional and administrative direction from the Director of the Construction Division through a home office Construction Division Manager.

4.4 Purchasing Department

4.4.1 The Director of the Purchasing Department reports to the Director of Project Support and Quality Assurance.

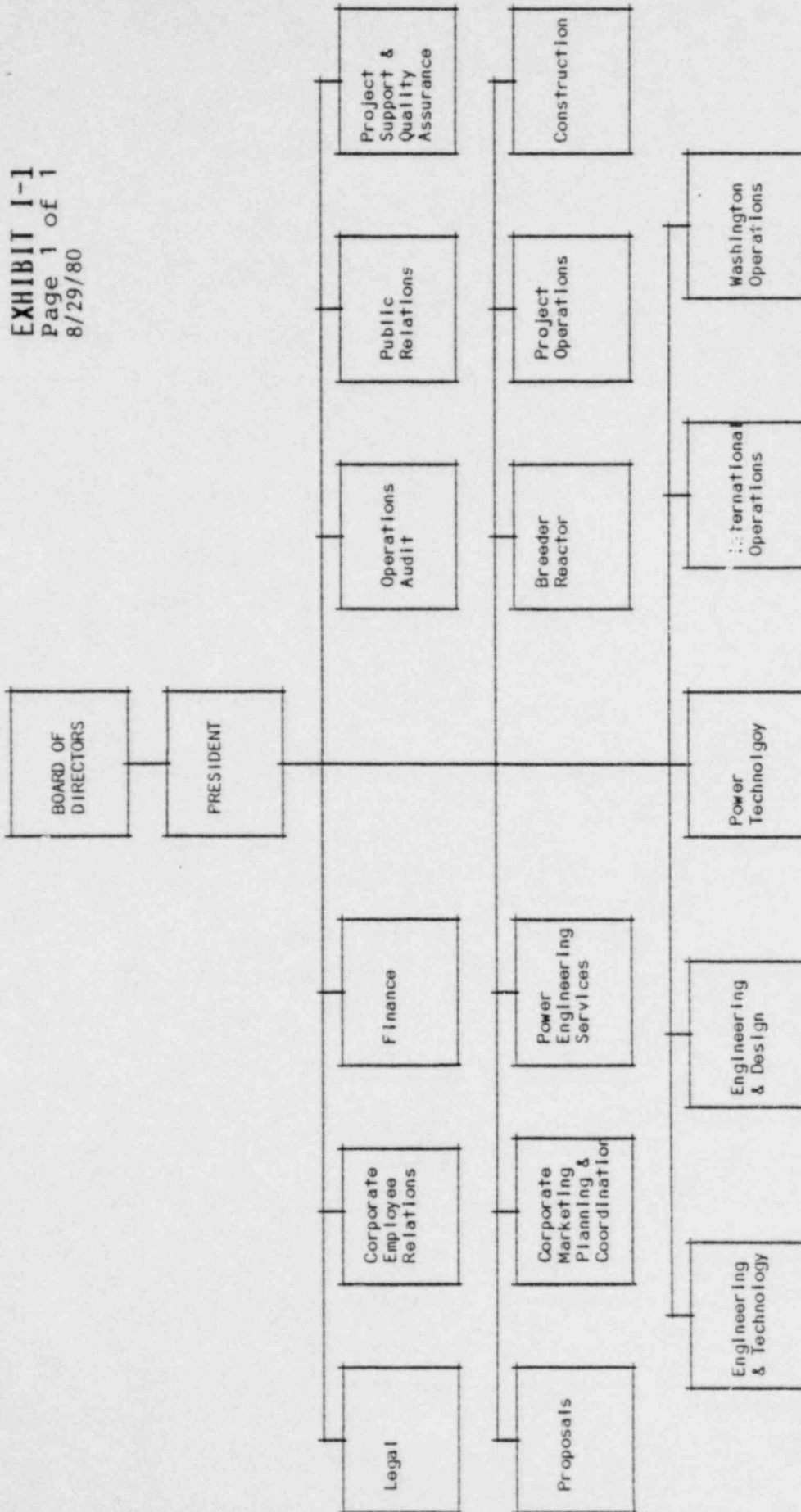
4.4.2 The Director of Purchasing is responsible for the procurement activities of the project. These duties include the expediting of hardware items and engineering and quality documents required from contractors.

4.5 Other Departments/Divisions

Other supporting functions, such as planning, scheduling, and estimating, are supplied to the project by the appropriate divisions or departments, in accordance with the Burns and Roe, Inc. scope of services and as required to support the Project.

EXHIBITS:

- Exhibit I-1 Burns and Roe, Inc. CORPORATE ORGANIZATION CHART
- Exhibit I-2 Burns and Roe, Inc. PROJECT WORK POLICY PW-006
- Exhibit I-3 Burns and Roe, Inc. NUCLEAR PROJECT ORGANIZATION CHART



CORPORATE ORGANIZATION CHART



PROJECT WORK POLICY

Subject Assurance of Quality	Effective Date 1/1/78	Initiated By President <i>[Signature]</i>
	Supersedes PW-006 dated 9/1/77	Approved By

1. The company is committed to achieving standards of quality in all its services to clients which will assure public safety and optimize product reliability. Without compromising this commitment, due consideration will be given to project budgets and client guidance.
2. As a minimum, the company will take appropriate measures to engineer, design, and cause to be built into its designs a level of quality adequate to comply with statutory codes, Burns and Roe, Inc. engineering standards, and contractually imposed requirements. In addition, for nuclear facilities, Burns and Roe, Inc. will comply with the appropriate portions of the Code of Federal Regulations, the Regulatory Guide, and other nationally recognized codes or standards applying to nuclear installations.
3. The primary responsibility for the quality of the product rests with the individuals doing the work and with their immediate supervisors. However, separate people are assigned the responsibility to confirm, audit, inspect, or otherwise verify that an activity has been correctly performed.
4. Procedures and organizational arrangements are established which provide that the individual or group assigned the responsibility to confirm, audit, inspect, or otherwise verify quality is independent of, and has organizational freedom from, the person or group directly responsible for performing the specific work activity. In this regard persons assigned to confirm or review will be free to identify quality problems, to recommend solutions, and to verify the implementation of corrective action.
5. Responsibilities for assurance of quality are as follows:
 - a. The responsibility for the technical quality of engineering and design work is described in Corporate Policy G-001, "Excellence in Engineering."
 - b. The Director, Breeder Reactor Division is responsible for quality assurance compliance on those projects assigned to the Breeder Reactor Division. For all other power plant projects, the Quality Assurance Division has the responsibility to verify that appropriate quality measures are prescribed, to confirm that actions prescribed are being performed in compliance with applicable requirements, and to develop applicable quality manuals.
 - c. When Burns and Roe, Inc. is performing in the role of construction manager on other than nuclear projects, surveillance of contractors' inspection and nondestructive examination activities will normally

be performed by Construction Division personnel. When force account work is undertaken at such sites, Construction Division personnel will normally perform inspection of Burns and Roe, Inc. construction work. In either case, personnel assigned to perform these functions will be qualified formally by the Director of the Quality Assurance Division and their activities will be audited periodically by the Quality Assurance Division. All other audit, surveillance, inspection, and non-destructive examination of manufacturing and construction work will be performed by Quality Assurance Division personnel unless otherwise approved in writing by the President.

6. The Quality Assurance Division Director and the Breeder Reactor Division Quality Assurance Manager have the authority to stop unsatisfactory nuclear work or to control further processing, delivery, or installation of non-conforming items. In exercising this authority, the Project Manager will be advised of the circumstances and will be requested to take appropriate action, including stopping work when considered necessary. The Project Manager will proceed in an orderly manner with the action requested. If the responsible Division Director considers the action taken inappropriate, the matter is to be resolved immediately in accordance with Corporate Policy PW-004, "Resolution of Conflicts."

When appropriate, the authority granted here to the Quality Assurance Director and the Breeder Reactor Division Quality Assurance Manager may be delegated in writing to assigned project quality assurance personnel.

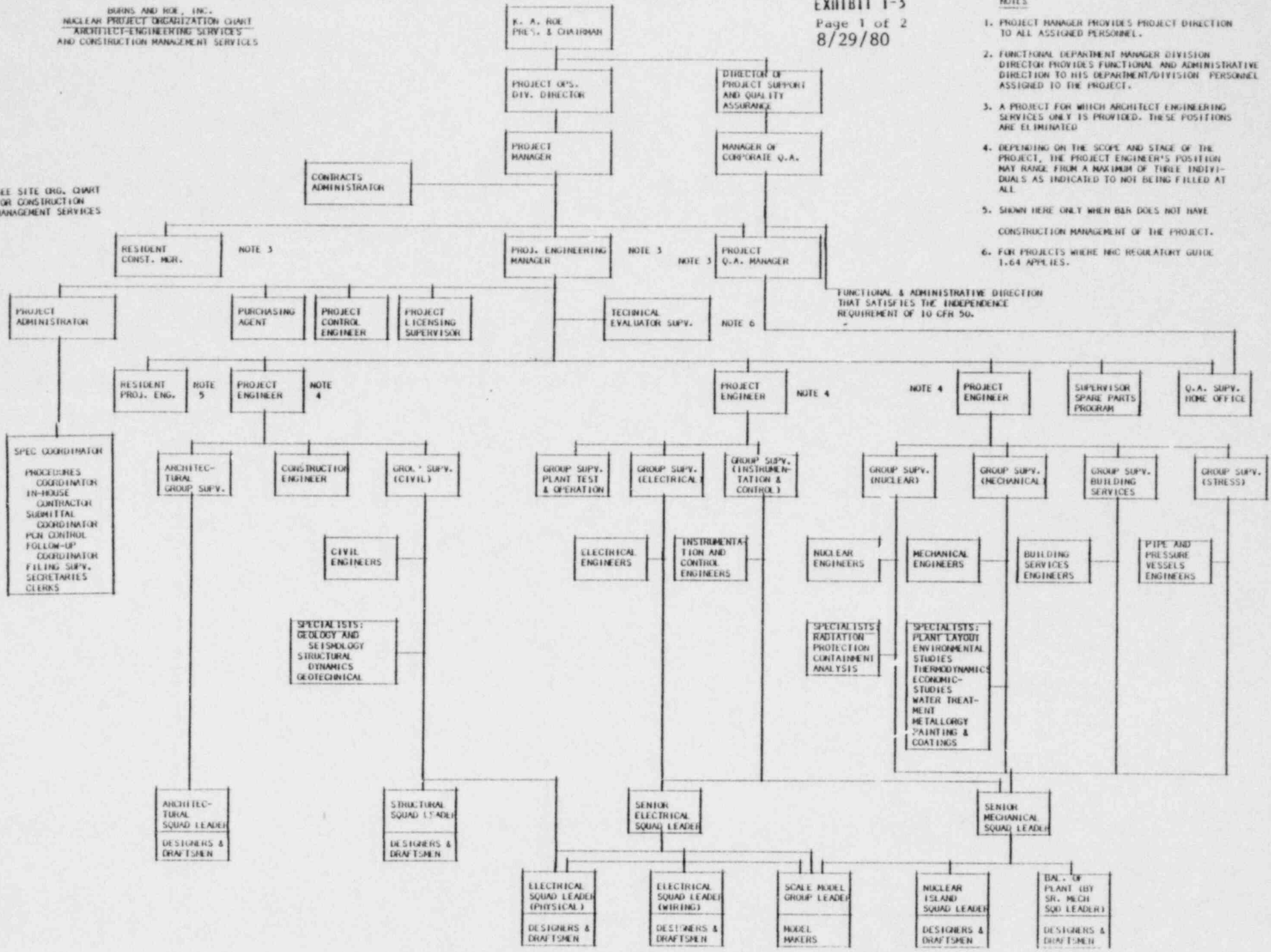
7. The Director, Quality Assurance Division will formally certify those who qualify in non-destructive examination methods in accordance with applicable standards.
8. The company's plans for assurance of quality are described in (1) the Nuclear Quality Assurance Manual for nuclear power plant project compliance with 10CFR50, Appendix B; (2) the Quality Compliance Manual for quality verification on other than nuclear power plant projects; and (3) the Quality Assurance Program Plan for Breeder Reactor Division project compliance with 10CFR50, Appendix B and RDT Standard F2-2.

NOTES

1. PROJECT MANAGER PROVIDES PROJECT DIRECTION TO ALL ASSIGNED PERSONNEL.
2. FUNCTIONAL DEPARTMENT MANAGER DIVISION DIRECTOR PROVIDES FUNCTIONAL AND ADMINISTRATIVE DIRECTION TO HIS DEPARTMENT/DIVISION PERSONNEL ASSIGNED TO THE PROJECT.
3. A PROJECT FOR WHICH ARCHITECT-ENGINEERING SERVICES ONLY IS PROVIDED, THESE POSITIONS ARE ELIMINATED.
4. DEPENDING ON THE SCOPE AND STAGE OF THE PROJECT, THE PROJECT ENGINEER'S POSITION MAY RANGE FROM A MAXIMUM OF THREE INDIVIDUALS AS INDICATED TO NOT BEING FILLED AT ALL.
5. SHOWN HERE ONLY WHEN BAR DOES NOT HAVE CONSTRUCTION MANAGEMENT OF THE PROJECT.
6. FOR PROJECTS WHERE NRC REGULATORY GUIDE 1.64 APPLIES.

SEE SITE ORG. CHART FOR CONSTRUCTION MANAGEMENT SERVICES

I-10



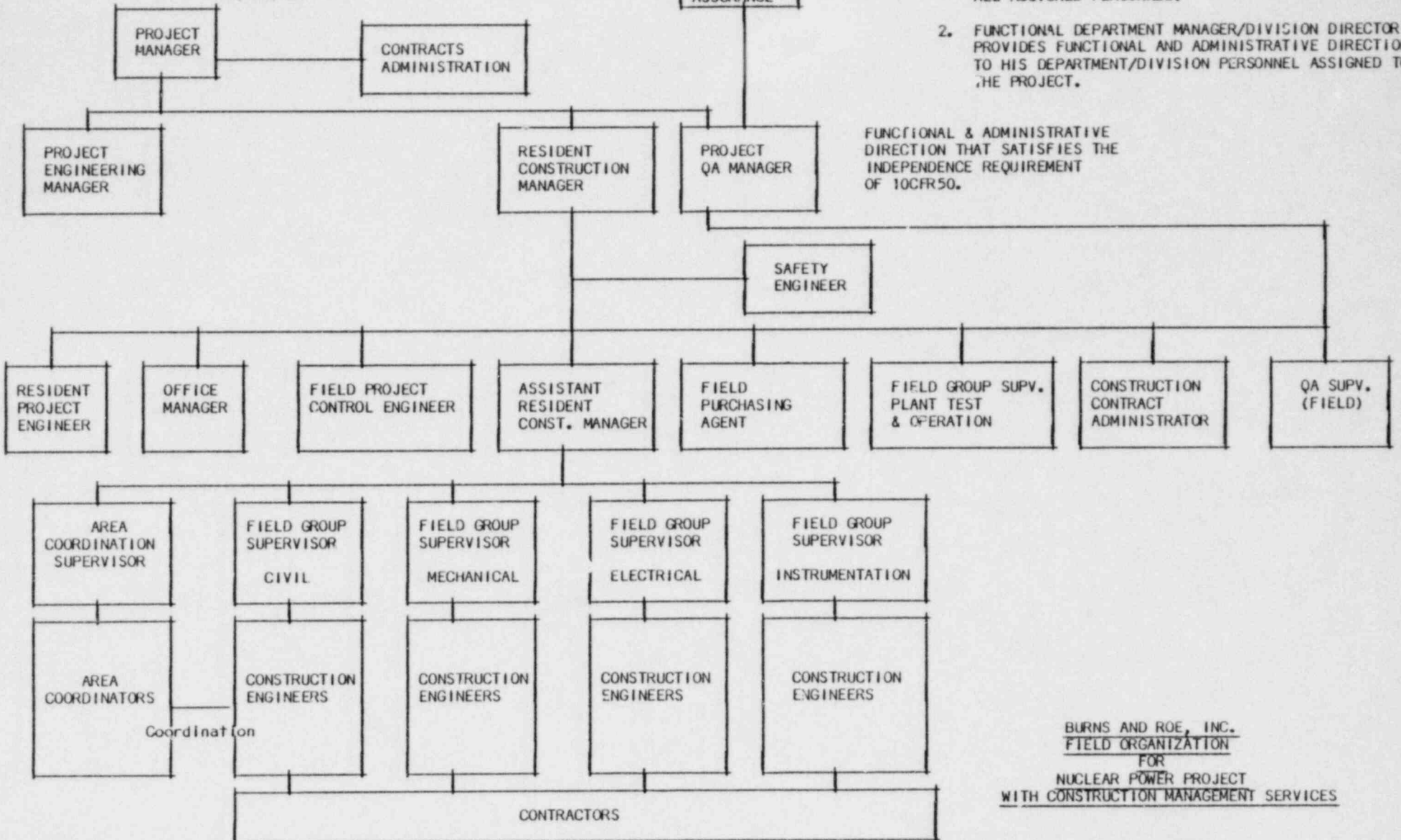
FUNCTIONAL & ADMINISTRATIVE DIRECTION THAT SATISFIES THE INDEPENDENCE REQUIREMENT OF 10 CFR 50.

MANAGER OF
CORPORATE
QUALITY
ASSURANCE

NOTES

1. PROJECT MANAGER PROVIDES PROJECT DIRECTION TO ALL ASSIGNED PERSONNEL.
2. FUNCTIONAL DEPARTMENT MANAGER/DIVISION DIRECTOR PROVIDES FUNCTIONAL AND ADMINISTRATIVE DIRECTION TO HIS DEPARTMENT/DIVISION PERSONNEL ASSIGNED TO THE PROJECT.

FUNCTIONAL & ADMINISTRATIVE
DIRECTION THAT SATISFIES THE
INDEPENDENCE REQUIREMENT
OF 10CFR50.



II-11

BURNS AND ROE, INC.
FIELD ORGANIZATION
FOR
NUCLEAR POWER PROJECT
WITH CONSTRUCTION MANAGEMENT SERVICES



Subject CHAPTER II -- QUALITY ASSURANCE PROGRAM	Effective Date 8/29/80	Initiated By Quality Assurance Department
	Supersedes Chapter II dated 2/15/78	Approved By Office of the President

CHAPTER II
QUALITY ASSURANCE PROGRAM

1. SCOPE

This chapter describes how the Burns and Roe, Inc. nuclear quality assurance program is incorporated into a project quality assurance plan for the design and/or construction of a nuclear power plant by the proper selection, modification, and utilization of corporate policies and standard procedures. The quality assurance program requirements described throughout this manual are applicable to activities performed on safety related structures, systems, and components and the fire protection system when identified by the client (utility and applicant) in individual Safety Analysis Reports as being within the Burns and Roe, Inc. scope of work. The requirements of this program are applied on a selective basis to items other than safety-related structures, systems, and components when requested by the client.

2. GENERAL DESCRIPTION

2.1 The quality assurance program requirements, described in this Nuclear Quality Assurance Manual, provide guidance for the preparation of a project quality assurance plan for each nuclear power plant in accordance with the quality assurance criteria of 10CFR50, Appendix B, and the guidelines set forth in current applicable regulatory guides and ANSI standards. The Burns and Roe, Inc. position with regard to specific USNRC Regulatory Guides concerning quality assurance is indicated in Exhibit II-1. Any deviation from this quality assurance program description for specific plants shall be identified in the Safety Analysis Report for the particular plant for USNRC review and acceptance. Whenever project quality assurance plans deviate from the requirements of this Manual due to unique project requirements, such deviations must be approved by the Manager of Corporate Quality Assurance.

2.2 The Burns and Roe, Inc. nuclear quality assurance program is defined in various documents that control the operations of the company as follows:

2.2.1 CORPORATE OPERATIONS MANUAL

This Manual, approved by the President, contains corporate policies, organization, procedures, manuals, guides, and standards used in conducting company business.

2.2.2 Nuclear Quality Assurance Manual

This Manual, approved by the President, is incorporated in Part IV of the CORPORATE OPERATIONS MANUAL. It describes all quality related policy and operational methods defined in the CORPORATE OPERATIONS MANUAL and adds the applicable regulatory elements that must be included in the Project Quality Assurance Plan.

2.2.3 Quality Assurance Department Manual

This intra-departmental manual, approved by the Manager of Corporate Quality Assurance, provides standard procedures and instructions for those Quality Assurance Department personnel assigned to a project.

2.2.4 Project Quality Assurance Plan

This plan is established to meet the requirements imposed by the Nuclear Quality Assurance Manual. The plan is designed to suit the unique requirements of each client and the scope of Burns and Roe, Inc. services for a project.

3. PROJECT QUALITY ASSURANCE PLAN

- 3.1 The project quality assurance plan is prepared by the Project Quality Assurance Manager assigned to a specific nuclear power project by the Manager of Corporate Quality Assurance. The plan is approved by the Project Manager and the Manager of Corporate Quality Assurance.
- 3.2 To assure that the project quality assurance plan meets the requirements of this Manual and the appropriate criteria of 10CFR50, Appendix B, the Project Manager selects procedures from the CORPORATE OPERATIONS MANUAL and Quality Assurance Department Manual to provide control of all quality affecting work functions. The selection of procedures is based on the scope of services to be supplied and the general requirements imposed by this Manual.
- 3.3 The corporate project procedures, implementing the requirements of this Manual, are in Part III of the CORPORATE OPERATIONS MANUAL and are the basis for the project quality assurance plan for a specific nuclear power project. The procedures are supplemented, where necessary, by instructions, plans, and checklists to meet specific project requirements. The quality assurance methods used are documented in the Quality Assurance Department Manual procedures and instructions.
- 3.4 Exhibit II-2 provides a synopsis of the major project procedures contained in the CORPORATE OPERATIONS MANUAL. Exhibit II-3 is a matrix which relates these procedures to 10CFR50, Appendix B.

4. ELEMENTS OF THE PROJECT QUALITY ASSURANCE PLAN

- 4.1 Safety-related structures, systems, and components are identified in a project criteria document for each specific project. The Engineering and Design Division is responsible for preparation of the project criteria document in accordance with procedures contained in Part III of the CORPORATE OPERATIONS MANUAL.
- 4.2 The project quality assurance plan assigns the responsibility for quality to the organization responsible for performing the work and includes, as a basic requirement, that individuals responsible for verifying and checking are independent of the individual or group responsible for performing the work. In addition, design verification, audits, and surveillance are performed by individuals or groups other than those who supervised or performed the original design work.
- 4.3. To assure an orderly transfer of responsibilities for the management and technical interfaces among the various organizational elements, such as engineering, construction, the nuclear steam system supplier, and the utility, an interface document is prepared in conjunction with the various participants in accordance with approved procedures. This interface document becomes part of the Burns and Roe, Inc. project plan. Implementation of the imposed requirement is then controlled by appropriate procedures selected from Part III of the CORPORATE OPERATIONS MANUAL and in the project quality assurance plan.
- 4.4 Corporate policy and objectives relative to assurance of quality are contained in the CORPORATE OPERATIONS MANUAL. When new or revised policies are issued, it is the responsibility of the Manager of Corporate Quality Assurance to assure that this Manual is consistent with and meets the revised requirements. On an annual basis, the Manager of Corporate Quality Assurance directs a documented and detailed review of the Nuclear Quality Assurance Manual; the purpose of which is the assurance of inclusion of revisions to requirements promulgated by the USNRC or Burns and Roe, Inc. All changes to the Quality Assurance Manual are submitted to USNRC for review and approval prior to implementation. Organizational changes which do not affect the program are submitted to USNRC within 30 days after announcement.
- 4.5 To assure that all responsible organizations and individuals are aware that quality policies, manuals, and procedures are mandatory requirements that must be implemented and enforced, appropriate forewords are included in each of the elements forming a part of the total quality assurance program. In addition, directives from the Office of the President may be issued, when necessary, to provide specific notification of policy changes or to reinforce existing policies.
- 4.6 Consistent with the contract scope of Burns and Roe, Inc. services and as described in the appropriate sections of the Nuclear

Quality Assurance Manual and reflected in a specific project quality assurance plan, the Quality Assurance Department provides verification that the following major quality affecting functions are satisfactorily accomplished:

- The design process is accomplished in accordance with established procedures.
 - Specifications contain appropriate quality requirements.
 - Contractors' quality assurance programs and procedures are adequate.
 - Contractor performance and product are supplied in accordance with established requirements.
 - Nonconformances are identified and disposition provided.
 - Material receiving, inspection, and storage functions are performed in accordance with established procedures.
 - Surveillance of site contractor activities is performed.
 - Audits of all quality affecting activities are performed on a scheduled basis.
 - A permanent plant record file is established and maintained.
- 4.7 Differences of opinion between quality assurance personnel and those of other divisions or departments will be resolved at the next higher supervisory or management level, with the Office of the President providing final resolution when this cannot be obtained at an intermediate level. This course of action is indicated in Project Work Policy PW-004.
- 4.8 Changes to this Nuclear Quality Assurance Manual may be directed by the President or be requested by division or department heads. These changes or revisions are subject to the same review and approval cycle as the original issue. Control and distribution of this Nuclear Quality Assurance Manual, as part of the CORPORATE OPERATIONS MANUAL, is the responsibility of the Administration and Management Department.
- 4.9 To assure that contractors contributing to the overall Burns and Roe, Inc. efforts have acceptable quality assurance programs, specific requirements for these programs are contained in procurement documents. These programs are subject to review prior to contract award and are audited throughout the contract life. Chapters IV and VII of this Manual further define this activity.
- 4.10 All quality related activities initiated both prior to and after the submittal of the Preliminary Safety Analysis Report are sub

ject to the controls of this Nuclear Quality Assurance Manual and the policies and procedures established in the CORPORATE OPERATIONS MANUAL. When Burns and Roe, Inc. is responsible for a preoperational testing program, its activities will be governed by a Project Quality Assurance Plan developed in accordance with this Nuclear Quality Assurance Manual.

- 4.11 To assure that all quality related activities, such as inspections and tests, are performed with appropriate equipment and under suitable environmental conditions, appropriate requirements are imposed on contractors by procurement documents. In addition, inspection and test procedures for these activities are reviewed prior to use. Verification of conformance to procedures is performed during inspections and tests.
- 4.12 To assure that appropriate materials, the quality of which has not been degraded, are utilized during fabrication and construction, requirements are imposed on contractors by procurement documents. These requirements indicate the need for appropriate procurement, storage, and issuance control of such expendable and consumable items as weld rod, weld inserts, cable, lubricants, and penetrant testing materials in a manner which precludes degradation. In addition, on certain materials, documented certification is required prior to installation or use.
- 4.13 Whenever changes are made to the project quality assurance plan, any affected safety analysis report will be revised, as necessary, to remain current.

5. INDOCTRINATION AND TRAINING

Indoctrination and training procedures are established for those personnel performing quality related activities. These procedures provide for indoctrination or training in areas such as the use of manuals, procedures, nondestructive examination, inspection, and auditing methods. Training programs and procedures are developed based on published industry standards, such as SNT-TC-1A, ANSI N45.2.6, and ANSI N45.2.23, when such standards are available. As new or revised standards become available, they will be reviewed for applicability and, where appropriate, incorporated into indoctrination and training procedures. Proficiency of personnel performing quality affecting activities is assured by retraining, reexamining, and recertifying.

Training sessions require documentation which, as a minimum, includes the objectives, content of each lesson, list of attendees, instructor, location, and date of performance.

6. COMPUTER CODES

- 6.1 Computer codes used during the design and engineering effort on a project are governed by the Burns and Roe, Inc. Computer Users Manual, Part IV of the CORPORATE OPERATIONS MANUAL, and by Project Work Policy PW-008.
- 6.2 The development, control, and use of computer codes is described in documented procedures. The procedures define responsible individuals for approval of and revision to computer codes.
- 6.3 Independent verification of policy, Computer Users Manual and procedure compliance is provided by scheduled quality assurance audits and surveillance.

7. MANAGEMENT REVIEW

- 7.1 Continuing involvement at the highest corporate level in quality assurance matters is assured by the assignment of oversight responsibility to a member of the Office of the President.
- 7.2 To assure that the nuclear quality assurance program is effectively meeting its intended objectives and complies with 10CFR50, Appendix B, an annual audit is performed by representatives assigned by the Office of the President. These representatives are either personnel from within Burns and Roe, Inc. who hold managerial positions outside the Quality Assurance Department (e.g., Breeder Reactor Division, Engineering and Design Division), or recognized consultants from firms which specialize in quality assurance or management. The scope of this audit includes the quality assurance program of projects currently in effect selected at random by the auditors. The governing audit criteria are those of 10CFR50, Appendix B. Information gained during these audits is used to correct program nonconformances, as well as improve program effectiveness.

EXHIBITS:

- Exhibit II-1 Burns and Roe, Inc. Position Regarding Certain USNRC Regulatory Guides
- Exhibit II-2 Synopsis of Burns and Roe, Inc. Quality Related Procedures
- Exhibit II-3 Document Matrix Cross-Referenced to 10CFR50, Appendix B

BURNS AND ROE, INC. POSITION REGARDING
USNRC REGULATORY GUIDES

<u>Guide No.</u>	<u>Date</u>	<u>Title</u>	<u>Standard Accepted/ Guidance Provided (NRC Comment)</u>	<u>B&R Position</u>
1.26 R3	2/76	Quality Group Classifications and Standards for Water-, Steam-, and Radioactive- Waste- Containing Components of Nuclear Power Plants	Provides NRC Staff Practice Regarding Quality Group Classification System Expanding on 10CFR50.55a.	B&R commits to comply with the Regulatory Position of Reg. Guide 1.26 of 2/76 without reservation.
1.28 R2	2/79	Quality Assurance Program Requirements (Design and Construction)	Accepts ANSI-N45.2-1977 "Quality Assurance Program Requirements for Nuclear Power Plants" (some clarifications)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.28 of 2/79 without reservation.
II-7 1.29 R3	9/78	Seismic Design Classification	Provides NRC Staff Practice Regarding Seismic Design Classification System.	B&R commits to comply with the Regulatory Position of Reg. Guide 1.29 of 9/78 without reservation.
1.30 R0	8/72	Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment	Accepts ANSI-N45.2.4-1972 "Installation, Inspection, and Testing Requirements for Instrumentation and Electric Equipment During the Construction of Nuclear Power Generating Stations" (IEEE-336-1971) (some clarifications)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.30 of 8/72 without reservation.

<u>Guide No.</u>	<u>Date</u>	<u>Title</u>	<u>Standard Accepted/ Guidance Provided (NRC Comment)</u>	<u>B&R Position</u>
1.37 R0	3/73	Quality Assurance Requirements for Cleaning Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants	Accepts ANSI-N45.2.1-1973 "Cleaning of Fluid Systems and Associated Components During the Construction Phase of Nuclear Power Plants" (some clarifications)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.37 of 3/73 without reservation.
1.38 R2	5/77	Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants	Accepts ANSI-N45.2.2-1972 "Packaging, Shipping, Receiving, Storage, and Handling of Items for Nuclear Power Plants During the Construction Phase" (some clarifications)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.38 of 5/77 without reservation.
1.39 R2	9/77	Housekeeping Requirements for Water-Cooled Nuclear Power Plants	Accepts ANSI-N45.2.3-1973 "Housekeeping During the Construction Phase of Nuclear Power Plants" (some clarifications)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.39 of 9/77 without reservation.
1.58 R0	8/73	Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel	Accepts ANSI-N45.2.6-1973 "Qualification of Inspection, Examination, and Testing Personnel for the Construction Phase of Nuclear Power Plants" (some clarifications)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.58 of 8/73 without reservation.
1.64 R2	6/76	Quality Assurance Requirements for the Design of Nuclear Power Plants	Accepts ANSI-N45.2.11-1974 "Quality Assurance Requirements for the Design of Nuclear Power Plants" (some clarifications)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.64 of 6/76 without reservation.
1.74 R0	2/74	Quality Assurance Terms and Definitions	Accepts ANSI-N45.2.10-1973 "Quality Assurance Terms and Definitions" (one clarification)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.74 of 2/74 without reservation.

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<u>Guide No.</u>	<u>Date</u>	<u>Title</u>	<u>Standard Accepted/ Guidance Provided (NRC Comment)</u>	<u>B&R Position</u>
1.88 R2	10/76	Collection, Storage, and Maintenance of Nuclear Power Plant Quality Assurance Records	Accepts ANSI-N45.2.9-1974 "Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants" (some clarifications)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.88 of 10/76 without reservation.
1.94 R1	4/76	Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants	Accepts ANSI-N45.2.5-1974 "Supplementary Quality Assurance Requirements for the Inspection, Installation, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants" (some clarifications)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.94 of 4/76 without reservation.
6-II 1.116 R0	5/77	Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems	Accepts ANSI-N45.2.8-1975 "Supplementary Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems for the Construction Phase of Nuclear Power Plants" (some clarifications)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.16 of 5/77 without reservation.
1.123 R1	7/77	Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants	Accepts ANSI-N45.2.13-1976 "Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants" (some clarifications)	B&R commits to comply with the Regulatory Position of Reg. Guide 1.23 of 7/77 without reservation.
1.144	1/79	Auditing of Quality Assurance Programs for Nuclear Power Plants	Accepts ANSI/ASME N45.2.12-1977 "Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants"	B&R commits to comply with the Regulatory Position of Reg. Guide 1.144 of 1/79 without reservation.

SYNOPSIS OF BURNS AND ROE QUALITY RELATED PROCEDURES

QA-001 Audits of Quality Assurance Program

This procedure establishes the requirements for the corporate audit program.

QA-002 Corrective Action Requests

This procedure establishes the requirements for a corrective action reporting and control system.

QA-004 Processing of Nonconformance Reports Received by Burns and Roe

This procedure establishes the requirements for a nonconformance reporting and control system.

QA-006 Vendor Surveillance

This procedure establishes the requirements for the vendor surveillance program.

PM-000 Project Instructions

This procedure establishes the requirements for the preparation, review, and approval of project instructions.

PM-003 Design Change Control System

This procedure establishes the requirements for the design change control system.

PM-006 Document Distribution Control

This procedure establishes the requirements for the document distribution control system.

PM-008 Project Plan

This procedure establishes the requirements for a plan to be developed which delegates the responsibilities of the various organizations involved in the project.

PM-010 Resolution Authority of Engineers at the Site

This procedure establishes the requirements for the authority of the Lead Resident Discipline Engineer at a site for resolving change requests, information requests, nonconformance, proposed repairs, and other discrepancies that originate at the site.

PM-013 Indoctrination and Training of Project Personnel

This procedure establishes the requirements for the indoctrination and training of project personnel.

PM-014 Safety Analysis Reports

This procedure establishes the requirements for preparation, review, approval, and change of the Safety Analysis Report.

PM-014.1 Reportable Defects and Noncompliance

This procedure establishes the requirements for the evaluation and reporting of deficiencies as defined in 10CFR50.55(e) and 10CFR21.

PM-015 Project Filing System

This procedure establishes the methods and categories to be used in project file systems.

PM-016 Review and Approval Signature Requirements for System Design Descriptions, Drawings, Technical Specifications, and SAR/ER

This procedure establishes the requirements for the reviews and approvals of system descriptions, drawings, technical specifications, and SARs.

ED-001 Engineering Review and Approval of Project Drawings

This procedure establishes the requirements for the engineering review and approval of project drawings.

ED-004 Engineering HOLD

This procedure establishes the requirements for initiating, reporting, and removing HOLDS.

ED-005 Vendor/Contractor Document Submittals

This procedure establishes the requirements for the review, processing, and status of those records submitted by suppliers and contractors which provide documentary evidence of the quality of items and activities affecting quality.

ED-008 Project Criteria Document

This procedure establishes the requirements for the preparation, review, approval, release, and change of the project criteria document.

ED-009 Review, Certification, and Approval of Technical Specifications

This procedure establishes the requirements for the review and approval of technical specifications.

ED-010 Calculations

This procedure establishes the requirements for the preparation, checking, and approval of design calculations.

ED-011 System Descriptions

This procedure establishes the requirements for the preparation, review, approval, release, and change of system descriptions.

ED-016 Use of Technical Standards

This procedure establishes the requirements for the use of technical standards which include engineering standards, standard drawings, and standard technical specifications.

ED-017 Design Verification

This procedure establishes the requirements for accomplishing design verification of safety-related structures, systems, and components of nuclear power plants as required by applicable regulatory guides, codes, and standards.

ED-019 Evaluation and Implementation of Changes to Standards Other Than Nuclear Regulatory Requirements

This procedure establishes the requirements for the evaluation of changes to standards other than Regulatory requirements.

ED-019.1 Evaluation and Implementation of Changes to Nuclear Regulatory Requirements

This procedure establishes requirements for informing project personnel of changes to Nuclear Regulatory requirements and to develop a course of action for dealing with such changes.

PRO-001 Selection of Bidders

This procedure establishes the requirements for the selection of a bidder's list.

PRO-002 Requisitions

This procedure establishes the requirements for the review and approval of procurement requisitions submitted to the Purchasing Department.

PRO-003 Request for Bid or Proposal

This procedure establishes the requirements for the preparation, review, approval, and release of the nontechnical portion of procurement documents and changes thereto.

PRO-004 Evaluation of Bids or Proposals

This procedure establishes the requirements for the evaluation of the received bid or proposal.

PRO-005 Negotiation and Award of Contracts

This procedure establishes the requirements for negotiations with bidder, conformance of the technical specifications, and award of contract.

PRO-006.1 Contractor Release

This procedure establishes requirements for providing written release to equipment contractors.

CA-001 Changes in Scope of Work

This procedure establishes the requirements for controlling and pricing scope of work changes and for obtaining client approval of same.

DOCUMENT MATRIX CROSS-REFERENCED TO 10CFR50, APPENDIX B

CRITERION	TITLE	CHAPTER	PROCEDURE/DOCUMENT DESCRIPTION
I	ORGANIZATION	I	CORPORATE OPERATIONS MANUAL (Reference)
II	QUALITY ASSURANCE PROGRAM	II	CORPORATE OPERATIONS MANUAL (Reference) PM-008 Project Plan Project Quality Assurance Plan (Reference) Quality Assurance Department Manual (Reference) PM-013 Indoctrination and Training of Project Personnel
III	DESIGN CONTROL	III	CA-001 Changes in Scope of Work ED-001 Engineering Review and Approval of Project Drawing ED-004 Engineering HOLD ED-005 Vendor/Contractor Document Submittals ED-008 Project Criteria Document ED-009 Review, Certification, and Approval of Technical Specifications ED-010 Calculations ED-011 System Descriptions ED-016 Use of Technical Standards ED-017 Design Verification ED-019 Evaluation and Implementa- tion of Changes to Standards other than Nuclear Regulatory Requirements ED-019.1 Evaluation and Implementa- tion of Changes to Nuclear Regulatory Requirements PM-003 Design Change Control System PM-010 Resolution Authority of Engineers at the Site PM-014 Safety Analysis Reports
IV	PROCUREMENT DOCUMENT CONTROL	IV	ED-009 Review, Certification and Approval of Technical Specifications CA-001 Changes in Scope of Work PRO-002 Requisitions PRO-003 Request for Bid or Proposal PRO-006.1 Contractor Release

DOCUMENT MATRIX CROSS-REFERENCED TO 10CFR50, APPENDIX B

CRITERION	TITLE	CHAPTER	PROCEDURE/DOCUMENT DESCRIPTION
V	INSTRUCTIONS, PROCEDURES, AND DRAWINGS	V	ED-019.1 Evaluation and Implementation of Changes to Nuclear Regulatory Requirements PM-000 Project Instructions PM-010 Resolution Authority of Engineers at the Site Quality Assurance Department Manual (Reference) CORPORATE OPERATIONS MANUAL (Reference)
VI	DOCUMENT CONTROL	VI	PM-006 Document Distribution Control PM-016 Review and Approval Signature Requirements for System Descriptions, Drawings, Technical Specifications, and SAR/ER
VII	CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES	VII	Engineering Technical Specification PRO-001 Selection of Bidders PRO-004 Evaluation of Bids or Proposals PRO-005 Negotiations and Award of Contracts PRO-006.1 Contractor Release QA-006 Vendor Surveillance QA-001 Audits of Quality Assurance Program ED-005 Vendor/Contractor Document Submittals PM-010 Resolution Authority of Engineers at Site
VIII	IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS	VIII	Engineering Technical Specification
IX	CONTROL OF SPECIAL PROCESSES	IX	Engineering Technical Specification Quality Assurance Department Manual

DOCUMENT MATRIX CROSS-REFERENCED TO 10CFR50, APPENDIX B

CRITERION	TITLE	CHAPTER	PROCEDURE/DOCUMENT DESCRIPTION
X	INSPECTION	X	Engineering Technical Specification Quality Assurance Department Manual
XI	TEST CONTROL	XI	Engineering Technical Specification
XII	CONTROL OF MEASURING AND TEST EQUIPMENT	XII	Engineering Technical Specification
XIII	HANDLING, STORAGE, AND SHIPPING	XIII	Engineering Technical Specification
XIV	INSPECTION, TEST, AND OPERATING STATUS	XIV	Engineering Technical Specification
XV	NONCONFORMING MATERIALS, PARTS, OR COMPONENTS	XV	QA-004 Processing of Nonconformance Reports Received by Burns and Roe PM-010 Resolution Authority of Engineers at the Site
XVI	CORRECTIVE ACTION	XVI	PM-014.1 Reportable Defects and Noncompliance QA-002 Corrective Action Requests
XVII	QUALITY ASSURANCE RECORDS	XVII	PM-015 Project Filing System
XVIII	AUDITS	XVIII	QA-001 Audits of Quality Assurance Program QA-006 Vendor Surveillance



Subject

CHAPTER III --
DESIGN CONTROL

Effective Date

8/29/80

Initiated By

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Chapter III
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Approved By

Office of the President

CHAPTER III
DESIGN CONTROL

1. SCOPE

This chapter describes the measures established to assure that design bases, regulatory requirements, codes, and standards are correctly translated into the controls established for the review, approval, issue, and revision of design documents.

2. GENERAL DESCRIPTION

2.1 The Burns and Roe, Inc. design control program complies with USNRC Regulatory Guide 1.64, "Quality Assurance Requirements for the Design of Nuclear Power Plants" as applicable to the Burns and Roe, Inc. scope of supplied services.

2.2 The design control program is governed by a series of corporate policy statements, project procedures, and technical standards contained in the CORPORATE OPERATIONS MANUAL. The design control program has been established to assure that all design related activities are carried out in a planned, controlled, and orderly manner. These design activities include seismic, stress, thermal, hydraulics, radiation, and accident analyses; compatibility of materials; use of computer codes; access for in-service inspection, repair and maintenance; quality standards; and field design activities.

3. DESIGN CRITERIA

3.1 A project criteria document is prepared for each nuclear power project. This document, prepared by a criteria development team, identifies applicable regulatory requirements, design bases, codes, and standards to be translated into drawings, specifications, procedures, and instructions during the design process.

3.2 The initial issue of the project criteria document is not intended to provide all the detailed requirements to be incorporated into design documents, but to provide sufficient basic requirements to permit the design process to proceed. The project criteria document is a specification for the design of a project; it is not the design itself.

3.3 Additional criteria that are developed during the design process are incorporated into the project criteria document following review and approval prescribed by the appropriate project procedures.

4. DESIGN PROCESS

- 4.1 The detailed design effort proceeds in accordance with the approved project criteria document and the applicable approved system descriptions.
- 4.2 The system descriptions present the specific systems design requirements and show how these specific requirements are satisfied by system design. With its associated appendices and references, the system description provides the basis for the design selected. The review, approval, issue, and revision of system descriptions are performed in accordance with applicable project procedures.
- 4.3 The design effort is generally limited to system and structure design with individual component design subcontracted to the component supplier as described in the appropriate procurement contract document.
- 4.4 A system of design interface control is established in the Project Criteria Document with project procedures used to assure communication, review, approval, distribution, and revision control system interface between participating external organizations and internal organizational elements.
- 4.5 The requirement that suitable quality standards be included in design documents is imposed by internal technical standards, project procedures, and as a requirement in procurement contract documents. Documented reviews of design documents assures that these provisions have been satisfactorily incorporated so that design characteristics can be controlled, inspected, and tested according to identified criteria.
- 4.6 Procedure control imposed on the design process assures the suitability of materials, parts, components, and processes and includes the use of applicable industry standards and corporate standard technical specifications.
- 4.7 The use of standard or commercial parts, components, or equipment which have previously been approved for a different application are reviewed for suitability prior to selection.
- 4.8 A system of internal design reviews is implemented at various stages throughout the design process to assure acceptability of the design prior to the design verification process. These reviews consist of in-process checking and approval of design calculations, system descriptions, design specifications, stress

reports, drawings, procurement specifications, and other design documents at various stages of completion, and special design reviews as appropriate. Errors and deficiencies detected during internal design reviews are documented and appropriate corrective action instituted to preclude repetition.

- 4.9 The use of computer codes is procedurally controlled with access for use governed by the Computer Users Manual (CORPORATE OPERATIONS MANUAL Part IV, Section III). Only computer codes which have been verified are certified for use.

5. DESIGN VERIFICATION

- 5.1 Final design documents, including stress reports, receive a design verification performed by individuals or groups other than those who supervised or performed the original design work. The design verification program is the responsibility of the Engineering Development and Evaluation Department which acts and reports independently of the organization performing the design work. The authority and responsibilities of personnel performing these reviews are identified and controlled by project procedures which indicate required documentation. Adherence to these procedures is monitored by the Quality Assurance Department.

- 5.2 The design verification process assures that the final design documents fully comply with the applicable design bases, regulatory requirements, codes, and standards. The design verification plan is established considering the safety importance of the structure, system, or component, complexity of design, degree of standardization, and similarity to previously proven designs. This design verification plan indicates the type of verification (interdisciplinary, multi-organizational, single individual) and documents subjected to verification. The design verification is accomplished by one of the following actions: independent review of design documents, special design reviews, alternate calculations necessary to assure that the design meets the specified criteria, or testing.

Design verification, except where testing is used, is completed prior to final release of design documents for work. Exceptions to this requirement are documented, with justification given on an individual basis, to assure control of any unverified design or portion thereof. When design verification is not complete, work will not proceed to a point where it becomes irreversible. Design verification, including testing, shall be completed prior to the turn over of an item to the owner for fuel load or operation.

When qualification testing is required to verify design work normally performed by Burns and Roe, Inc., test specifications will be prepared which will assure that testing is performed under adverse design conditions.

5.3 The documented results of all design verification procedures are reviewed by cognizant members of the Engineering and Design Division in accordance with applicable project procedures.

5.4 Errors or deficiencies in approved design documents or methods (such as computer codes) are documented with corrective action taken, including that needed to prevent repetition.

6. DESIGN CHANGES

All changes to design documents, including field originated changes or changes required due to design verification action, are performed according to applicable project procedures which require that changes receive review and approval by the same individuals or organizations who performed the original design. The project procedures also require and control the performance of design verification of design changes to previously verified work.



Subject CHAPTER IV -- PROCUREMENT DOCUMENT CONTROL	Effective Date 8/29/80	Initiated By Quality Assurance Department
	Supersedes Chapter IV dated 2/15/78	Approved By Office of the President

CHAPTER IV
PROCUREMENT DOCUMENT CONTROL

1. SCOPE

This chapter describes the general requirements for preparing and controlling the documents required for purchasing an item or service. These requirements are applicable to the activities performed in the development, review, and issuance of Burns and Roe, Inc. construction and prepurchased equipment procurement contract documents.

2. GENERAL DESCRIPTION

The basic instrument used by Burns and Roe, Inc. for procuring supplies and services is the technical specification. The technical specification for each procurement includes a statement of the scope of work to be performed by the supplier and any specific drawings, industry specifications, codes, and standards that describe the items or services to be furnished. The requirement that the supplier have a documented quality assurance program that implements USNRC Regulatory Guide 1.28 is included by reference or in a separate Burns and Roe, Inc. quality program specification. The system described in the following paragraphs applies to all procurements made for nuclear power projects including spare or replacement parts.

3. TECHNICAL SPECIFICATION PREPARATION AND CONTROL

3.1 Project management is responsible for determining the items or services Burns and Roe, Inc. will procure in fulfilling the terms of the contract with its client. This determination is translated into a list of procurement and construction packages, i.e., technical specifications that will be prepared for a given project. This list of technical specifications is included in the overall project plan.

3.2 Each Burns and Roe, Inc. technical specification includes:

- The scope of work to be performed by the supplier
- Quality assurance program requirements
- Rights to access for source inspection and audit
- Documentation requirements

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CHAPTER IV -- Procurement Document Control	8/29/80	2 of 3	B&ROE-COM4-1-NP

- . Nonconformance reporting and disposition
- . Requirements concerning materials to be utilized

- 3.3 The preparation, review, and approval cycle applied to the Burns and Roe, Inc. technical specification and associated drawings is outlined in Chapter III, Design Control, of this Manual.
- 3.4 Inclusion of the requirements of paragraph 3.2 above is further assured during the review of technical specifications by the Quality Assurance Department. This procedurally controlled and documented review provides assurance that technical specifications contain or reference appropriate quality requirements and that these requirements are controllable and inspectable. Further, the review assures that adequate acceptance and rejection criteria are contained or referenced in the specification. The review provides assurance that appropriate documentation (drawings, specifications, procedures, inspection and fabrication plans, inspection and test records, personnel and procedural qualifications, and chemical and physical test results of material) is required and identified in an understandable manner. Documentation which requires Burns and Roe, Inc. review and approval before use, as well as those records to be retained, controlled, and maintained by the supplier and those records to be delivered prior to use or installation of the hardware, is identified as part of this review.
- 3.5 Project management is responsible for the final approval of all technical specifications and changes prior to issuance. Procedural controls govern the preparation, review, and approval of the technical specification portion of the procurement document. Compliance with these procedures is verified by the Project Manager prior to technical specification approval. Documentation of the procedural compliance is reviewed during quality assurance surveillance and audits. Distribution within Burns and Roe, Inc. is controlled.
- 3.6 Review and approval actions are documented and available for verification.

4. ISSUING THE PROCUREMENT PACKAGE

Approved technical specifications are combined with appropriate commercial requirements, established by the Purchasing Department, to form the procurement package which is distributed to potential suppliers for bid action.

5. EVALUATION OF BIDS

Upon receipt of bids, each bidder's proposal is evaluated to determine the degree of responsiveness to the technical, commercial, and quality assurance requirements of the procurement package. During this evalua-

tion, the commercial information is separated from the technical and quality assurance information with the former being evaluated by Burns and Roe, Inc. or client procurement specialists. The latter information regarding technical and quality assurance requirements is evaluated separately by engineering and quality assurance personnel. Exceptions taken by the bidder are resolved. Recommendations concerning acceptability are made to the Project Manager. Bids that are considered non-responsive are rejected by project management. Award is determined by the client and the Burns and Roe, Inc. Project Manager.

6. CONFORMING THE CONTRACT

After a successful bidder is designated, bidder exceptions are resolved through negotiations. When appropriate, changes to the technical specifications are initiated and a conformed technical specification is prepared. The conformed technical specification is reviewed and approved in accordance with the same procedure used for the original technical specification. Changes to the technical specification, after contract award, are subject to the same system of control as the original document.

7. PROCUREMENT OF SPARE OR REPLACEMENT PARTS

Required and desirable spare parts shall be procured together with original equipment using the same technical requirements. Should later procurement be determined appropriate and assigned to Burns and Roe, Inc., the original or improved technical requirements shall be used.



Subject CHAPTER V -- INSTRUCTIONS, PROCEDURES, AND DRAWINGS	Effective Date 8/29/80	Initiated By Quality Assurance Department
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CHAPTER V
INSTRUCTIONS, PROCEDURES, AND DRAWINGS

1. SCOPE

This chapter describes the general requirements for the preparation, review, approval, and control of instructions, procedures, and drawings for quality affecting activities. These requirements are applicable to Burns and Roe, Inc. and to contractors performing fabrication and site construction activities.

2. GENERAL DESCRIPTION

2.1 The Burns and Roe, Inc. program for assuring that quality affecting activities in compliance with 10CFR50, Appendix B are prescribed and accomplished in accordance with documented instructions, procedures, or drawings is based on a system which requires:

- . Each fabricator or construction site contractor to prepare and submit a quality assurance plan commensurate with the scope of work involved. Included in this plan shall be the commitment to a disciplined approach in the preparation, review, and modification of instructions, procedures, and drawings. This plan must indicate the measures used by the contractor to assure that the quality assurance organization reviews and concurs in inspection plans, tests, calibration, and special process procedures, developed drawings and specifications, and changes thereto, or indicates alternatives for Burns and Roe, Inc. evaluation. Additionally, the contractor is required to submit instructions, procedures, and drawings, such as welding, nondestructive testing, and testing procedures, conforming to the requirements imposed by Burns and Roe, Inc. procurement and construction contract documents.
- . Burns and Roe, Inc. working documents, such as instructions, procedures, drawings, and specifications, and changes thereto, are prepared, reviewed, and approved in accordance with this manual, project procedures, and company standards which outline the sequence of actions in detail.

2.2 Burns and Roe, Inc. procurement documents require each contractor to provide a quality assurance plan appropriate to the scope of

Subject Instructions, Procedures, CHAPTER V - and Drawings	Effective Date 8/29/80	Page 2 of 2	No. B&ROE-COM4-1-NP
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work. The procedurally controlled review of the submitted plan, by Burns and Roe, Inc., provides assurance of adequate contractor quality assurance involvement in the development, review, and approval of such documents as inspection plans, test, calibration and special process procedures, drawings, and specifications, as well as changes thereto.

Project procedures govern the generation of all documents utilized by project personnel engaged in the design and construction effort. These procedures provide the mechanism of project quality assurance involvement in the preparation, review, and approval of such documents as design criteria, project plan, inspection plan, and project technical specifications which provide the mechanism for issuance of project drawings.

- 2.3 Prior to use, contractor instructions, procedures, and drawings are subject to review and approval by project personnel.

This procedurally controlled and documented review requires responsible engineers and specialists (e.g. welding engineers, nondestructive examiners) to review and comment on submittals and report their findings to cognizant system or component engineers. The cognizant engineer makes final recommendations to project management which approves, approves with comment, or disapproves the submittal.

- 2.4 Instructions, procedures, and drawings include qualitative and quantitative acceptance criteria to verify that important activities have been satisfactorily accomplished.
- 2.5 Verification that instruction, procedure, and drawing programs are being effectively implemented is assured by a series of surveillances and audits performed by Quality Assurance personnel.



Subject

CHAPTER VI --
DOCUMENT CONTROL

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CHAPTER VI
DOCUMENT CONTROL

1. SCOPE

This chapter describes the general requirements for the control of documents which affect quality related activities. These requirements are applicable to Burns and Roe, Inc., fabrication and site construction contractors.

2. GENERAL DESCRIPTION

2.1 The Burns and Roe, Inc. document control program is governed by a series of policy statements, standards, and procedures contained in the CORPORATE OPERATIONS MANUAL. The document control program establishes methods to procedurally control the review, approval, issue, and revision of documents prior to release to assure document adequacy and incorporation of the appropriate quality requirements. These documents include:

- . Technical specifications
- . Design, manufacturing, construction, and installation drawings
- . Procurement documents
- . Project quality assurance plans
- . Corporate project procedures and instructions
- . Divisional procedures and instructions
- . Design criteria documents, such as project criteria document, system descriptions, and safety analysis reports
- . Design and engineering calculations
- . Documentation related to computer codes used in design and engineering
- . Contractor manufacturing, inspection, and testing procedures
- . Construction and operational test procedures

- . Design change requests and contract waiver requests
 - . Nonconformance reports including disposition information
 - . Topical reports
- 2.2 The project procedures and the Quality Assurance Department Manual identify the organizational elements responsible for reviewing, approving, issuing, and revising the above documents. Changes to the documents are reviewed and approved by the same organization that performed the original review and approval or by another delegated qualified organization.
- 2.3 The project instructions and procedures contained in a project plan for each nuclear power project detail the control placed upon documents issued by the project. These instructions and procedures specifically require that approved changes be included in documents, such as those listed in paragraph 2.1 above, prior to implementing the change through the use of appropriate change vehicles.
- 2.4 Document control centers for the project are established in the project engineering office and the construction site. Controlled documents are received, distributed, released, and controlled through these centers.
- 2.5 Approved documents, prepared by project engineering, are issued to the organizations responsible for performing the work. Status lists identifying these documents and their current revision status are issued periodically. These lists are updated and distributed to predetermined organizations to preclude use of obsolete or superseded documents. Transmittal forms, with provision for receipt acknowledgement, are employed to forward these documents.
- 2.6 The Burns and Roe, Inc. document control program for contractors is based on a system which requires each fabricator or construction site contractor to control their documents to the requirements imposed by procurement and construction contract documents. These contract documents require the contractors to submit a document control procedure as part of their quality assurance program describing the receipt, review, approval, distribution, and revision requirements of their document control program. Prior to use, the contractors document control program is reviewed and approved by Burns and Roe, Inc. project personnel. This procedurally controlled and documented review is the responsibility of the cognizant system or component engineer and includes review by a quality assurance engineer. Project management, based upon comments generated during this review, makes an approval determination.
- 2.7 Verification that the document control program is being effectively implemented is assured by a series of surveillances and audits performed by quality assurance personnel.



Subject

CHAPTER VII --
 CONTROL OF PURCHASED
 MATERIAL, EQUIPMENT,
 AND SERVICES

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CHAPTER VII
 CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

1. SCOPE

This chapter describes the general requirement to assure that supplier furnished items and services conform to the requirements of the procurement documents. These requirements are applicable to Burns and Roe, Inc. procurements of prepurchased items, including spares and replacement parts and site services.

2. GENERAL DESCRIPTION

- 2.1 Suppliers are selected on the basis of demonstrated or assessed capability to comply with the requirements of the technical specification and imposed quality program.
- 2.2 Source surveillance is performed by Burns and Roe, Inc. at a supplier's facility when prepurchased items are of such a nature that compliance with the procurement documents may not readily be accomplished during receiving inspection.
- 2.3 Surveillance activities are planned and performed in accordance with written procedures which incorporate the guidelines of ANSI N45.2.13.
- 2.4 Personnel performing surveillance activities are qualified or certified to written procedures which comply with the criteria of USNRC Regulatory Guide 1.58.
- 2.5 Systems, structures, or components which do not comply with the requirements are identified and dispositioned in accordance with Chapter XV, Nonconforming Materials, Parts, or Components, of this Manual.
- 2.6 All documents and records relating to supplier furnished items and services are maintained as described in Chapter XVII, Quality Assurance Records, of this Manual.

3. BIDDER EVALUATION

The Burns and Roe, Inc. Purchasing Department is responsible for providing project management with a recommended bidders list for procurement packages. Inclusion of a potential supplier on the recommended

bidders list is dependent upon satisfactory evaluation by the Quality Assurance Department. Evaluation factors include:

- . Quality history relative to current or previous procurement actions
- . ASME Certificate of Authorization (i.e., Code Stamp, Quality System Certificate)

4. SUPPLIER SELECTION

4.1 Suppliers are selected on the basis of responsiveness to the technical specification and assessed capability to furnish items or services to the specified quality. Evaluation of bids is described in Chapter IV, Procurement Document Control, of this Manual. In addition to the design and engineering technical evaluation, bidder proposals are reviewed by a quality assurance engineer for the following:

- . Adequacy of the suppliers' quality assurance manual or procedures submitted with the bid
- . Adequacy of the suppliers' methods for generating, submitting, and retaining specified documentation
- . Acceptability of the exceptions taken by the bidder to the quality assurance requirements

4.2 Prior to award, the required quality assurance audits of supplier facilities are conducted in accordance with project procedures and a report is furnished to the Purchasing Department for bidder notification. When appropriate, commitments for resolving audit findings are obtained. When shortcomings in supplier quality ability are identified, appropriate actions to supplement this quality program are recommended as a requisite for procurement.

In the event that the "CASE" Register is used as a factor in establishing the qualifications of a supplier, the documentation specifically identifies the source document (audit) used.

- 4.3 Awards are approved by project management subject to any required approval by the client.
- 4.4 Records of the results of supplier selection are maintained and filed in accordance with project procedures.

5. SURVEILLANCE PLANNING

5.1 The Manager of Corporate Quality Assurance is responsible for directing the planning, scope, and intensity of the Burns and Roe, Inc. surveillance activities applicable to a particular procurement.

- 5.2 Surveillance planning is performed in accordance with procedures included in the Burns and Roe, Inc. Quality Assurance Department Manual. The factors which determine the scope of the surveillance effort for a particular item or service are:
- . Quality classification
 - . Design complexity and state-of-the-art
 - . Special processes involved and the degree to which compliance can be demonstrated by end product examination or test
 - . Previous quality history of the supplier
- 5.3 Vendor and site surveillance plans are prepared which list the specific quality verification actions to be performed. These plans include:
- . Procedures to be reviewed
 - . Quality assurance program elements to be audited
 - . Special processes to be audited
 - . Inspections and tests to be witnessed
 - . Records required for acceptance
 - . Purchase orders to lower tier vendors/subcontractors to be reviewed
 - . Type and frequency of independent audits, inspections, or tests to be performed in evaluating the validity of suppliers' certificates of conformance
- 5.4 During the procurement cycle, reports of Burns and Roe, Inc. surveillances and audits are reviewed by management personnel on a continuing basis. Included in this review are reports of post-award surveys, process surveillances, quality program audits, inspections and tests witnessed, and supplier records reviewed. In addition, a deficiency analysis data system is maintained on suppliers of prepurchased equipment. When appropriate, the scope and intensity of the Burns and Roe, Inc. surveillance activities are increased or decreased commensurate with the suppliers demonstrated performance and with the importance, complexity, and quality of the item or service.
- 5.5 Surveillance plans are reviewed and approved by the Project Quality Assurance Manager and, when required, by the client.

6. SUPPLIER SURVEILLANCE

6.1 Vendor Submittals

Burns and Roe, Inc. technical specifications require the supplier to furnish documentary evidence of compliance to procurement requirements. Such documents, which include drawings; quality assurance manuals; procedures for the qualification of personnel, processes, and equipment; and records of the results of reviews, inspections, tests, and material analysis are reviewed and approved by project personnel. This procedurally controlled and documented review requires responsible engineers and specialists (e.g. metallurgists, quality assurance engineers, nondestructive examiners) to review and comment on submittals and report their findings to cognizant system or component engineers. The cognizant engineer makes final recommendations to project management which approves, approves with comment, or disapproves the submittal.

6.2 Source Surveillance

6.2.1 The Burns and Roe, Inc. vendor surveillance group is responsible for:

- . Auditing compliance of suppliers to their approved quality assurance program/plans
- . Verifying performance of selected processes, inspections, and tests in accordance with specified requirements

6.2.2 Source verification inspection and audit actions are detailed in vendor surveillance plans, approved by the project quality assurance group, and are implemented in accordance with the vendor surveillance procedures included in the Burns and Roe, Inc. Quality Assurance Department Manual.

6.3 Site Surveillance

6.3.1 Depending upon the scope of work authorized by a client, the project quality assurance group is responsible for verifying the quality of construction services and items furnished by site contractors.

6.3.2 This verification is accomplished by the following applicable processes:

- . Auditing site contractor quality assurance programs including controls over subcontractors
- . Performing verification inspections of selected processes, inspections, and tests during the fabrication and installation phases of construction

- . Performing receiving inspection or auditing receiving inspection activities of site contractors

7. RECEIVING INSPECTION

- 7.1 Prior to installation or use, receiving inspection of supplier furnished items is performed in accordance with appropriate procedures and item checklists. Generally the quality characteristics verified at receiving inspection will depend on the factors delineated in paragraph 5.2 above and the extent of source surveillance performed where applicable. As a minimum, all items received at a site are subject to the following verifications or reviews upon receipt:
- . Verification of correct part, assembly, or model
 - . Visual inspection for damage and adequacy of packaging and packing for anticipated storage condition
 - . Supplier documentation complies with the requirements of the Burns and Roe, Inc. technical specification
 - . Availability at the site of properly executed record of Burns and Roe, Inc. source surveillance (Release for Shipment)
- 7.2 Items processed through site receiving inspection stations are identified as described in Chapter VIII, Identification and Control of Materials, Parts, and Components, of this Manual.



Subject CHAPTER VIII -- IDENTIFICATION AND CONTROL OF MATERIALS, PARTS AND COMPONENTS	Effective Date 8/29/80	Initiated By Quality Assurance Department
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**CHAPTER VIII
IDENTIFICATION AND CONTROL OF MATERIALS,
PARTS AND COMPONENTS**

1. SCOPE

This chapter describes the general requirements and methods for the identification and control of materials, parts, and components, including partially fabricated assemblies. These requirements are applicable during design, procurement, installation, and construction site activities to prevent the use of incorrect or defective items.

2. GENERAL DESCRIPTION

2.1 The Burns and Roe, Inc. program for the identification and control of materials (including consumables), parts, components, and partially fabricated assemblies is based on a system which requires each fabricator or construction site contractor to identify and control items to the requirements imposed by the Burns and Roe, Inc. procurement and construction contract documents. These requirements indicate a method of identification to be applied to all components, assemblies, and subassemblies which has been developed for the entire project during the generation of specifications and design drawings. Verification of identification is performed and documented prior to shipment from the contractors facility.

2.2 These documents require that contractors prepare and submit an identification and control program consisting of the following elements:

- . Identification and control procedures to assure that identification is maintained on the item or on records traceable to the item (items may be identified by stenciled or etched markings, strip markings, imprinted tape, tagging, color coding, and other appropriate means approved by Burns and Roe, Inc.)
- . Large quantities or small items may be identified as to heat, batch, lot, or specification by applying markings to bags, bins, tanks, or other suitable containers
- . Markings are clear, unambiguous, and indelible and do not affect fit, functions, or quality of the item to which applied

- . Markings are not obliterated or hidden by surface treatment or coating unless other means of identification is substituted
 - . Identification of items is traceable to appropriate documentation such as drawings, specifications, purchase orders, manufacturing and inspection documents, deviation reports, and physical and chemical mill test reports
 - . Control on consumable material which assures use within prescribed dates and first-in/first-out usage
 - . Items are handled and stored in accordance with requirements of Chapter XIII, Handling, Storage, and Shipping, of this Manual so as to maintain identification
 - . Verification of correct identification is performed and documented prior to release for fabrication, assembly, shipment, or installation
- 2.3 Prior to use, the contractor's identification control program is subject to review by the cognizant system or component engineer. Approval, based on the cognizant engineer's review, is made by project management.
- 2.4 Verification that the identification and control program is being effectively implemented is assured by a series of surveillances and audits performed by quality assurance personnel.



Subject

CHAPTER IX --
CONTROL OF SPECIAL
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CHAPTER IX
CONTROL OF SPECIAL PROCESSES

1. SCOPE

This chapter describes the general requirements for the control of special processes. These requirements are applicable to all special processes, including welding, heat treating, casting, coating application, and nondestructive examination performed by or for Burns and Roe, Inc. by contractors and suppliers where special process controls, such as qualified procedures and personnel, are required to assure product quality.

2. GENERAL DESCRIPTION

2.1 The Burns and Roe, Inc. program for the control of special processes is based on a system which requires each fabricator or construction site contractor to control their special processes to the requirements imposed by the Burns and Roe, Inc. procurement and construction contract documents. These requirements are included in standards or generic specification sections which are developed from applicable codes or industry standards.

2.2 The contract documents require that contractors prepare and submit a special process program established by written procedures consisting of the following elements:

- . Operations to be performed
- . Sequence of the operations and their characteristics
- . Process controls
- . Measuring and test equipment required
- . Requirements for qualification of personnel, process, and equipment to the applicable code, standard, or specification
- . Requirements for documentation
- . Quantitative and qualitative acceptance criteria
- . Requirements for documentation of process, including establishment and implementation of a records control program which docu-

ments and maintains current qualification records of procedures, equipment, and personnel associated with the special process involved.

- 2.3 Prior to use, the contractor's special process control program is subject to review and approval by project personnel.
- 2.4 Documentation that provides verification of the satisfactory completion of the special process also must be submitted for review on a selective basis as defined in the specification or procurement document that imposed the original requirement.
- 2.5 Burns and Roe, Inc. may perform evaluation of special processes performed by contractors, such as nondestructive examination, as a part of its vendor or construction site surveillance activity. This work is performed by personnel qualified and certified in accordance with appropriate codes and standards. Records attesting to the qualification and certification are procedurally controlled and maintained current.
- 2.6 Verification that the contractor's special process control program is being effectively implemented is assured by a series of operational surveillances and audits performed by quality assurance personnel.



Subject

CHAPTER X --
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CHAPTER X
INSPECTION

1. SCOPE

This chapter describes the general requirements for the control of inspection of items to assure conformance to contract documents. These requirements are applicable to contractors performing fabrication or construction site activities.

2. GENERAL DESCRIPTION

2.1 The Burns and Roe, Inc. inspection program is based on a system which requires each contractor to inspect to a program in accordance with the applicable requirements of Regulatory Guides 1.30, 1.58, 1.94, 1.116, and 1.123. The requirements and mandatory inspection hold points for witness by Burns and Roe, Inc. personnel are imposed by Burns and Roe, Inc. procurement and construction contract documents.

2.2 These documents require that contractors prepare and submit an inspection program established by written procedures and checklists consisting of the following:

- . Identification of characteristics and activities to be inspected
- . Identification of the individuals or groups responsible for performing the inspection operation
- . Acceptance and rejection criteria
- . A description of the method of inspection
- . A list of the inspection equipment to be used and the requirements regarding accuracy of the equipment
- . Recording evidence of completing and verifying an inspection or test operation
- . A record of the results of the inspection operation
- . Documents necessary for inspection available prior to and at the general location of the inspection activity

- . Modified, repaired, or replaced items inspected in accordance with the original inspection methods (equivalent methods, where appropriate, require Burns and Roe, Inc. approval prior to inspection)
 - . Independence of inspection personnel from the individual or group performing the activity being inspected
 - . Inspector qualification in accordance with applicable codes, standards, and company training programs
 - . Indirect control by monitoring processing methods, equipment, and personnel if direct inspection is not possible due to configuration or production methods (both inspection and process monitoring are to be provided when control is inadequate without both)
 - . Requirements for documentation of inspection function, including establishment and implementation of a records control program which documents and maintains current qualification records and certification of inspection
- 2.3 Prior to use, the contractor's inspection program is subject to review by the cognizant system or component engineer. Approval, based on the cognizant engineer's review, is made by project management.
- 2.4 Verification that the contractor's inspection program is being effectively implemented is accomplished by a series of surveillances and audits performed by quality assurance personnel.
- 2.5 Inspection and test records required by procurement contract documents shall contain, as applicable:
- . A description of the type of observation
 - . Evidence of completing and verifying an inspection or test operation
 - . Evidence of acceptance required for documented waiver of hold points
 - . The date and results of the inspection or test
 - . Information related to conditions adverse to quality
 - . Inspector or data recorder identification
 - . Evidence as to the acceptability of the results by a responsible individual
 - . Actions taken to resolve any discrepancies noted



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CHAPTER XI
TEST CONTROL

1. SCOPE

This chapter describes the general requirements for controlling the testing of structures, systems, and components. These requirements are applicable to the activities performed by fabrication and construction site contractors and Burns and Roe, Inc.

2. GENERAL DESCRIPTION

2.1 The Burns and Roe, Inc. test control program is based on a system which requires each fabricator or construction site contractor to establish and implement a test program to the requirements imposed by Burns and Roe, Inc. procurement and construction contract documents. These requirements are included in standards, generic specification sections, and drawings which are developed from applicable codes or industry standards such as Regulatory Guides 1.30, 1.58, 1.94, 1.116, and 1.123. Any tests within the scope of Burns and Roe, Inc. responsibility are also covered by these requirements.

2.2 These contract documents require that contractors prepare and submit a test control program established by written procedures consisting of the provisions listed below, which also apply to the procedures prepared by Burns and Roe, Inc. project personnel:

- . Requirements and acceptance limits contained in applicable design and procurement documents
- . Instructions for performing the test
- . Establishment of necessary monitoring activities which will assure the accomplishment of test prerequisites including:
 - a. The use of calibrated instrumentation
 - b. Requirements for trained, qualified, or certified personnel to conduct the tests
 - c. Preparation, condition, and completeness of the item to be tested

- d. Suitable and controlled environmental condition
 - e. Method of data collection and storage
 - . Verification of test prerequisites having been met prior to test
 - . Mandatory hold points for witness by owner or his agent, contractor, or authorized inspector
 - . Acceptance and rejection criteria
 - . Method of documenting or recording test data and results
- 2.3 Prior to use, the contractor's test control program is subject to review by the cognizant system or component engineer. Approval, based on the cognizant engineer's review, is made by project management. Similarly, Burns and Roe, Inc. test control programs are subject to review and approval by the client.
- 2.4 Test results are documented, evaluated, and their acceptability determined by cognizant system and component engineers and submitted for client approval, as appropriate. Deviations from test requirements are referred to supervisory engineering personnel for disposition and resolution.
- 2.5 Modifications, repairs, and replacements to items are tested in accordance with approved procedures that comply with the original design and testing requirements or, where applicable, by acceptable engineers and approved by project management prior to use.
- 2.6 Verification that the test control program is being effectively implemented is assured by a series of surveillances and audits performed by quality assurance personnel.
- 2.7 Inspection and test records required by procurement contract documents shall contain, as applicable:
- . A description of the type of observation
 - . Evidence of completing and verifying an inspection or test operation
 - . The date and results of the inspection or test
 - . Information related to conditions adverse to quality or required environmental conditions
 - . Inspector or data recorder identification
 - . Evidence as to the acceptability of the results
 - . Action taken to resolve any discrepancies noted



Subject CHAPTER XII -- CONTROL OF MEASURING AND TEST EQUIPMENT	Effective Date 8/29/80	Initiated By Quality Assurance Department
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CHAPTER XII
CONTROL OF MEASURING AND TEST EQUIPMENT

1. SCOPE

This chapter describes the general requirements for control, calibration, and maintenance of measuring and testing devices employed on structures, systems, and components. These requirements are applicable to contractors and their subcontractors who are required to perform measurements and tests.

2. GENERAL DESCRIPTION

2.1 The Burns and Roe, Inc. program for the control of measuring and test equipment is based on a system which requires each fabricator or construction site contractor to control measuring and test equipment to the requirements imposed by Burns and Roe, Inc. procurement and site construction contract documents.

2.2 These documents require that contractors prepare and submit a program established by written procedures for the control of measuring and test equipment consisting of the following elements:

- . Written procedures describing the calibration technique and frequency, maintenance, and control of the measuring and test equipment used in the measurement, inspection, or test of safety-related items
- . Measuring and test equipment identified and traceable to the calibration test data
- . Measuring and test equipment labeled, tagged, marked, or properly identified by other suitable means to indicate the next calibration date
- . Measuring and test instruments calibrated at specified intervals based on the required accuracy, purpose, degree of usage, stability characteristics, and other conditions affecting the measurement
- . Determining and documenting the validity of previous inspections or tests when measuring and test equipment is found to be out of calibration (reinspection or retest of suspect items will be utilized as determined appropriate)

- . Calibration standards with an uncertainty (error) requirement of no more than one-fourth of the tolerance of the equipment being calibrated unless limited by the, "state-of-the-art" (responsible management of the contractors organization will provide documented authorization, proof of adequacy to requirements, and the basis for acceptance wherein the method of calibration uses a standard of accuracy less than the one-fourth requirement)
 - . Records maintained listing the complete status of all measuring and test equipment and standards under the calibration system and identification and removal from service of measuring and test equipment that have not been properly maintained or calibrated in accordance with specified schedules
 - . Reference and transfer standards traceable to nationally recognized standards, or where national standards do not exist, provisions established to document the basis for calibration
- 2.3 Prior to use, the contractor's program for the control of measuring and test equipment is subject to review and approval by Burns and Roe, Inc. This procedurally controlled and documented review is the responsibility of the cognizant system or component engineer and includes review by a quality assurance engineer. Project management, based on comments generated during the review, makes an approval determination.
- 2.4 Verification that the program for the control of measuring and test equipment is being effectively implemented is assured by a series of surveillances and audits performed by quality assurance personnel.



Subject CHAPTER XIII -- HANDLING, STORAGE, AND SHIPPING	Effective Date 8/29/80	Initiated By Quality Assurance Department
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CHAPTER XIII
HANDLING, STORAGE, AND SHIPPING

1. SCOPE

This chapter describes the general requirements for the handling, preservation, storage, cleaning, packaging, and shipping of items. These requirements are applicable to contractors performing fabrication or construction site activities.

2. GENERAL DESCRIPTION

- 2.1 The Burns and Roe, Inc. program for handling, preservation, storage, cleaning, packaging, and shipping of items is based on a system which requires each fabricator and construction site contractor to handle, preserve, store, clean, package, and ship items to the requirements imposed by Burns and Roe, Inc. procurement and construction contract documents. These requirements are included in standards or generic specification sections which are developed from applicable USNRC Regulatory Guide, codes, or industry standards.
- 2.2 These documents require that contractors prepare and submit a program for the control of handling, preservation, storage, cleaning, packaging, and shipping of items established by written procedures consisting of the following provisions:
- . Personnel qualification requirements necessary to implement program requirements
 - . Classification of equipment, parts, and components
 - . Packaging design and methods
 - . Shipping requirements and methods
 - . Receiving requirements and methods
 - . Cleaning requirements and procedures
 - . Storage requirements, recommendations, and procedures including long term storage periods
 - . Handling requirements, recommendations, and procedures

- . Contact preservative and special coating requirements and procedures
 - . Preventive maintenance requirements and procedures
 - . Records
- 2.3 Prior to use, the contractor's program for the control of handling, preservation, storage, cleaning, packaging, and shipping of items is subject to review and approval by Burns and Roe, Inc. personnel. This procedurally controlled and documented review is the responsibility of the cognizant system or component engineer and includes review by a quality assurance engineer. Project management, based on comments generated during the review, makes an approval determination.
- 2.4 At the construction site, materials and equipment are received, inspected, stored, and maintained in accordance with approved contractor procedures by the site contractor(s). Items are physically inspected upon arrival at the site and moved into prescribed storage areas or to the installation location if adequate protection is available. Appropriate measures are instituted during off loading to prevent handling damage. Immediate movement to the installation location is permitted if it would eliminate multiple handling and is compatible with the construction schedule. Special environmental conditions, such as inert gas atmosphere, specific moisture content levels, and temperature levels prescribed in procedures or specifications, are controlled at the site.
- 2.5 Provisions are made to provide adequate storage facilities and to preserve the integrity of items during storage, whether in place or in a specified area.
- 2.6 The items are stored in predetermined locations and storage levels. The storage levels used are: 1) indoor controlled environment, 2) indoor heated and ventilated 3) indoor or equivalent ventilated and 4) outdoor.
- 2.7 Provisions for surveillance, maintenance, segregation, preservation, release, and audit of stored items are provided, as appropriate, in accordance with approved procedures.
- 2.8 Verification that the contractor's program is being effectively implemented is assured by a series of surveillances and audits performed by quality assurance personnel.



Subject

CHAPTER XIV --
INSPECTION, TEST, AND
OPERATING STATUS

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CHAPTER XIV
INSPECTION, TEST, AND OPERATING STATUS

1. SCOPE

This chapter describes the general requirements for identifying and documenting the status of inspections or tests on structures, systems, and components and the status of the readiness of these items for initial operation. These requirements are applicable to contractors performing fabrication or construction site activities, and to the Plant Test and Operations Department when their function is included in the Burns and Roe, Inc. scope of services.

2. GENERAL DESCRIPTION

2.1 The Burns and Roe, Inc. inspection, test, and operating status program is based on a system which requires each fabricator or construction site contractor to control the inspection, test, and operating status of structures, systems, and components to the requirements imposed by the Burns and Roe, Inc. procurement and construction contract documents.

2.2 These documents require that contractors prepare and submit an inspection, test, and operating status program established by written procedures, consisting of the following provisions:

- . Identification of in-process and final inspection, test, and operating status of structures, systems, and components throughout fabrication, manufacture, storage, installation, and test
- . Identification status indicators provided by tapes, stamps, labels, manufacturing or test reports, or other suitable methods consistent with the requirements of Chapter VIII, Identification and Control of Materials, Parts, and Components, of this Manual
- . Procedural control of the application and removal of inspection and welding stamps and status indicators
- . Procedural control of system to preclude inadvertent bypassing of inspections and tests, and other critical operations

- . Identification of the status of nonconforming, inoperative, or malfunctioning structures, systems, or components to prevent inadvertent use
- 2.3 Burns and Roe, Inc. Plant Test and Operations Department is responsible for incorporating the requirements of paragraph 2.2 above in all preoperational or operational test procedures.
- 2.4 Prior to use, the inspection, test, and operating status program is subject to review by the cognizant system or component engineer. Approval, based on the cognizant engineer's review, is made by project management.
- 2.5 Verification that the inspection, test, and operating status program is being effectively implemented is assured by a series of surveillances and audits performed by quality assurance personnel.



Subject

CHAPTER XV --
NONCONFORMING MATERIALS,
PARTS, OR COMPONENTS

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CHAPTER XV
NONCONFORMING MATERIALS, PARTS, OR COMPONENTS

1. SCOPE

This chapter describes the general requirements for the identification, documentation, segregation, disposition, and notification to affected organization of nonconforming materials, parts, or components that are applicable to contractors performing fabrication or construction site activities and include Burns and Roe, Inc. interface requirements.

In addition, this program provides for the control of nonconformances which can occur during engineering and design (including computer codes) and construction within Burns and Roe, Inc. or service contractors.

2. GENERAL DESCRIPTION

2.1 The Burns and Roe, Inc. program for the control of nonconforming materials, parts, or components is based on a system which requires each fabrication or construction site contractor to control nonconformances to the requirements imposed by the Burns and Roe, Inc. procurement and construction contract documents.

2.2 These documents require that contractors prepare and submit a non-conformance control program consisting of the following elements:

- . Identification, documentation, segregation, review, and disposition of nonconforming materials, parts, or components controlled in accordance with established procedures
- . Notification of nonconforming conditions provided to Burns and Roe, Inc. where conditions do not meet specification requirements or contractor drawing requirements subject to Burns and Roe, Inc. approval
- . Nonconformance reports which identify the nonconforming item, describe the nonconformance, provide a disposition, describe any unique inspection requirements needed to accept the item disposition, and include signature approval of the disposition
- . Identification of the responsibility and authority of personnel who approve the disposition of nonconforming items

- . Provisions included for identification and segregation of nonconforming items
 - . Acceptability of rework or repair verified by reinspecting and retesting the item as originally inspected or tested and documentation of all rework, repair, inspection, or testing procedures (if an alternate method is required, due to the nature of the repair or rework, it must be at least equal to the original method)
 - . Nonconformance reports with a disposition of accept-as-is or repair included as part of the final data package for the item which shall be forwarded to Burns and Roe, Inc.
 - . Nonconformance reports analyzed periodically to determine any quality trends and the results reported to management for review and assessment
- 2.3 Prior to use, the contractor's nonconformance control program is subject to review and approval by the project. This procedurally controlled and documented review is the responsibility of the cognizant system or component engineer and includes review by a quality assurance engineer. Project management, based on comments generated during this review, makes an approval determination.
- 2.4 During the course of fabrication or construction site activities, any nonconformance reports generated which the contractor proposes to disposition as "accept-as-is" or "repair" require Burns and Roe, Inc. approval. This approval is obtained following a procedurally controlled and documented review which includes engineers and specialists (e.g. welding engineers, nondestructive examiners, metallurgists) appropriate to the discipline involved, as well as cognizant system or component engineers. Repair decisions are supported by approved repair procedures. The decision to approve a nonconformance report by project management, following the review, must be concurred in by the Project Quality Assurance Manager prior to transmittal to the contractor.
- 2.5 A nonconformance report summary is maintained by project quality assurance personnel, field or home office as appropriate, for the purpose of recording status of nonconformance reports. This summary assures timely closeout of individual nonconformance reports, initiation of corrective action requests, and performance of trend analysis. This report also provides assurance of the close out of nonconformances concerning preoperational testing of the items.
- 2.6 Verification that the nonconformance control system is being effectively implemented is assured by a series of surveillances and audits performed by quality assurance personnel.
- 2.7 During the course of the review, approval and/or verification of engineering and design work, the identification of drawings,

calculations, computer outputs or specifications, which do not conform to project criteria or sound engineering practice, is identified on appropriate documents such as design verification reports, audit reports, etc. These reports can result in cessation of work using the nonconforming documents until appropriate correction can be effected. Additionally, project management evaluates the condition and determines the need to report the condition and the proposed action as required by 10CFR50:55(e) and 10CFR21.



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CORRECTIVE ACTION

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CHAPTER XVI
CORRECTIVE ACTION

1. SCOPE

This chapter describes the general requirements for a system of corrective action based on an evaluation of conditions adverse to quality as identified by various program documents and reports. These requirements are applicable to all phases of engineering, design, procurement, and construction site activities.

2. GENERAL DESCRIPTION

- 2.1 All quality affecting activities performed by Burns and Roe, Inc. are subject to a verification process consisting of overchecks, reviews, approvals, surveillances, or audits. When conditions adverse to quality are detected during these processes, appropriate documentation is generated to assure identification and correction of the identified condition. These adverse quality conditions may be identified as nonconformances, deficiencies, deviations from procedure, or equipment failures or malfunctions.
- 2.2 When an evaluation of these reports and documentation indicates that a condition adverse to quality is significant, or where the cause of the condition cannot be immediately corrected, appropriate management of Burns and Roe, Inc. or the contractor is notified by means of a corrective action request.
- 2.3 Following receipt of the corrective action request, appropriate management is required to perform an investigation and evaluation of the noted condition and determine the extent to which the condition is adverse to quality, the required corrective action, and a schedule of correction. Additionally, project management evaluates the condition and determines the need to report the condition and the proposed action as required by 10CFR50:55(e) and 10CFR21.
- 2.4 Appropriate management promptly initiates the required corrective action as indicated by their evaluation. The corrective action response not only addresses the condition in existence, but also addresses the cause of the condition in such a manner as to prevent recurrence.
- 2.5 When the proposed corrective action has been implemented, the Quality Assurance Department initiates an evaluation of the action

taken to verify the correction has, in fact, addressed the condition and its cause. The results of this evaluation are documented as acceptable prior to closing the corrective action request.

- 2.6 When proposed corrective action is deemed unacceptable or ineffective, the corrective action system includes provisions to escalate the corrective action request to any necessary level of management until the condition is satisfactorily resolved.
- 2.7 Individual Project Quality Assurance Managers, the Manager of Vendor Surveillance and NDE, and the Manager of Quality Audits report significant conditions adverse to quality, the cause of the condition, the corrective action taken to preclude repetition, and the evaluation of the corrective action to the Manager of Corporate Quality Assurance in written reports. As determined appropriate, the Manager of Corporate Quality Assurance advises senior Burns and Roe, Inc. management regarding significant conditions adverse to quality.



Subject CHAPTER XVII -- QUALITY ASSURANCE RECORDS	Effective Date 8/29/80	Initiated By Quality Assurance Department
	Supersedes Chapter XVII dated 2/15/78	Approved By Office of the President

CHAPTER XVII
QUALITY ASSURANCE RECORDS

1. SCOPE

This chapter describes general requirements for the collection, storage, and maintenance of nuclear quality assurance records. These requirements are intended to assure that those records which furnish documentary evidence of the quality of items and of activities affecting quality are available when needed for their intended purpose. Quality assurance records include, but are not limited to: results of reviews, inspections, tests, audits, and material analyses; monitoring of work performance; qualification of personnel, procedures, and equipment; and other documentation such as drawings, specifications, procurement documents, calibration procedures and reports; nonconformance reports; and corrective action reports.

2. GENERAL DESCRIPTION

- 2.1 During the performance of power plant project work, completed documents furnishing evidence of the quality of items and of activities affecting quality will be controlled by the cognizant project consistent with the requirements of ANSI N45.2.9, "Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants." as applicable to the Burns and Roe, Inc. scope of supplied services and until such time as the completed records are submitted to the client or plant owner.
- 2.2 The preparation of quality assurance records by Burns and Roe, Inc. is governed by technical standards and written procedures and instruction to ensure that such records are legible, complete, adequately identifiable to the items or activities involved, and properly authenticated and dated by authorized personnel. Revisions, corrections, or supplements to quality assurance records will be accomplished in accordance with written procedures and instructions which provide appropriate review, approval, and inclusion of the date and identification of the person authorized to issue such revisions, corrections, or supplements.
- 2.3 When Burns and Roe, Inc. is delegated responsibility during the period of contract services for the retention of completed quality assurance records prepared by Burns and Roe, Inc., the retention of such records will be based on a system implemented by the cognizant project which provides that:

- The requirements for collection, filing, storing, maintenance, and disposition of such records will be defined, implemented, and enforced in accordance with written procedures, instructions, and other project documentation.
 - Index systems issued for such records will provide sufficient identifying information to be compatible with the index system specified by the client or plant owners for final storage of quality assurance records.
 - The retention period for each applicable record will be established in writing consistent with Appendix A of ANSI N45.2.9 until such time as the records are transferred to the client or plant owners for final storage.
 - The quality assurance record file will be retained in predetermined locations in accordance with written procedures and instructions, which provide for the maintenance, preservation, safekeeping, and retrieval of the records consistent with the requirements described in ANSI N45.2.9, until such time as the records are transferred to the client or plant owner for final storage. As an alternative to fire proof storage facilities and consistent with client requirements, duplicate files may be established.
- 2.4 When Burns and Roe, Inc. is delegated responsibility during the period of contract services for receiving completed quality assurance records prepared by other organizations, a receipt control system will be implemented by the cognizant project and, as a minimum, include:
- A records checklist designating the required quality assurance records
 - A record for quality assurance records received
 - Procedures for receipt and inspection of incoming quality assurance records to verify that the records are in agreement with the transmittal document and the records checklist and are in good condition
 - The capability to permit an up-to-date and accurate assessment of the status of quality assurance records during the receiving process.
- 2.5 When the Burns and Roe, Inc. scope of supplied services includes inspection or test responsibilities, required records will contain, where applicable, the following:
- A description of the type of observation
 - The date and results of the inspection or test

- . Information related to conditions adverse to quality
- . Evidence as to the acceptability of the results
- . Action taken to resolve any discrepancies noted



Subject CHAPTER XVIII -- AUDITS	Effective Date 8/29/80	Initiated By Quality Assurance Department
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CHAPTER XVIII
AUDITS

1. SCOPE

This chapter describes the general requirements for a system of planned and documented audits to verify compliance with all aspects of the quality assurance program and to verify the effectiveness of the program. These requirements are applicable to the audits performed on Burns and Roe, Inc. organizational elements at the corporate office and construction site locations, as well as the audits of construction site contractors and equipment or service suppliers.

2. GENERAL DESCRIPTION

- 2.1 The audit program, which is structured to meet the requirements and guidelines contained in Regulatory Guide 1.144 consist of both internal and external audits that are planned, documented, and conducted to assure coverage of all aspects of the Burns and Roe, Inc. quality assurance program.
- 2.2 All safety-related activities, and other appropriate activities which relate to quality of the service performed by Burns and Roe, Inc., are audited by the internal audit program. External audits of other organizations are performed by Burns and Roe, Inc. in compliance with client requirements and the project quality assurance plan.

Areas subjected to audit include, but are not limited to:

- . Early site activities regarding such features as core sampling, site preparation, foundation, preparation, meteorology, when such work is within the Burns and Roe, Inc. scope
- . Design and engineering activities
- . Procurement activities
- . Project indoctrination and training programs
- . Interface control methodology and procedures
- . Corrective action programs
- . Nonconformance control programs

- . Control of special processes
 - . Control of measuring and test equipment
 - . Commitment control systems
- 2.3 Audit schedules are prepared and published based on the status and safety importance of the activities being performed and initiated early enough to assure effective quality assurance during all phases of project activity.
- 2.4 The audit program is reviewed on a periodic basis and revised, as necessary, to assure that scheduling and coverage are maintained current and reflect ongoing quality assurance program activities.
- 2.5 Audit personnel have the necessary qualifications and are certified to the appropriate Quality Assurance Department procedure prior to the performance of audit activities. They are independent of any direct responsibility for the performance of the activity audited.
- 2.6 Audits are performed in accordance with the appropriate project procedure for the function or area audited. These project procedures include the following requirements:
- . Performance of audits in accordance with an individual audit plan or checklist
 - . Audit results documented and reviewed with management having responsibility for the area audited
 - . Objective evaluation of quality related practices, procedures, instruction, and the effectiveness of implementation.
 - . Objective evaluation of work areas, activities, processes, and items, as well as the review of documents and records
 - . Reaudit of deficient areas on a timely basis to verify implementation or corrective action
 - . Timely action by management of the area audited to correct deficiencies identified
- 2.7 Regularly scheduled audits are supplemented, when necessary, by audits for one of the following reasons:
- . When it is necessary to determine the capability of a supplier's quality assurance program prior to awarding a contract or purchase order
 - . When, after award of a contract, sufficient time has elapsed for implementing the quality program and it is appropriate to deter-

mine that the organization is adequately performing the functions defined in the program, codes, standards, and other contract documents

- . When significant changes are made in functional areas of the quality program, such as significant reorganization or procedure revisions
 - . When it is suspected that the quality of the item or service is in jeopardy due to deficiencies in the quality program
 - . When a systematic, independent assessment of program effectiveness is considered necessary
- 2.8 Audit data is analyzed on a periodic basis and reported to management for review and assessment. These reports identify quality trends and assess the effectiveness of the overall quality program.
- 2.9 The Manager of Quality Audits is responsible for implementing and administering the internal audit program on those activities under direct control of the corporation. This area of responsibility includes audits, as appropriate, of project engineering and administration, site construction management, site quality assurance, and vendor surveillance activities.
- 2.10 The Site Project Quality Assurance Manager is responsible for implementing and administering the audit program on site construction contractors when Burns and Roe, Inc. acts as the constructor or construction manager for the client.
- 2.11 The Manager of Vendor Surveillance and NDE is responsible for implementing and administering the audit program on material and equipment suppliers. This area of responsibility includes those functions defined in Chapter VII, Control of Purchased Material, Equipment, and Services, of this Manual.