QUALITY ASSURANCE PROGRAM DESCRIPTION

TOPICAL REPORT NO. BVTR-1-0A

POWER DIVISION
BLACK & VEATCH CONSULTING ENGINEERS
KANSAS CITY, MISSOURI

8003060554

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

JAN 3 1 1980

Mr. R. E. Blaisdell
Quality Assurance Manager
Black & Veatch Consulting
Engineers
P.O. Box 8405
Kansas City, MO 64114

Dear Mr. Blaisdell:

SUBJECT: NRC ACCEPTANCE OF BLACK & VEATCH TOPICAL REPORT ON QUALITY ASSURANCE (BVTR-1-0)

By your letter of December 19, 1979 you submitted the Black & Veatch Topical Report, BVTR-1-0, "Quality Assurance Program Description." This submittal reflects proposed changes resulting from our review of your February 20, July 2, and September 24, 1979 quality assurance topical report submittals and our meeting of November 1, 1979. The changes clarified the topical report concerning commitments to regulatory guides, the timeliness of design review, quality assurance for fire protection, and other similar items.

We find that the December 19, 1979 submittal of the topical report describes an acceptable quality assurance program for the design and procurement activities within the Black & Veatch Consulting Engineers' Power Division scope of work for nuclear power plants. Therefore, your topical report on quality assurance is acceptable, and you may implement it upon issuance. For the Black & Veatch quality assurance program description, applicants need only reference this topical report in Chapter 17 of license applications. We do not plan to re-review this topical report unless changes occur.

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

Please include this acceptance letter and its enclosure in each report, renumber the report BVTR-1-0A, date it per the date of this letter, and transmit 36 copies to the NRC. In your transmittal letter, indicate to which plant(s) this report will be applicable. Should you have any questions regarding our review or if we can provide assistance, please contact me or Mr. Jack Spraul on (301) 492-7741.

Sincerely,

Walter P. Haass

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

Enclosure:
Topical Report Evaluation

Topical Report Evaluation

Report Number: BVTR-1-OA
Report Title: Quality Assurance Program Description
Report Date: November 1979
Originating Organization: Black & Veatch Consulting Engineers
Reviewed By: Quality Assurance Branch

SUMMARY OF TOPICAL REPORT

Topical report BVTR-1-OA describes the quality assurance program which the Black & Veatch Consulting Engineers' Power Division applies to those design and procurement activities involving safety-related structures, systems, and components of nuclear power plants within the Black & Veatch scope of work. BVTR-1-OA commits Black & Veatch to comply with the requirements of Appendix B to 10 CFR Part 50 and to comply with the regulatory position provided by the NRC (with some exceptions which have been found acceptable by the NRC) in the following Regulatory Guides:

Regulatory Guide	Revision	Date
1.26	3	2/76
1.28	2	2/79
1.29	3	9/79
1.30	0	8/72
1.37	0	3/73
1.38	2	5/77
1.39	2	9/77
1.58	0	8/73
1.64	2	6/76
1.74	0	2/74
1.88	2	10/76
1.94	1	4/76
1.116	0	5/77
1.123	1	7/77
1.144	0	1/79

Black & Veatch has provided for our evaluation a detailed description of organizations and groups involved in implementing activities required by the quality assurance program and a delineation of duties, responsibilities, and authority of those organizations involved in the quality assurance program. BVTR-1-OA describes the measures used to carry out the Black & Veatch quality assurance program, and it describes how the applicable requirements of Appendix B to 10 CFR Part 50 will be satisfied by the administration and implementation of these measures.

SUMMARY OF REGULATORY EVALUATION

We have evaluated the quality assurance program and the organizations responsible for quality assurance functions as described in BVTR-1-OA. We find that quality

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

Based on our review and evaluation of BVTR-1-OA, we conclude that:

1. The organizations and persons performing quality assurance functions within Black & Veatch have the required independence and authority to effectively implement the quality assurance program without undue influence from those directly responsible for costs and schedules, and

2. The Black & Veatch quality assurance program contains the requirements and controls which, when properly implemented, comply with the requirements of Appendix B to 10 CFR Part 50 and the applicable regulatory guides and standards contained in Chapter 17 of the NRC Standard Review Plan.

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KANSAS CITY, MISSOURI 64114

December 1, 1978

POWER DIVISION

The general policy of the Power Division is to provide complete engineering services which fully satisfy the Owner's project needs, which result in economical installations of required quality and which satisfy applicable laws and regulations.

The objective of the Quality Assurance Program - Nuclear of the Power Division is to assure that this policy has been satisfied.

The policies and procedures set forth in this Quality Assurance Program - Nuclear shall be applied to the execution of services for nuclear power plants in connection with those systems, structures, and components which prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public and as required by the Nuclear Regulatory Commission.

The applicable Quality Assurance Program requirements established herein shall be carried out for each respective activity involving the management, planning, design, procurement, and for the evaluation of quality for any project for which the Division has been assigned responsibility.

The appropriate requirements set forth in this Quality Assurance Program - Nuclear shall also be applied to engineering or other services provided by others to Black & Veatch as included in the written specifications, agreements, etc., prepared specifically for each assignment for such services.

This Quality Assurance Program - Nuclear shall be implemented by the assigned Project Manager for safety-related designs for each nuclear project assigned to the Power Division, effective this date.

P. J. ADAM
HEAD OF POWER DIVISION

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B-0873

INTRODUCTION

The Quality Assurance (QA) Program is provided by the Black & Veatch (B&V) Power Division to assure that the required management, effort, and procedures are directed toward satisfying the quality objectives of providing safe and reliable designs for structures, systems, and components of nuclear power plants. This program description is structured in accordance with the outline of the 18 criteria of Appendix B of 10 CFR Part 50 and NRC Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants--Light Water Reactor Edition."

This document describes the QA Program which is applied by the B&V Power Division to safety-related design aspects of nuclear power plants. The design aspects of structures, systems, and components are classified "safety-related" if they would prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health or safety of the public. Services provided by B&V Power Division, identified and controlled by the QA Program described in this document, encompass the broad phases of:

- Conceptual and preliminary design,
- Systems and components design,
- Preparation of procurement documents,
- Review of contractor design and stress reports, and
- Preparation of construction drawings.

When required for specific application, the description of controls and assurance methods applied to other services will be included in regulatory license application documents. Other services that the Power Division may provide on a specific application basis could include the following.

- Contractor evaluation and selection.
- Supplier auditing, surveillance, and monitoring.
- Construction management.
- Preparation of start-up testing procedures.

The Black & Veatch Power Division is not structured and does not intend, at this time, to provide services or products related to the following.

- Fabrication and assembly of components or systems.
- Construction or erection service.
- Specific acceptance testing or inspection.

The Nuclear Regulatory Commission (NRC) will be given notification of programmatic changes in the QA Program prior to implementation, as described herein, except changes that reflect organizational changes. Organizational changes affecting the QA Program will be reported to the NRC within 30 days after implementation. This QA Program description will be reviewed at least annually and revised if necessary to reflect programmatic and organizational changes.

1.0 ORGANIZATION

1.1 ORGANIZATIONAL STRUCTURE

The firm of Black & Veatch is a partnership engaged in the practice of consulting engineering. The general management of the firm is vested in the administrative group consisting of a Managing Partner and five members designated Executive Partners. Fundamental policies and general direction for all divisions of the firm are established by the administrative group and are administered by the Managing Partner. An Executive Partner in the administrative group functions as the Head of the Power Division and administers the firm's policies within the Power Division. The organization of the firm is shown on Figure 1-1.

The organizational structure of the Power Division is shown on Figure 1-2. The Power Division's administrative organization includes the Head of the Power Division, the Manager of Engineering, the Manager of Administrative Services, the Quality Assurance Manager, the engineering department heads, the Support Services Department Head, and heads of the service groups. The Power Division administrative organization administers the personnel, programs, and facilities of the Power Division.

The Power Division utilizes project management organizations to provide overall management of the engineering services for each respective project. Project management personnel are assigned by the Head of the Power Division as needed. Interfacing between the project management organization and the discipline-oriented design personnel is accomplished by the project engineers. Project engineer responsibilities are systems oriented. This organizational arrangement allows flexibility for rapid response to normally changing project requirements. Ability to respond to changing project requirements is further enhanced through transfers of personnel between departments and between divisions, particularly with regard to technician and drafter classifications.

A typical project organization is shown on Figure 1-3. The project organization consists of project management and department engineering personnel assigned to support the project. Project Management includes

the Project Manager (who reports to the Head of the Power Division) the Assistant Project Manager, the Manager-Design, the Manager-Procurement, and Project Engineers.

Project Design Engineers (PDE) and other department personnel assigned to the project report to the Project Engineers.

The assurance of quality is a management function which includes coordination and implementation of an overall quality assurance program starting, in the case of power generation projects, with the Head of the Power Division who is responsible for the total quality program and who promulgates the Power Division policies and standards for the assurance of quality. The formulation of quality assurance methods and evaluation of the quality assurance program is assigned to the Quality Assurance Manager who reports functionally and administratively to the Head of the Power Division. Execution of the quality control program for design is the responsibility of personnel assigned to the project. The control of quality-affecting activities performed by personnel assigned to the project within each engineering department is the responsibility of the respective Project Design Engineers.

The Project Manager is supported by a staff which includes the Project Quality Control Engineer (PQCE).

Personnel who perform independent design reviews for the purpose of objectively determining the completeness, correctness, and adequacy of the designs are assigned by the Manager of Engineering. Personnel assigned to perform independent design reviews shall not be the same persons or the immediate supervisor of such persons who performed the original work except as specifically defined in Regulatory Guide 1.64, (Rev. 2, June, 1976). Scheduling and completeness of independent reviews is the responsibility of the Manager-Design.

1.2 DIVISION ORGANIZATION

1.2.1 Head of the Power Division.

The Head of the Power Division directs the operations of the Power Division through the Division's organizational structure, with established policies and procedures, and has the following responsibilities.

(1) Establish objectives and formulate policies for the Division.

(2) Provide Division Support Services.

(3) Establish the Division Quality Assurance Program and review and approve quality assurance program documents.

(4) Appoint Division staff personnel and management personnel for the departmentalized internal engineering organization.

(5) Appoint Project Management Personnel for each project.

(6) Monitor Division performance.

(7) Evaluate quality-affecting activities and determine courses of corrective action when needed.

(8) Coordinate management reviews of the Quality Assurance Program.

(9) Report significant deficiencies to the Owner.

1.2.2 Quality Assurance Manager.

The Quality Assurance Manager is responsible to the Head of the Power Division for application of the Quality Assurance Program and for the evaluation of its effectiveness. He functions as the Head of the Quality Assurance Group and is responsible for its activities.

The primary function of the Quality Assurance Group is to verify through audits that activities have been performed in compliance with the Quality Assurance Program.

The Quality Assurance Manager is delegated the authority and responsibility for the following.

(1) Establish Quality Assurance Group Procedures to carry out his responsibilities in an orderly and documented manner.

(2) Provide for the development or revision and review of Quality Assurance Program documents, procedures, etc.

(3) Select Quality Assurance Group personnel for assignment as Project Quality Control Engineer.

(4) Assist the Project Quality Control Engineer to develop indoctrination programs as appropriate and to provide assistance for the additional indoctrination of personnel whenever the need is indicated.

(5) Review and evaluate compliance with the Quality Assurance Program by auditing, identifying problems, and recommending corrective action or solutions when required.

(6) Report specific nonconforming items to appropriate management and verify correction of such nonconformances.

(7) Periodically review the effectiveness of the Quality Assurance Program and its procedures, and report findings to the Head of the Power Division.

(8) Initiate audits of quality assurance document distribution records and selected holders' copies for compliance with applicable quality assurance requirements.

(9) Assist Project Management in the establishment and preparation of applicable and effective quality control procedures for project design, procurement, and field engineering activities.

(10) Stop the release of documents found to be in nonconformance with the requirements of the Quality Assurance Program until responsible management has determined an acceptable disposition. Stop work that is causing repeated deficiencies.

(11) Coordinate quality assurance activities with the Owner.

(12) Report significant deficiencies to the Head of the Power Division.

(13) Provide for trends analyses.

1.2.3 Manager of Engineering

The Manager of Engineering is responsible to the Head of the Power Division for implementation of the design verification activities. The Manager of Engineering assures that the individuals assigned to design verification activity are independent of the project responsibilities and that the design verifications are completed.

1.3 PROJECT ORGANIZATION

1.3.1 Project Manager.

The Project Manager for a nuclear project shall coordinate with and report to the Head of the Power Division; shall manage the project; shall interface with Owner management; shall participate in the project as appropriate; shall monitor progress, schedules, and costs for the project; and shall carry out the project in accordance with the Quality Assurance Program.

The Project Manager shall participate in the important activities and decisions affecting the project and shall delegate work through assignments or written instructions.

The Project Manager is delegated the authority and has the responsibility to accomplish the following.

(1) Establish the administrative controls for project personnel and identify interfacing project organizations.

(2) Establish project instructions for the project, and communicate these to others assigned to the project.

(3) Initiate and develop documented programs for indoctrination of the project organization in the Quality Assurance Program.

(4) Resolve conflicts and correct discrepancies between project needs and the quality assurance program requirements.

(5) Establish engineering requirements for the project and review and approve the engineering schedule.

(6) Verify that appropriate design documents have been reviewed as required including appropriate review by the Owner, and that approved documents are followed in the execution of the work.

(7) Take corrective action where necessary to prevent or resolve deficiencies in the quality of work, project activities, and the engineering schedule.

(8) Establish positions in the project organization to meet the project requirements and instruct the assigned personnel as to their responsibilities and duties.

(9) Cooperate with the Quality Assurance Manager so that he can effectively perform functions for which he is responsible.

1.3.2 Manager-Procurement.

Responsibilities of the Manager-Procurement are as follows.

(1) Comply with the Owner's procurement policies and procedures and coordinate with the Project Manager.

(2) Implement the Quality Assurance Program in his area of responsibility.

(3) Implement the schedule for procurement.

(4) Coordinate design input requirements for procurements with Project Engineers.

(5) Coordinate the preparation, review, and production of bidding documents.

(6) Coordinate pre-bid activities with the Owner and Project Manager.

(7) Coordinate bid analyses and evaluations.

(8) Provide and distribute conformed contract documents as directed.

(9) Coordinate review and issuance of Contract changes.

1.3.3 Manager-Design.

Responsibilities of the Manager-Design include the following.

(1) Implement the Quality Assurance Program in his area of responsibility.

(2) Review the safety classification system for systems, structures, and components for final approval by the Project Manager.

(3) Interface with the Owner's engineering manager in connection with design coordination.

(4) Monitor interfacing activities between the Project Engineers and Owner's responsible engineers for system responsibilities by reviewing transmittals by Project Engineers, and by Owner relating to design for all systems. Any questions as to the content of transmittals shall be resolved with the respective Project Engineer, or by the Project Manager.

(5) Monitor the implementation of control of design documents and changes to design documents.

(6) Advise the Project Manager and the PQCE with respect to indoctrination of engineering personnel.

(7) Review design and monitor compliance with requirements for safety, reliability, operability, maintainability, and constructability. Any apparent deficiencies shall be resolved with the Project Engineer or by the Project Manager.

(8) Initiate timely reviews of significant design considerations with Project Management.

1.3.4 Project Engineers.

Each Project Engineer is responsible for functional plant systems assigned to him as follows.

(1) Implement the Quality Assurance Program in his area of responsibility.

(2) Coordinate with the Manager-Design and with the Project Manager.

(3) Implement the design engineering activities in accordance with the project schedule for systems for which he has been assigned responsibility.

(4) Interface with the Owner's representative for each system for which he has been assigned responsiblity including record keeping and correspondence applicable to such interface. He is responsible for all aspects of the system and for accomplishment of design engineering for the system or systems assigned to him.

(5) Provide inputs to the engineering data system for systems assigned to him.

(6) Provide engineering inputs to the management information system, as required.

(7) Provide the technical input for procurement for systems for which he is responsible through the staff assigned to the project by the respective design departments.

(8) Accomplish effective intersystem design coordination for systems for which he is responsible.

(9) Report and provide solutions to design nonconformances.

(10) Identify training requirements and coordinate with the PQCE.

(11) Communicate contemplated design changes appropriately to the Project Manager and Licensing Engineer for review and incorporation into licensing documents.

(12) Resolve conflicting design requirements or directions and provide suitable documentation of the solution.

(13) Interface effectively with the other Project Engineers to coordinate between systems.

1.3.5 Project Design Engineers.

Each Project Design Engineer and the Legal/Environmental Coordinator is responsible to:

(1) Carry out the work assigned to him by Project Engineers.

(2) Implement the Quality Assurance Program in his area of responsibility.

(3) Accomplish the detailed design engineering, documentation, inputs to the engineering data system, and other assigned project work in a coordinated, accurate, and complete manner.

(4) Carry out the design activities in accordance with the project schedule.

(5) Handle and review contractor's information.

1.3.6 Licensing Engineer.

The Licensing Engineer is responsible to:

(1) Identify regulatory requirements affecting the project.

(2) Direct the preparation, review, and production of:

(a) Environmental Reports.

(b) Safety Analysis Reports.

(c) Other licensing permits, as applicable, and as specifically required by the Owner.

(3) Provide requirements for and prepare necessary studies as inputs to licensing documents.

(4) Coordinate licensing activities with the Owner.

(5) Participate in the interfacing activities with regulatory agencies.

(6) Define licensing activities to be scheduled.

1.3.7 Project Quality Control Engineer(s).

The Project Quality Control Engineer(s) is a member of the Division Quality Assurance Group assigned to assist the Project Organization. The Project Quality Control Engineer(s) is responsible for the following assigned functions.

1.3.7.1 Quality Control. The Project Quality Control Engineer is responsible to verify to the Project Manager that conformance with the Quality Assurance Program is accomplished.

In fulfilling those responsibilities, the Project Quality Control Engineer has authority and responsibility to:

(1) Identify activities and documentation which do not comply with the Quality Assurance Program.

(2) Initiate corrective action requests.

(3) Verify the implementation of adequate solutions to problems affecting quality by monitoring the project activities.

(4) Confer with the Project Manager for direction to control further processing and to prevent incorporation of nonconforming items into the project, and/or to determine the corrective action for appropriate disposition of such items.

(5) Perform frequent surveys to verify conformance to the Quality Assurance Program and make written reports to the Project Manager, Quality Assurance Manager, and others as appropriate.

(6) Provide the Project Manager with analyses of trends in nonconformances.

(7) Coordinate project quality control activities with the Owner.

1.3.7.2 Indoctrination. The Project Quality Control Engineer is responsible to establish schedules for required indoctrination sessions for project personnel, coordinate the indoctrination session presentations, and maintain records showing that such sessions have been conducted.

Indoctrination shall include instructions in quality control responsibility, project instruction requirements, and other quality-related requirements.

I.3.7.3 Experience Reports. The PQCE shall verify that reports of nuclear industry experience are provided to appropriate project personnel.

I.3.8 Project Document Control Administrator.

The Project Document Control Administrator (PDCA) is responsible to the Project Manager to carry out the applicable provisions of this Quality Assurance Program related to Document Control. This includes:

(1) Receive and transmit documents.

(2) Identify documents.

(3) Index documents.

(4) Distribute and route documents to personnel having responsibility for action and those having need of information.

(5) File and store project documents and quality assurance records.

(6) Process permanent files through the Microfilm Center.

Processing and filing of procurement documents shall be coordinated with the requirements established in Article I.3.2.

I.4 QA GROUP

The primary function of the Quality Assurance Group is to determine, through audits, the adequacy and effectiveness of the quality-affecting activities and procedures used by the project organization. The Quality Assurance Group has sufficient authority and organizational freedom to carry out the following activities.

(1) Identify problems which adversely affect the quality of services rendered and initiate corrective action.

(2) Recommend solutions to quality problems through the appropriate project organization or administrative organization channels.

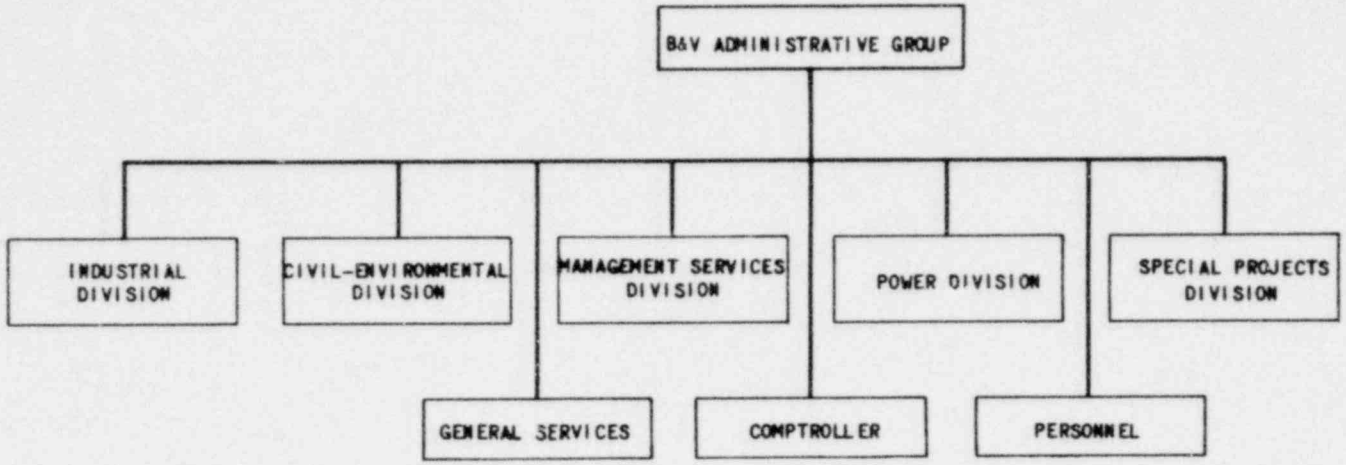
(3) Verify implementation of solutions to problems affecting quality of service.

(4) Stop document release and control further processing activities until designated management having responsibility for the affected area has determined appropriate disposition.

In addition to the audit function, the Quality Assurance Group monitors the training and indoctrination programs within the Power Division and provides assistance in QA indoctrination; provides qualified QA/QC personnel to assist in the review of safety-related design documents and in the evaluation of bidders' QA programs (See Article 7.1.3 and 7.2); participates in the processing of nonconforming item reports, evaluation of corrective actions, and assessment of quality trends; reviews vendors and contractors quality assurance program manuals when B&V is contractually responsible for this activity; and maintains appropriate files and records related to group functions.

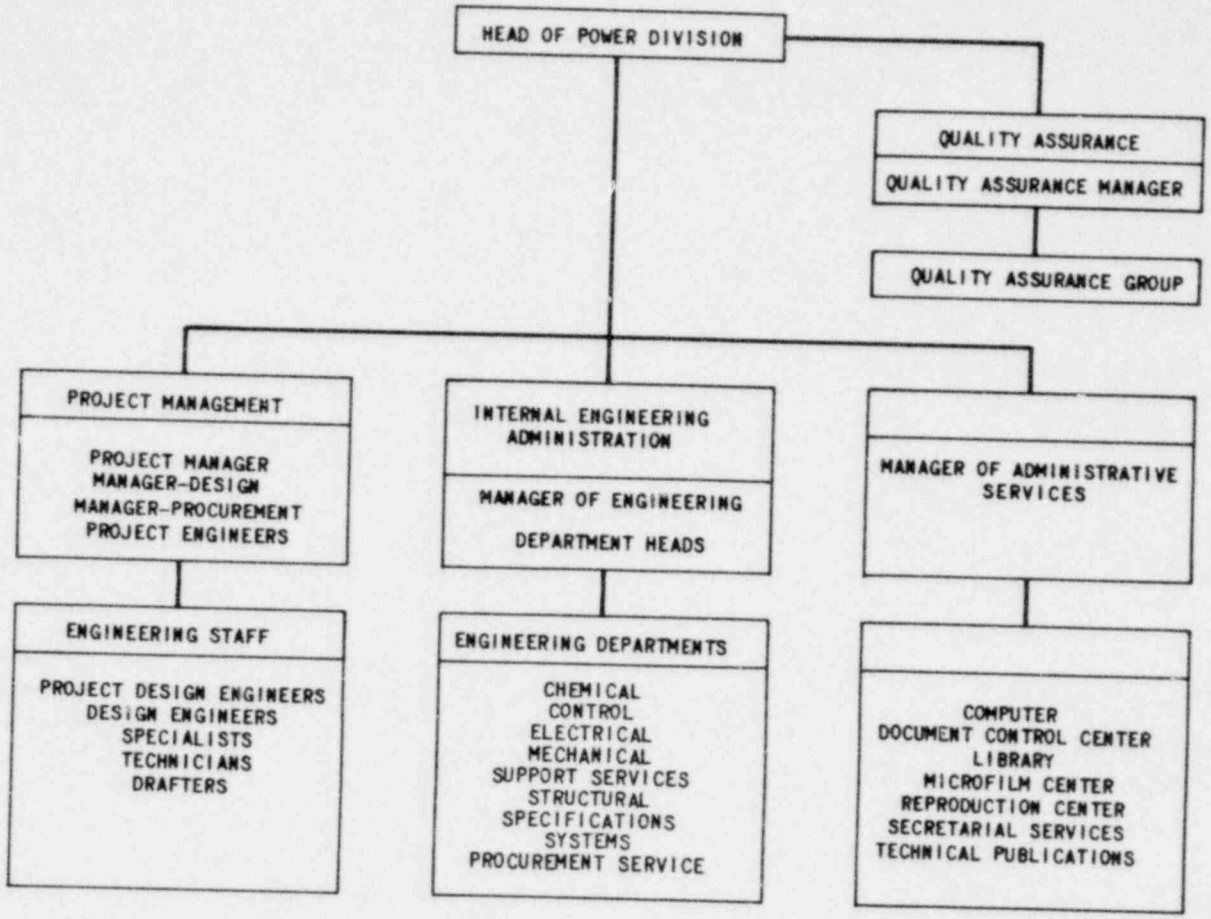
The Quality Assurance Group and the personnel within it are administratively independent of the project organization. This organization is responsible for supporting the Project Manager by providing objective audits to assure compliance with regulatory requirements and the applicable procedures of the Power Division.

Administratively, the Project Quality Control Engineer(s) are responsible to the Division QA Manager and, thus, may obtain resources of the Division QA Group in the execution of their responsibilities.



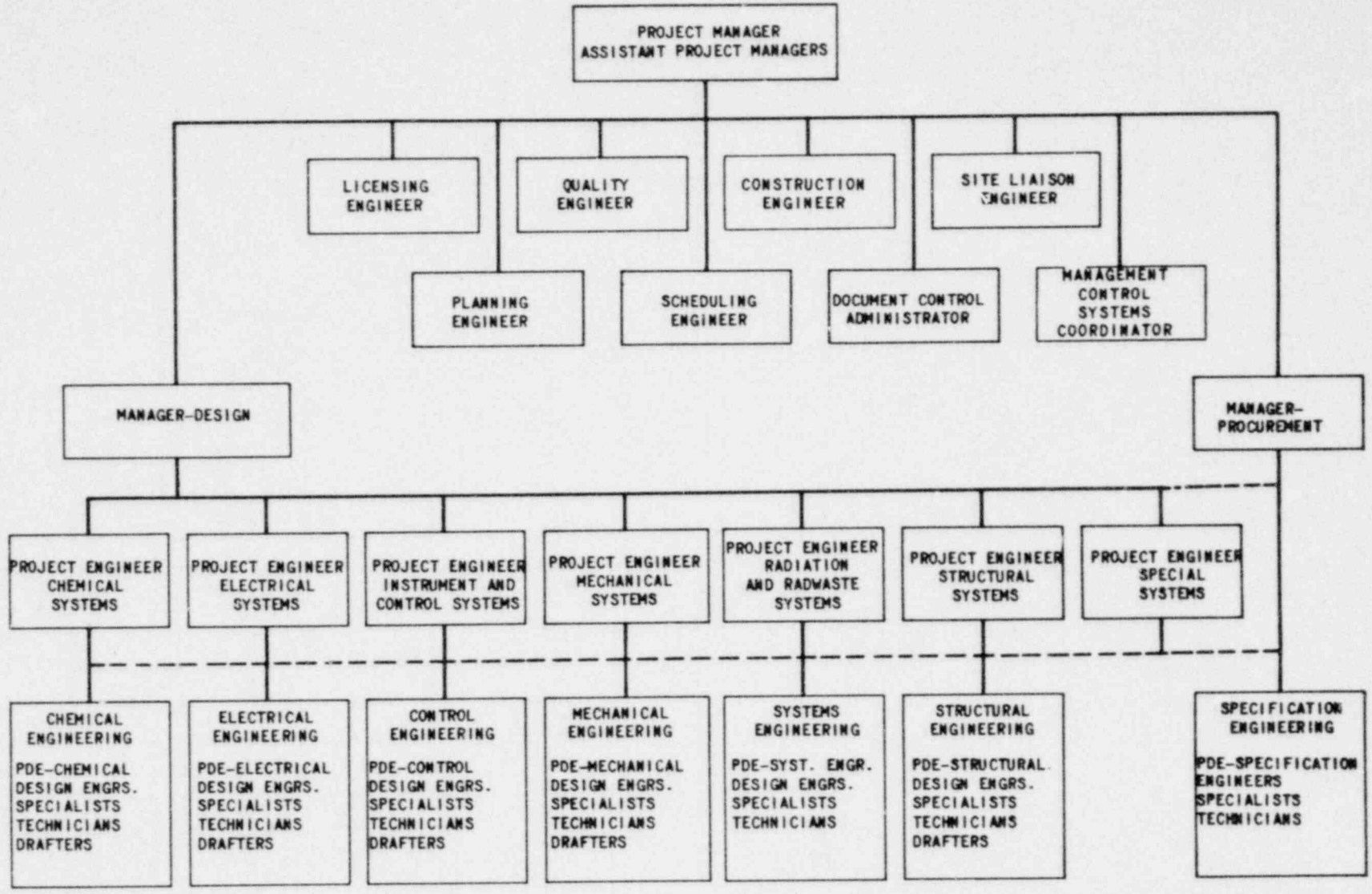
BLACK & VEATCH ADMINISTRATIVE ORGANIZATION

FIGURE 1-1



POWER DIVISION ADMINISTRATIVE ORGANIZATION

FIGURE 1-2



TYPICAL PROJECT ORGANIZATION

FIGURE 1-3

2.0 QUALITY ASSURANCE PROGRAM

2.1 DEFINITIONS

The following definitions are applicable to terms used in this report. Unless otherwise defined in this section, other QA terms are defined in ANSI N45.2.10, Quality Assurance Terms and Definitions.

Approver - An individual who reviews an activity for concept and conformity with codes and standards; the approver is a person other than the originator.

Audit - An activity to determine through investigation the adequacy of, and adherence to, established procedures, instructions, specifications, codes, and other applicable contractual and licensing requirements, and the effectiveness of implementation.

Checker - An individual, other than the originator or approver, who is qualified in the area being checked and who has the responsibility to check the activity and/or all revisions for completeness, clarity, and accuracy.

Designer - The individual who performed the design.

Deficiency - Any condition considered to be adverse to quality including inadequacies of personnel, procedures, systems, methods, or items.

Documents - Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results. Examples of documents are drawings, specifications, instructions and procedures significant to the design, construction, testing, maintenance and operation of nuclear safety related equipment and systems.

Item - Any level of unit assembly, including structure, system, subsystem, subassembly, component, part, or material.

Nonconforming Item Report - A report of a deficiency in characteristics, documentation, or procedure which renders the quality of an item unacceptable or indeterminate.

Quality Assurance Records - Those records which furnish documentary evidence of the quality of items and of activities affecting quality.

Quality Assurance Requirements - Inspection, testing, examination, certification, and documentation required to provide objective evidence of the conformance of an item or activity to design, engineering, standards, and code requirements.

Quality Control - Those quality assurance actions which provide a means to control and measure the physical characteristics of an item, process, or facility to established requirements.

Responsible Engineer - The engineer assigned responsibility for an item or service.

Revisions - Any addition, correction, deletion or change.

2.2 CONFORMANCE OF QUALITY ASSURANCE PROGRAM TO REGULATORY REQUIREMENTS

The Quality Assurance Program - Nuclear conforms to the applicable provisions of Regulatory Guides 1.28, 1.64, and 1.88, and the ANSI standards endorsed therein. Table 2-1, NRC Regulator Guide Positions, defines the issue and applicability of QA related regulatory guides to B&V. The Project Manager is responsible to see that other regulatory guides and industry standards are properly translated into appropriate policies, procedures, and other documents necessary to accomplish quality-affecting activities of the Power Division for a specific project in a controlled manner.

The details of the Quality Assurance Program - Nuclear and program application to be implemented on a nuclear power project and the means for implementing procedural details are contained in the Quality Assurance Program - Nuclear Standard Procedures. The Quality Assurance Program-Nuclear is submitted to the Owner to assure coordination of functions between the Owner and B&V. The application of the Quality Assurance Program-Nuclear to "SPECIAL" plant systems is defined in Table 2-5-PROGRAM APPLICABILITY FOR SPECIAL PLANT SYSTEMS.

2.3 IDENTIFICATION OF ESSENTIAL ITEMS.

Safety, seismic, and quality classifications of structures, systems, and components are identified in project essential items lists. The QA Program - Nuclear applies to those items identified as having the QA criteria of 10 CFR 50, Appendix B applied. The project essential items list shall include as a minimum ALL items included in the Owner Safety Analysis Reports. The project essential items list is part of the defined minimum content of the Project Design Manual (See Table 2-1, SP 3.2). Standard procedure SP 3.2 requires approval of the Manager-Design for issue and changes and reviews for consistency with regulation requirements.

2.4 TIMELY ESTABLISHMENT OF THE PROGRAM.

Quality assurance planning for a nuclear power project is initiated at the project inception and is continued in parallel with the total project planning and scheduling activities.

Standardized procedures have been developed which cover each applicable subject to effectively satisfy the needs of the project organization in carrying out the Quality Assurance Program requirements. Consequently, a coordinated manual has been issued to provide standard procedures for application by the various project organizational levels. The Quality Assurance Program - Nuclear includes the standard procedures.

As a means of providing for interfaces and coordination of functions between the Owner and B&V and other project participants, procedures which are unique to the project requirements are established and issued in the B&V Project Instruction Manual. The Project Instructions shall not conflict with the committments in this Topic Report with prior NRC approval.

Engineering activities are carried out in accordance with these manuals. Internal audits and indoctrination is accomplished using these manuals as the basis.

2.5 DOCUMENTED POLICIES AND PROCEDURES.

The general policy of Black & Veatch is to provide complete engineering services which fully satisfy the Owner's project needs, which result in economical installations of required quality, and which satisfy applicable laws and regulations.

The objectives of the Quality Assurance Program - Nuclear is to assure that these policies have been satisfied. The information set forth in the Quality Assurance Program - Nuclear implements these policies.

The Quality Assurance Program Description docketed as Topical Report BVTR-I-0A is carried out through the B&V Quality Assurance Program - Nuclear. The Topical Report is an accurate summary description of the Quality Assurance Program - Nuclear. The Quality Assurance Program -

Nuclear contains the policies as provided by the Head of the Power Division. It also contains specific standard procedures for the implementation of the Quality Assurance Program. Those Regulatory Guides and ANSI document requirements applicable to the activities within the Black & Veatch Organization are incorporated in the procedures as methods for accomplishing the activities. The implementation of those Regulatory Guides than must be accomplished by others will be incorporated as requirements in procurement documents. The minimum content of procurement documents is addressed in the Standard Procedure 4.2. Every procurement document for safety-related activities is reviewed by the project management organization as well as the Quality Assurance Organization for verification of the implementation of the ANSI documents and Regulatory Guides.

The requirements of the Quality Assurance Program - Nuclear are carried out for each respective activity involving the management, planning, design, preparation of procurement documents and for the evaluation of quality.

The appropriate requirements set forth in the Quality Assurance Program - Nuclear are applied to engineering or services provided by others to B&V as defined in written specifications, instructions, etc.

The policies and practices set forth in the Quality Assurance Program-Nuclear apply to the execution of services for nuclear power plants in connection with those systems, structures, and components which prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. Table 2-2 lists the quality assurance criteria of 10 CFR 50, Appendix B, and identifies Black & Veatch Quality Assurance Program-Nuclear implementing documents. Table 2-2 also lists the criteria of ANSI N45.2 and ANSI N45.2.11 and identifies the corresponding Quality Assurance Program-Nuclear implementing documents. The table reflects the policies established in the Quality Assurance Program-Nuclear and program application.

A summary of the implementing procedures contained in the Quality Assurance Program-Nuclear is shown in Table 2-3, B&V, Quality Assurance

Program Standard Procedure Content Summary. Table 2-4 provides a summary of typical project instructions used to provide project unique interface requirements.

Procedures required for future activities will be completed prior to initiation of the activity to be controlled.

2.6 INDOCTRINATION AND PERSONNEL TRAINING

A letter of promulgation, signed by the Head of the Power Division, is incorporated into all copies of the Quality Assurance Program - Nuclear manuals. This letter communicates that the Quality Assurance Program -Nuclear is established as a mandatory program to achieve quality in providing engineering services for nuclear projects.

Indoctrination of personnel assigned to the project is the responsibility of the Quality Assurance Group. The indoctrination includes:

(1) Personnel responsible for performing quality-affecting activities are instructed as to the purpose, scope, and implementation of the quality-related manuals, instructions, and procedures.

(2) Personnel verifying activities affecting quality are trained in the principles, techniques, and requirements of the activity being performed.

(3) For formal training programs, documentation includes the objective, content of the program, attendees, and date of attend ance.

(4) Proficiency of personnel performing and verifying activities affecting quality is maintained by retraining, reexamining, and/ or recertifying as determined by management or program commitment.

2.7 QUALIFICATION OF RESPONSIBLE PERSONNEL

Personnel responsible for assuring the effective implementation of the Quality Assurance Program-Nuclear are selected on the basis of their technical qualifications and proven abilities commensurate with assigned responsibilities. The designated Project Manager and Manager-Design shall have a minimum of 10 years of engineering experience. The Manager-Design shall have 5 years experience associated with nuclear power plant design or construction. Minimum requirements for the Power Division Quality Assurance Manager include a Bachelor's degree in science or engineering and 8 years of appropriate experience. At least 2 of the

8 years of experience must be in QA/QC activities and one of the 8 years must include management direction of technical personnel and/or activities.

2.8 CONTROLLED CONDITIONS AFFECTING QUALITY

Design activities of the Power Division are accomplished under the close surveillance of engineers with many years of experience in power generation system design.

Documented design guidance in the form of engineering standard practices are used as applicable. Control of design is also provided by a comprehensive system of design review as described in Section 3.

2.9 MANAGEMENT REVIEW OF QUALITY ASSURANCE PROGRAM STATUS AND ADEQUACY

The Power Division Quality Assurance Manager is responsible for auditing the project organization to determine compliance with Quality Assurance Program-Nuclear policies and procedures. Audit reports to management contain brief, narrative descriptions of QA Program progress and accomplishments, summaries of current problems or a summary of nonconformances with analyses and corrective action status, and recommendations for improvements in the QA Program where appropriate.

The Project Manager reviews the Quality Assurance Program implementation within his areas of responsibility and recommends changes as necessary to bring the program and its implementation into agreement should deviations exist. Such reviews may uncover the need for changes in Power Division policy which are referred to the Head of the Power Division for resolution. The Head of the Power Division is advised of the results of these reviews so that he may initiate any changes in organization, Division policy, Quality Assurance Program, or the methods of implementation necessary for improving the effectiveness of the QA Program. Any disputes concerning the QA Program that cannot be resolved within the project organization will be resolved by the Head of the Power Division.

The Head of the Power Division is responsible for the overall management review and assessment of the Black & Veatch QA Program. This review is accomplished in accordance with written procedures and is

directed toward determining the adequacy of the QA Program and its compliance with 10 CFR 50, Appendix B. Specific predetermined elements of the review are accomplished through assignments to B&V personnel knowledgeable in management, the QA Program, and QA requirements. The individual(s) assigned to complete a Management Review task shall be independent of the individual(s) directly responsible for the implementation of the subject under review. Individuals who have prepared specific QA Program documents will not be assigned Management Review tasks associated with those documents. The assignments are made in a sequence to complete the program review on an annual basis. Based on his review of documented report findings, the Head of the Power Division issues memorandums which identify and direct appropriate corrective actions. The memorandums for corrective action are documented, issued to appropriate personnel, and followed up for resolution.

TABLE 2-1. NRC REGULATORY GUIDE POSITIONS

NRC Regulatory Guide	ANSI Standard	Black & Veatch Position
1.26--Rev 3 Feb. 1976 "Quality Group Classifications and Standards for Water, Steam, and Radioactive Waste-containing Components of Nuclear Power Plants.	N/A	B&V will implement the regulatory position of Regulatory Guide 1.26 by including the codes, standards and quality requirement in procurement documents.
1.28--February, 1979, Rev. 2 "Quality Assurance Program Requirements (Design & Construction)"	N45.2-1977	Comply with the provisions of Regulatory Guide 1.28 (Feb. 1979) and the requirements and guidelines in ANSI N45.2-1977, except as follows: 1. Section 4.3, second paragraph, first sentence: This sentence is not considered applicable since the first paragraph of Section 4.3 identifies three alternate methods for verifying or checking the adequacy of design. All other sentences of Section 4.3 will be complied with. 2. Section 14, second paragraph, second sentence: This sentence is interpreted to mean that necessary handling tools and equipment will be used and controlled. It does not mean that B&V will necessarily provide handling tools and equipment. The provision of such tools and equipment is a contractual consideration. 3. Section 18, fourth paragraph, first sentence: To the extent required by contract, B&V will maintain records which correctly identify the "as built" condition of items for the life of the particular item, rather than for the life of the plant. 4. Section 18, fourth paragraph, second sentence: This sentence is not considered applicable. Refer to the committed B&V position on Regulatory Guide 1.88.

TABLE 2-1 (Continued). NRC REGULATORY GUIDE POSITIONS

NRC Regulatory Guide	ANSI Standard	Black & Veatch Position
1.29--Rev 3 Sept. 1979 Seismic Design	N/A	The classification provided by this regulator guide will be applied in B&V design documents.
1.30--August 11, 1972, "Quality Assurance Requirements for the Installation, Inspection & Testing of Instrumentation & Electrical Equipment	N45.2.4-1972	Implement regulatory position through the inclusion of applicable requirements in procurement documents.
1.37--March 16, 1973, "Quality Assurance Requirements for Cleaning of Fluid Systems & Associated Components of Water-Cooled Nuclear Power Plants."	N45.2.1-1972	1. Implement the regulatory portion of Regulatory Guide 1.37 (March 16, 1973) and the requirements and recommendations in ANSI N45.2.1-1973, through procurement documents except as follows: Section 5, sixth paragraph, recommends that local rusting on corrosion-resistant alloys be removed by mechanical methods. This recommendation shall be interpreted to mean that local rusting may be removed mechanically, but that it does not preclude the use of other removal means. Removal methods shall be controlled to assure that harmful effects to products are prevented. 2. B&V will reference the NSSS standards or methods in those areas of the plant designed and specified by the NSSS.

TABLE 2-1 (Continued). NRC REGULATORY GUIDE POSITIONS

NRC Regulatory Guide	ANSI Standard	Black & Veatch Position
1.38--May, 1977, Rev. 2 "Quality Assurance Requirements for Packaging, Shipping Receiving, Storage & Handling of Items for Water Cooled Nuclear Power Plants."	N45.2.2-1972	Implement provisions of Regulatory Guide 1.38 (May 1977) and the requirements and guidelines in ANSI N45.2.2-1972, except as follows: 1. Section 3.7.1(1): B&V will specify cleated, sheathed boxes up to 1,000 lb rather than 500 lb. This type of box is safe for, and has been tested for, loads up to 1,000 lb. Other national standards allow this; see Federal Specification PPP-B-601. 2. Appendix Section A3.4.1(4) and (5). During printing of this document, a transposition occurred between the last sentence of (4) and (5). The correct requirements are as follows: (4) "However, preservatives for inaccessible inside surfaces of pumps, valves and pipe for systems containing reactor coolant water shall be the water flushable type." (5) "The name of the preservative used shall be indicated to facilitate touch up."
1.39--Rev. 2, Sept, 1977 "Housekeeping Requirements for Water-Cooled Nuclear Power Plants."	N45.2.3-1973	Invoke requirements, in Construction Contracts, of Regulatory Guide 1.39 (September 1977) and the requirements and guidelines in ANSI N45.2.3-1973.

TABLE 2-1 (Continued). NRC REGULATORY GUIDE POSITIONS

NRC Regulatory Guide	ANSI Standard	Black & Veatch Position
1.58--August 1973, "Qualification of Nuclear Power Plant Inspection, Examination & Testing Personnel."	N45.2.6-1973	Comply with the provisions of Regulatory Guide 1.58 (August 1973) and the requirements and recommendations in ANSI N45.2.6-1973, except as follows: Section 2.2, taken together with Table 1, indicates that a person who approves inspection and test procedures must be certified as meeting Level III capability requirements. Not all B&V personnel who approve inspection and test procedures will be certified as meeting Level III capability requirements. However, personnel who approve inspection and test procedures will be determined by B&V management, through evaluation of their education, training, and experience, to be fully qualified and competent to approve such procedures. The basis for the determination will be documented, such as engineering registration, certification, or past experience.
1.64--Rev. 2, June 1976, "Quality Assurance Requirements for the Design of Nuclear Power Plants"	N45.2.11-1974	Comply with the provisions of Regulatory Guide 1.64--Rev. 2, except: (1) An individual who contributed to a given design may participate in a group verification of that design provided that individual who contributed to the design (a) does not verify his contribution and (b) does not serve as the chairman or leader of the group verification activity.
1.74--February 1974, "Quality Assurance Terms & Definitions."	N45.2.10-1973	Implement regulatory position.

TABLE 2-1 (Continued). NRC REGULATORY GUIDE POSITIONS

NRC Regulatory Guide	ANSI Standard	Black & Veatch Position
1.88--Rev. 2, Oct. 1976, "Collection, Storage & Maintenance of Nuclear Power Plant Quality Assurance Records."	N45-2.9-1974	Comply with the provisions of Regulatory Guide 1.88, Revision 2 (Oct. 1976) and the requirements and guidelines in ANSI N45.2.9-1974, except as follows: Section 3.2.2, fourth sentence: This sentence is not considered applicable. B&V will comply with a substitute sentence which reads: "Index systems used by organizations for the retention of quality assurance records shall provide information which can be used to identify equipment or material."
1.94--Rev 1, April 1976, "Quality Assurance Requirements for Installation, Inspection, & Testing of Structural Concrete & Structural Steel During the Construction Phase of Nuclear Power Plants."	N45.2.5-1974	Provide for the implementation of the requirement by inclusion of provisions in construction contracts.
1.116 May 1977 "Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems"	N45.2.8-1975	Provide for the implementation of the requirement by inclusion of provisions in construction contracts.

TABLE 2-1 (Continued). NRC REGULATORY GUIDE POSITIONS

NRC Regulatory Guide	ANSI Standard	Black & Veatch Position
1.123 Rev. 1, July 1977 "Quality Assurance Requirements for Control & Procurement of items and services for Nuclear Power Plants."	N45.2.13-1976	Comply with the Regulatory Guide 1.123 for the actions within B&V scope of service and implement the requirements by inclusion of applicable provisions in procurement specifications.
1.144 Jan. 1979 (for comment) "Auditing of Quality Assurance Programs for Nuclear Power Plants."	N45.2.12-1977	Comply with the Regulatory Guide 1.144 for conducting audit programs.

TABLE 2-2

BLACK & VEATCH, CONSULTING ENGINEERS
POWER DIVISION QUALITY ASSURANCE PROGRAM - NUCLEAR
AND PROGRAM APPLICATION MATRIX

QUALITY ASSURANCE ELEMENTS	REQUIREMENT DOCUMENTS: NRC (AEC) Reg. 10 CFR 50, APPENDIX B CRITERION	REQUIREMENT DOCUMENTS: ANSI N45.2 (SECTION NO.)	REQUIREMENT DOCUMENTS: ANSI N45.2.11 (SECTION NO.)	RESPONSE DOCUMENT: POWER DIVISION QA PROGRAM (PARAGRAPH NO.)	IMPLEMENTING STANDARD DOCUMENTS: DIVISION STANDARD PROCEDURES (PROCEDURE NO.)	PROJECT UNIQUE DOCUMENT: BFS PROJECT INSTRUCTIONS
I. ORGANIZATION[a]						1.0
1) Responsibility for establishment and execution of a quality assurance program.	I	1.3, 3.0	2.1	1.2.2		
2) Responsibility and authority for attaining and verifying quality.	I	2.0, 3.0	2.1	1.3		
3) Responsibility for quality assurance program management and direction.	*	3.0	2.1	1.2.2		
4) Independency of personnel performing verification actions.	I	3.0	6.1, 6.2, 6.3	3.7	3.9	
II. QUALITY ASSURANCE PROGRAM[a]				TOTAL MANUAL		4.0
1) Planned and documented program for assurance of quality.	II	2.0	2.1, 2.2, 2.3	2.1	Table 2-1	
2) Items and services covered by quality assurance program.	II	2.0	2.2, 2.3	2.4.1	3.2	
3) Organizations covered by quality assurance program.	See Element 2.	2.0 3.0	2.1	2.4.1		
4) Determination of appropriate quality requirements.	II	2.0	2.2	2.4.1		
5) Controlled conditions for activities affecting quality.	II	2.0	2.2	2.7		

TABLE 2-2 (Continued)

QUALITY ASSURANCE ELEMENTS	REQUIREMENT DOCUMENTS: NRC (AEC) Reg. 10 CFR 50, APPENDIX B CRITERION	REQUIREMENT DOCUMENTS: ANSI N45.2 (SECTION NO.)	REQUIREMENT DOCUMENTS: ANSI N45.2.11 (SECTION NO.)	RESPONSE DOCUMENT: POWER DIVISION QA PROGRAM (PARAGRAPH NO.)	IMPLEMENTING STANDARD DOCUMENTS: DIVISION STANDARD PROCEDURES (PROCEDURE NO.)	PROJECT UNIQUE DOCUMENT: BFS PROJECT INSTRUCTIONS
6) Recognition of need for special skills, processes, and equipment.	II	2.0	2.2	2.6	2.1, 2.3, 2.5	
7) Indoctrination and training of personnel.	II	2.0	2.2	2.5	2.2	
8) Management review of quality assurance program status and adequacy.	II	2.0	2.2	2.8	2.4	
III. DESIGN CONTROL[a]						
1) Documented planning of design activities.	☆	☆	(ALL)	3	3.1	2.0, 3.0, 7.0
2) Translation of design requirements into design documents.	III	4.1	3.1, 4.2	3.2	3.2, 3.3	
3) Inclusion of quality standards in design documents.	III	4.1	3.2, 4.1	3	3.4	
4) Control of deviations from design requirements and quality standards.	III	4.1	4.1	3.5		
5) Review of material and processes for suitability.	III	4.1	☆	3.5		
6) Control of design documents.	III	4.2	4.2, 4.3, 4.4, 4.5	3.5 and others	Various	
7) Identification and control of design interfaces.	III	4.2	5.1, 5.2	3.6	Various	
8) Independent verification of design adequacy.	III	4.3	6.1, 6.2, 6.3	3.7	3.9	
9) Control of design changes.	III	4.4	2.2, 8.0	3.8	3.10	
10) Design holds.	☆	☆	☆			
11) Reports	☆	☆	☆		3.7	

TABLE 2-2 (Continued)

QUALITY ASSURANCE ELEMENTS	REQUIREMENT DOCUMENTS: NRC (AEC) Reg. 10 CFR 50, APPENDIX B CRITERION	REQUIREMENT DOCUMENTS: ANSI N45.2 (SECTION NO.)	REQUIREMENT DOCUMENTS: ANSI N45.2.11 (SECTION NO.)	RESPONSE DOCUMENT: POWER DIVISION QA PROGRAM (PARAGRAPH NO.)	IMPLEMENTING STANDARD DOCUMENTS: DIVISION STANDARD PROCEDURES (PROCEDURE NO.)	PROJECT UNIQUE DOCUMENT: BFS PROJECT INSTRUCTIONS
IV. PROCUREMENT DOCUMENT CONTROL[a]						3.0, 11.0
1) Inclusion of all applicable requirements in procurement documents.	IV	5.0	4.1	4.4	4.1, 4.2, 4.3	11.0, 12.0
2) Release and control of procurement documents.	VI	7.0	4.4	4.6	4.1	
3) Changes controlled as original procurement documents.	VI	5.0	4.1	4.6	4.4	
4) Extension of quality requirements and controls to subcontractors and suppliers.	IV	5.0	*	4.4	4.2	
V. INSTRUCTIONS, PROCEDURES, AND DRAWINGS[a]						3.0, 4.0, 5.0
1) Documented description of activities affecting quality.	V	6.0	4.3, 4.5	5.2	5.1, 5.2	
2) Compliance with documented description.	See Element 1.	See Element 1.	4.3, 4.5			
3) Inclusion of acceptance criteria in prescribed documents.	V	6.0	2.2, 4.1	5.1		
VI. DOCUMENT CONTROL[a]						3.0, 5.0, 8.0, 11.0
1) Release and control of documents.	VI	7.0	7.0	6	6.1, 6.3	
2) Review and approval of documents by authorized personnel.	VI	7.0	7.0	6	6.1, 6.3	
3) Changes controlled as original documents.	VI	7.0	7.0	6	6.1	

TABLE 2-2 (Continued)

QUALITY ASSURANCE ELEMENTS	REQUIREMENT DOCUMENTS: NRC (AEC) Reg. 10 CFR 50, APPENDIX B CRITERION	REQUIREMENT DOCUMENTS: ANSI N45.2 (SECTION NO.)	REQUIREMENT DOCUMENTS: ANSI N45.2.11 (SECTION NO.)	RESPONSE DOCUMENT: POWER DIVISION QA PROGRAM (PARAGRAPH NO.)	IMPLEMENTING STANDARD DOCUMENTS: DIVISION STANDARD PROCEDURES (PROCEDURE NO.)	PROJECT UNIQUE DOCUMENT: BFS PROJECT INSTRUCTIONS
VII. CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES(a)			N/A			5.0, 7.0, 11.0
1) Documenced planning of procurement activities.	*	*			7.1	
2) Conformance of purchased items and services to procurement documents.	VII	8.0		7.3	7.6	
3) Evaluation and selection of suppliers.	VII	8.0		7.2	7.2, 7.3, 7.5	
4) Source inspection audit.	See Element 3.	8.0		7.4		
5) Inspection of purchased items on receipt.	See Element 3.	See Element 4.		7.4		
6) Documented evidence of conformance.	VII	8.0		7.5	7.6	
7) Assessment of supplier quality related activities.	VII	8.0		7.6		
VIII. IDENTIFICATION AND CONTROL OF MATERIAL, PARTS AND COMPONENTS			N/A			5.0
1) Establishment and maintenance of item identification and control.	VIII	9.0		8.2		
2) Lineage traceability of items.	See Element 1.	9.0		8.3		
IX. CONTROL OF SPECIAL PROCESSES			N/A			
1) Establishment of process controls.	IX	10.0		9.1	4.2	
2) Qualification of personnel, procedures, and equipment.	See Element 1.	10.0				

TABLE 2-2 (Continued)

QUALITY ASSURANCE ELEMENTS	REQUIREMENT DOCUMENTS: NRC (AEC) Reg. 10 CFR 50, APPENDIX B CRITERION	REQUIREMENT DOCUMENTS: ANSI N45.2 (SECTION NO.)	REQUIREMENT DOCUMENTS: ANSI N45.2.11 (SECTION NO.)	RESPONSE DOCUMENT: POWER DIVISION QA PROGRAM (PARAGRAPH NO.)	IMPLEMENTING STANDARD DOCUMENTS: DIVISION STANDARD PROCEDURES (PROCEDURE NO.)	PROJECT UNIQUE DOCUMENT: BFS PROJECT INSTRUCTIONS
X. INSPECTION			N/A			
1) Documented planning of inspection activities.	*	*		10.1		
2) Establishment and execution of inspection program.	X	11.0				
3) Independence of inspectors.	X	11.0				
4) In process inspections.	X	11.0				
5) Option of inspection or monitoring.	X	11.0				
6) Recognition of hold points.	X	11.0				
7) Recognition of statistical quality control techniques.	*	11.0				
8) Documentation and evaluation of inspection results.	XVII	18.0				
XI. TEST CONTROL			N/A			
1) Documented planning of test activities.	*	*		11.1		
2) Establishment and execution of test program.	XI	12.0				
3) Inclusion of test requirements, acceptance criteria, and test conditions in test documents.	XI	12.0				
4) Documentation and evaluation of test results.	XI	12.0				
5) Criteria for retest.	*	*				
XII. CONTROL OF MEASURING AND TEST EQUIPMENT			N/A			
1) Evaluation of measuring and test equipment.	*	12.0		12.1		

TABLE 2-2 (Continued)

QUALITY ASSURANCE ELEMENTS	REQUIREMENT DOCUMENTS: NRC (AEC) Reg. 10 CFR 50, APPENDIX B CRITERION	REQUIREMENT DOCUMENTS: ANSI N45.2 (SECTION NO.)	REQUIREMENT DOCUMENTS: ANSI N45.2.11 (SECTION NO.)	RESPONSE DOCUMENT: POWER DIVISION QA PROGRAM (PARAGRAPH NO.)	IMPLEMENTING STANDARD DOCUMENTS: DIVISION STANDARD PROCEDURES (PROCEDURE NO.)	PROJECT UNIQUE DOCUMENT: BFS PROJECT INSTRUCTIONS
2) Calibration and control of measuring and test equipment.	XII	13.0				
3) Maintenance and control of standards	*	*				
4) Evaluation of discrepant equipment and affected items.	*	13.0				
5) Maintenance of calibration status.	*	13.0				
XIII. HANDLING, STORAGE, AND SHIPPING			N/A			
1) Control of handling, lifting, and rigging.	XIII	14.0		13.1		
2) Control of storage.	See Element 1.	See Element 1.				
3) Control of shipping.	See Element 1.	See Element 1.				
4) Control of cleaning, preservation, and packaging.	See Element 1.	14.0				
XIV. INSPECTION, TEST, AND OPERATING STATUS			N/A			
1) Indication of inspection and test status.	XIV	15.0		14.1		
2) Indication of operating status.	XIV	15.0				
XV. NONCONFORMING MATERIALS, PARTS, OR COMPONENTS						
1) Control of nonconforming items, processes, and activities.	XV	16.0	4.3, 4.4, 4.5	15.1		

TABLE 2-2 (Continued)

QUALITY ASSURANCE ELEMENTS	REQUIREMENT DOCUMENTS: NRC (AEC) Reg. 10 CFR 50, APPENDIX B CRITERION	REQUIREMENT DOCUMENTS: ANSI N45.2 (SECTION NO.)	REQUIREMENT DOCUMENTS: ANSI N45.2.11 (SECTION NO.)	RESPONSE DOCUMENT: POWER DIVISION QA PROGRAM (PARAGRAPH NO.)	IMPLEMENTING STANDARD DOCUMENTS: DIVISION STANDARD PROCEDURES (PROCEDURE NO.)	PROJECT UNIQUE DOCUMENT: BFS PROJECT INSTRUCTIONS
2) Identification, documentation and segregation of nonconforming items.	XV	16.0	4.3, 4.4, 4.5	15.1	15.1, 16.1	
3) Disposition of nonconforming items.	XV	16.0	4.3, 4.4, 4.5	15.1	16.1	
4) Inspection of repaired or reworked items.	*	16.0	4.3, 4.4, 4.5			
5) Extension of nonconformance reporting to subcontractors and suppliers.	See Element 2.	See Element 2.	4.3, 4.4, 4.5		4.2	
6) Maintenance of nonconformance data.	See Element 2.	16.0	4.3, 4.4, 4.5	15.1	17.1	
XVI. CORRECTIVE ACTION[a]						
1) Prompt identification and correction of conditions adverse to quality.	XVI	17.0	9.0	16.1	15.1	
2) Determination of causes of adverse quality conditions.	XVI	17.0	9.0		16.1, 16.2	
3) Documentation and reporting of corrective actions.	XVI	17.0	9.0		16.1, 16.2	
4) Extension of corrective action controls to subcontractors and suppliers.	*	*	*		4.2	
XVII. QUALITY ASSURANCE RECORDS[a]						
1) Preparation and maintenance of quality assurance records.	XVII	10.0,18.0	10.0	17	17.1	
2) Identification of types of records.	XVII	18.0	10.0	17	17.1	
3) Retrievability of records.	XVII	18.0	10.0		6.2	
4) Retention of records.	XVII	18.0	10.0	17	17.1	

TABLE 2-2 (Continued)

QUALITY ASSURANCE ELEMENTS	REQUIREMENT DOCUMENTS: NRC (AEC) Reg. 10 CFR 50, APPENDIX B CRITERION	REQUIREMENT DOCUMENTS: ANSI N45.2 (SECTION NO.)	REQUIREMENT DOCUMENTS: ANSI N45.2.11 (SECTION NO.)	RESPONSE DOCUMENT: POWER DIVISION QA PROGRAM (PARAGRAPH NO.)	IMPLEMENTING STANDARD DOCUMENTS: DIVISION STANDARD PROCEDURES (PROCEDURE NO.)	PROJECT UNIQUE DOCUMENT: BF3 PROJECT INSTRUCTIONS
XVIII. AUDITS[a]						
1) Documented planning of quality assurance audits.	XVIII	19.0	2.1, 11.0	18		
2) Audit performance and responsibility.	XVIII	19.0	11.0	18	18.2	
3) Documentation and reporting of audit results.	XVIII	19.0	11.0	18	18.2	
4) Follow-up action.	XVIII	19.0	11.0	18		

NOTES: (a) - Specified in NRC Guidance Documentation as Applicable to "Design and Procurement" QA.

* - Subject not addressed in Requirements Document.

N/A - Not Applicable.

TABLE 2-3. BLACK & VEATCH, CONSULTING ENGINEERS, QUALITY ASSURANCE PROGRAM STANDARD PROCEDURE CONTENT SUMMARY

POWER DIVISION STANDARD PROCEDURES-NUCLEAR

Number	Title	Summary of Contents
2.2	QUALITY ASSURANCE PROGRAM INDOCTRINATION	Describes how personnel in the Power Division assigned to nuclear projects are to be indoctrinated in the details of the QA Program.
2.3	PERSONNEL QUALIFICATION RECORDS	Describes how the QA indoctrination sessions and participation by individuals are documented.
2.4	MANAGEMENT REVIEWS	Establishes the method for conducting the review of the Quality Assurance Program by management personnel.
2.5	QUALIFICATION OF AUDITORS	Establishes the basis for the qualification of QA auditors.
3.1	SYSTEM ANALYSES	Establishes procedure for preparation and control of system analyses.
3.2	PROJECT DESIGN MANUALS	Establishes procedure for preparation and control of project design manuals.
3.3	SYSTEM DESIGN SPECIFICATIONS	Establishes procedures for preparation and control of system design specifications.

TABLE 2-3 (Continued). BLACK & VEATCH, CONSULTING ENGINEERS, QUALITY ASSURANCE PROGRAM STANDARD PROCEDURE CONTENT SUMMARY

POWER DIVISION STANDARD PROCEDURES-NUCLEAR

Number	Title	Summary of Contents
3.4	COMPONENT DESIGN SPECIFICATIONS	Establishes the content, review, and control of component design specifications in association with ASME Section III requirements.
3.5	CALCULATIONS, HANDWRITTEN	Specifies the format, verification and retention of handwritten calculations.
3.6	CALCULATIONS, COMPUTER	Specifies the format, verification and retention of computer calculations.
3.7	PERMIT AND LICENSE APPLICATIONS	Establishes procedures for control of Safety Analysis Reports during preparation, review, issuance, revision and storage. Establishes methods for the documented control of Environmental Reports and for control of other permits (i.e., state, local).
3.8	COMPUTER PROGRAM VERIFICATION	Describes how computer programs used on nuclear projects are to be verified.
3.9	DESIGN VERIFICATION	Establishes procedures for verification of design adequacy. Defines the methods used and describes the activities associated with independent reviews.
3.10	DESIGN CHANGE CONTROL	Establishes methods for preparation, review, and approval of Engineering Change Notices for released design documents.

TABLE 2-3 (Continued). BLACK & VEATCH, CONSULTING ENGINEERS, QUALITY ASSURANCE PROGRAM STANDARD PROCEDURE CONTENT SUMMARY

POWER DIVISION STANDARD PROCEDURES-NUCLEAR

Number	Title	Summary of Contents
4.1	PROCUREMENT SPECIFICATION CONTROL	Describes the control of procurement documents during the process of formulation through issuance to prospective bidders. Defines quality control requirements for reviewing procurement documents prior to issuance from B&V. This procedure controls the review of nuclear safety-related procurement specification manuscripts, preliminary issues, issues prior to release to bidders, and the review of addenda to bid issue specifications.
4.2	PROCUREMENT SPECIFICATION CONTENT	Defines the general content requirements of nuclear safety-related procurement documents in accordance with the requirements ANSI N45.2.
4.3	SPECIFICATION GUIDES AND STANDARDS FOR FRONT END DOCUMENTS	Establishes controls for the development, review, publication, and storage of procurement document standards and guide specifications applicable to the specific project for which they are intended.
4.4	CONTRACT CHANGES	Establishes the method for the preparation, review, and approval of changes to contracts after award.
5.1	PROCEDURE PREPARATION	Establishes the requirements for content of Quality Assurance Program documents and the provisions for initiation and revisions to the documents. Specifies the format to be used in preparation of Quality Assurance Program documents.

TABLE 2-3 (Continued). BLACK & VEATCH, CONSULTING ENGINEERS, QUALITY ASSURANCE PROGRAM STANDARD PROCEDURE CONTENT SUMMARY

POWER DIVISION STANDARD PROCEDURES-NUCLEAR

Number	Title	Summary of Contents
5.2	DRAWINGS AND LISTS	Describes the methods for the checking, review, approval, and control of design and construction drawings and lists.
6.1	CONTROL OF QA PROGRAM DOCUMENTS	Specifies the issuance, revision and control of QA Program-Nuclear documents.
6.2	PROJECT FILES--ADMINISTRATION AND NUMBERING	Establishes the file subject listing and the types and control of files needed for a nuclear project.
6.3	PROJECT DOCUMENT CONTROL	Establishes the method for processing and controlling project documents including correspondence, design, and procurement records.
6.4	DOCUMENT CONTROL FORM	Establishes procedures for entry of project documents into a computerized document indexing system.
6.5	MICROFILMING SERVICES	Describes how engineering drawings and manufacturers' drawings are processed through microfilm services by the engineering departments responsible for preparation and review and how the indexes of drawings are to be prepared and maintained.
6.6	CONTROL OF SOURCE DOCUMENTS	Establishes an indexing method and applications control for Codes, Standards and Regulatory Guides.

TABLE 2-3 (Continued). BLACK & VEATCH, CONSULTING ENGINEERS, QUALITY ASSURANCE PROGRAM STANDARD PROCEDURE CONTENT SUMMARY

POWER DIVISION STANDARD PROCEDURES-NUCLEAR

Number	Title	Summary of Contents
7.1	BIDDERS' LIST	Establishes the method for the development of a prospective bidders' list.
7.2	PRE-AWARD EVALUATION OF CONTRACTORS	Specifies procedures to be followed in pre-award evaluation of prospective contractors.
7.3	REVIEW OF CONTRACTOR'S QUALITY ASSURANCE PROGRAMS	Specifies procedure for office review of suppliers' and contractors' QA programs.
7.4	PROCUREMENT DEVIATIONS	Establishes the methods for review and disposition of deviations from contract requirements.
7.5	BID ANALYSES	Establishes uniform methods for the preparation and control of bid analyses.
7.6	PROCESSING AND REVIEW OF MANUFACTURERS' DRAWINGS AND DATA	Specifies how manufacturers' drawings and data are to be reviewed by the engineering departments and distributed and controlled.
15.1	REPORTING SIGNIFICANT DEFICIENCIES	Establishes method for reporting deficiencies under 10 CFR Part 50.55(e) and Part 21
16.1	REPORTING AND CORRECTION OF NONCONFORMANCES	Specifies how nonconforming items are identified and documented and how corrective actions are to be implemented.
16.2	CORRECTIVE ACTION REQUESTS	Establishes the method for documenting changes that are necessary due to audit report findings.

TABLE 2-3 (Continued). BLACK & VEATCH, CONSULTING ENGINEERS, QUALITY ASSURANCE PROGRAM STANDARD PROCEDURE CONTENT SUMMARY

POWER DIVISION STANDARD PROCEDURES-NUCLEAR

Number	Title	Summary of Contents
17.1	IDENTIFICATION OF QA RECORDS	Establishes bases for identification of QA records to be controlled and retained in project records.
18.1	CONDUCT DURING AUDITS BY OTHERS	Establishes requirements of and guidance to personnel during audits by regulatory and client personnel.
18.2	AUDIT PERFORMANCE	Specifies how physical audits are to be conducted by the performing organizations.
18.3	PROJECT INTERNAL SURVEYS	Establishes the methods for the project organization to conduct quality control surveillance.

TABLE 2-4. BLACK & VEATCH, CONSULTING ENGINEERS, SUMMARY OF TYPICAL PROJECT INSTRUCTION MANUAL CONTENT

Section	Title	Summary of Contents
1.0	ORGANIZATION	Identifies key personnel associated with the Project for Owner, B&V, and NSSS.
2.0	COMMUNICATIONS	Establishes general policies regarding communications between B&V and other project participants.
3.0	DOCUMENT CONTROL	Describes the control system for indexing project documents including QA Records.
4.0	PROJECT QUALITY ASSURANCE PROGRAM	Describes the project QA Program as it relates to the B&V Quality Assurance Program-Nuclear.
5.0	DRAWINGS AND LISTS	Defines reponsibilities for the issuance of drawings, accessory lists, and related design documentation prepared by B&V for Owner.
6.0	PROJECT SCHEDULES	Defines project schedule development and reviews.
7.0	DESIGN INTERFACE WITH OTHERS	Describes the responsibility and procedures of participating organizations for interfacing the design of safety-related items.
8.0	LICENSING DOCUMENTS	Defines the process of review and coordination of PSAR and ER sections prior to submittal.
9.0	MANAGEMENT INFORMATION SYSTEM	Describes requirements and responsibilities for preparation, issuance, and distribution of project reports including QA/QC activities.

TABLE 2-4 (Continued). BLACK & VEATCH, CONSULTING ENGINEERS, SUMMARY OF TYPICAL PROJECT INSTRUCTION MANUAL CONTENT

Section	Title	Summary of Contents
10.0	ENGINEER'S COST RECORDS	Cost accounting control.
11.0	PROCUREMENTS	Defines methods and procedures for project procurement document preparation, review, approval, and issuance.
12.0	STANDARD SPECIFICATIONS	Defines the preparation, review, and approval of standard specifications that will be used in procurement documents.
13.0	FIELD INTERFACES	Defines the responsibility and authority of B&V field personnel and the use and control of applicable documents.

TABLE 2-5. PROGRAM APPLICABILITY FOR SPECIAL PLANT SYSTEMS

SP #	Title	Fire Protection Systems	Radiation Waste Management Systems	Plant Security Systems
3.1	System Analysis	X	X	X
3.2	Project Design Manual	X	X	X
3.3	System Design Specification	X	X	X
3.5	Handwritten Calculations	X	X	X
3.10	Design Change Control	X	X	X
4.1	Procurement Specification Control	X	X	X
4.2	Procurement Specification Content	X	X	X
4.4	Contract Changes	X	X	X
5.2	Drawing & Lists	X	X	X
6.2	Project Files	X	X	X
6.3	Project Document Control	X	X	X
6.4	Document Control Form	X	X	X
6.5	Microfilming Service	X	X	X
7.1	Bidders List	X	X	X
7.4	Procurement Deviations	X		
7.5	Bid Analyses	X	X	X
7.6	Processing and Review of Manufacturer's Drawings	X	X	X
16.1	Reporting and Correction of Nonconformances	X	X	X
16.2	Corrective Action Requests	X		
17.1	Identification of QA Records	X		
18.2	Audit Performance	X		

3.0 DESIGN CONTROL

3.1 INTRODUCTION

3.1.1 General

The planning of design activities associated with the nuclear power plant must use methods such as Critical Path Method (CPM) scheduling or similar method of interfacing the numerous and complex activities. The appropriate sequence for completing the verifying the design documents associated with an excess of 100 static and dynamic systems for an entire nuclear power plant (both safety related and balance-of-plant), over 300 procurement documents for equipment, 25 site construction documents and over 10,000 engineering drawings must utilize sophisticated planning tools. The practices of Black & Veatch Consulting Engineers require detailed planning of design activities in such a manner to provide interface information and the accomplishment of design verification in an appropriate sequence. The primary documents utilized for design and the control of those documents are discussed in this section. Safety analysis reports are not a design control document under the Black & Veath Quality Assurance Program - Nuclear definition.

3.2 INCLUSION OF PROPER REQUIREMENTS

3.2.1 Project Design Manual

The Project Design Manual is a document utilized by Black & Veatch for the definition of common information associated with all power plant systems, including regulatory guidance, Code of Federal Regulations requirements, rulings from permit applications, natural phenomena, equipment numbering and nomenclature. The project design manual is prepared in accordance with Black & Veatch Quality Assurance Program - Nuclear Standard Procedures. The procedure requires acceptance by the Project Design Engineer - Systems, a review board, and the approval by the Manager - Design prior to the issuance of the various sections of the Project Design Manual. Sections of the Project Design Manual are issued in a sequence as necessary to be available as design input information prior to the initiation of detailed design.

3.2.2 System Design Specifications

Black & Veatch utilizes System Design Specifications (SDS's) to specify the controlling design criteria on power plant systems. The information required in SDS's includes regulatory commitments, requirements of the Code of Federal Regulations, codes, standards, interfacing NSSS information, quality classification, safety classification, seismic category, materials requirements, operation requirements, and accident analyses. System Design Specifications are prepared in accordance with established procedures in the Black & Veatch Quality Assurance Program - Nuclear. The preparation of SDS's is under the direction of the Project Design Engineer-Systems. He is responsible to prepare or have prepared an SDS with at least the minimum information listed above for a plant system. After the initial preparation the SDS is reviewed by the effected engineering discipline for technical content and interfaces. The Project Quality Control Engineers review the SDS for safety classification, quality classification and inclusion of proper regulatory guidance. The established procedures for the preparation of a System Design Specification require that, prior to issuance for use, the document be reviewed and approved by the responsible Project Design Engineer, the responsible Project Engineer, and the Manager-Design. The System Design Specifications are prepared prior to the initiation of detailed design.

3.3 DETAILED DESIGN CONTROL

3.3.1 Computer Programs

Procedures in the B&V Quality Assurance Program -Nuclear require that computer programs be verified prior to their utilization for any specific work concerning power plant design. Unverified programs or programs under development are specifically flagged with a message on the print-out such that the resultant calculations will not be utilized for plant design. Computer program verification is under the responsibility of the Project Manager who receives support from computer application specialists. A computer program verification is accomplished by assigned specialists in computer program applications (neither the programmer nor

his supervisor) and checked by individuals other than the person responsible for the initial verification. Black & Veatch Quality Assurance Program - Nuclear procedures require that the verification be accomplished using problems with known solutions in the public domain, simplified hand methods when appropriate, or by compari sion with public domain programs.

3.3.2 Computer Calculations

The Black & Veatch Quality Assurance Program -Nuclear contains procedures requiring the control of computer calculations. The computer calculations shall have controlled information for data input and the results of the calculation. Computer calculation input and output are checked by individuals other than those responsible for the problem solving.

3.3.3 Hand Calculations

The Black & Veatch Quality Assurance Program - Nuclear, contains procedures for the control of handwritten calculations. The form and format of the calculations are defined in the procedures. Procedures require that the hand calculations be checked by an individual other than the person who prepared the calculations. Procedures require that the checking of calculations be accomplished prior to incorporation of the results in detail design documents.

3.3.4 Component Design Specifications

Component Design Specifications (CDS, B&V terminology for ASME Owner's Design Specifications) are required by the ASME Boiler and Pressure Vessel Code. The Code of Federal Regulations, Article 50.55a, requires the use of the ASME Boiler and Pressure Vessel Code for reactor coolant pressure boundary. Regulatory Guide 1.26 further defines the applicability of the ASME Code to other specific power plant systems. The B&V Quality Assurance Program - Nuclear requires the utilization of Component Design Specifications for ASME applications. The QA Program procedures require that CDS's include the information required by the ASME Boiler and Pressure Vessel Code for Owner's Design Specifications. A Project Engineer is designated to be responsible for the preparation of each CDS. He is responsible to prepare, or have prepared, the CDS with

at least the minimum information required by the ASME Code. After initial preparation, the CDS is reviewed by affected engineering disciplines for technical content and interfaces. The Project Quality Control Engineers review the CDS for Code classifications and inclusion of proper regulatory guidance. The CDS's are approved and certified by a Registered Professional Engineer.

3.4 DESIGN OUTPUT

The output of the design activities result in two major documents (i.e. procurement specifications and drawings).

3.4.1 Procurement Specifications

The procurement specifications are discussed in Section 4.0 of this report.

3.4.2 Drawings

The drawings resulting from the detailed design activities are discussed in Section 5.0 of this report.

3.5 DESIGN VERIFICATION

Design verification is an activity which can be accomplished by the following.

- Design review
- Alternate calculations
- Prototype testing

Wherever possible, Black & Veatch utilizes the design review or alternate calculation methods. If prototype testing is the only applicable method, Black & Veatch will incorporate requirements for the prototype testing in the procurement specifications.

The individual documents utilized for design input, detailed design, and design output are checked, reviewed, approved and/or certified prior to utilization for intended purposes. The QA Program - Nuclear procedures identify the actions and responsible individuals required to assure adequacy of the control of the design process.

In addition to the control of the design process, the design verification activities are scheduled and assigned by the Manager - Design Engineering. The scheduling of the design verification activities is done to assure that the verification is completed prior to:

- Release of documents to other organization for design, or
- Release for manufacturing of components or
- Release for construction

In those cases where this timing cannot be met, the Manager - Design shall prepare a justification to defer the design verification. This justification will include the reason for deferral and a listing of the effected design documents.

To assure the independence and competence of the individuals assigned to design verification activities, the Manager of Engineering must concur with the assignment and receive a copy of the design review report. The Manager of Engineering must also, concur with any justification to defer design verification. In no cases will design verification be deferred until after fuel load without the approval of the Nuclear Regulatory Commission.

The individuals assigned to design verification functions are supported through Power Division Administrative organization for assistance and access to information. The reports of design verification that detect any difficulties must be resolved by the Manager of Engineering, who is independent of project responsibilities and supervision.

3.6 INTERNAL AND EXTERNAL INTERFACE CONTROL

Internal interface control is accomplished by the distribution of the design input, detail design, and design output documents to affected organizations. Interface reviews are accomplished on design documents by affected engineering disciplines. Controlled distribution of the design documents assures that affected organizations utilize current and approved documents in the design process.

External interface control is accomplished by the formal transmittal of design documents to the affected organizations and the formal processing and reviewing of information received from external organizations. The review of the external information received from suppliers by Black & Veatch is discussed in Section 7.0 of this report. Information received from the NSSS is included in the SDS's (see Article 3.2.2 of this report). External organizations are on formal distribution lists for design documents for the purposes of coordination of design.

The original or legible copies of Design Documents are provided to the Owner by B&V when the design activities are completed.

3.7 DESIGN CHANGES

Design changes are accomplished in one of two methods. In the first method, the specific design document is changed to the next revision from its previous issue. When this action does occur the review and approval process applied to the original issue of the document is then reapplied to the changed portion of the document. The revision of an entire document such as a drawing or System Design Specification is an example of this method for issuing, reviewing, and approving design changes.

The second method for executing design changes, as utilized by Black & Veatch, involves "Engineering Change Notices" (ECN's). This special purpose document may be applied to any of the design documents. The B&V Quality Assurance Program - Nuclear includes procedures for the control of engineering change notices and requires that the ECN receive checking, reviews, and approvals commensurate with the design document being changed.

3.8 NONCONFORMANCES

The B&V Quality Assurance Program - Nuclear includes standard procedures for processing nonconforming item reports. This procedure is for handling nonconforming items within B&V. This procedure authorizes all employees of B&V to prepare and submit nonconforming item reports for any deviations, problems, or any other matter concerning the quality of a document. The procedure requires the processing of a nonconforming item report through the Project Quality Control Engineer(s) for evaluation and the obtaining of corrective action.

4.0 PROCUREMENT DOCUMENT CONTROL

4.1 INCLUSION OF APPLICABLE QA REQUIREMENTS

Procurement documents for equipment, material, and construction services (including construction drawing per Section 5) prepared by B&V are developed, reviewed, and authorized for release in accordance with Quality Assurance Program-Nuclear Standard Procedures. These procedures require that procurement documents include or reference the following for safety-related items:

(1) Applicable regulatory requirements including 10 CFR 50.55a, codes, standards, design bases; technical requirements as specified in the applicable system design specifications or resulting from the final design; test requirements, inspection requirements; and special process controls.

(2) Defined accept-reject criteria when not a part of the referenced industry codes and standards.

(3) Requirements for supplier document submittals such as instructions, procedures, drawings, specifications, inspection, and test results, and other supplier documentary evidence of quality.

(4) QA Program requirements in accordance with ANSI N45.2. series "Quality Assurance" documents as defined in Table 2-1 including supplementary quality assurance provision for ASME B&PV Section III applications.

   (a) Requirements for submittal or retention, control, and maintenance of quality assurance records.

   (b) Statements as to rights of access to the suppliers' facilities and working documents for inspection and audit.

   (c) Provisions for the supplier's reporting and dispositioning of deviations from the procurement document requirements.

   (d) Documentation that identifies the purchased item and the specific procurement requirements (e.g., codes, standards, and specifications) met by the item.

   (e) Documentation identifying any procurement requirements that have not been met.

   (f) A description of those nonconformances from the procurement requirements dispositioned "accept as is" or "repair."

Upon request, B&V will assist the Owner in the performance of necessary pre-award surveys at prospective contractors' facilities.

Procurement specifications for spare or replacement items will be subject to the same controls as the original item.

4.2 INTERNAL CONTROL OF PROCUREMENT DOCUMENTS

The B&V organization is configured such that the engineering personnel assigned to any given project are responsible for the design, the preparation of the procurement documents, the recommendation of bidders, and the processing and/or review of information submitted by contractors. The individual discipline groups are responsible to complete the design, prepare the procurement documents, and process and/or review the submittals from contractors. Reviews by Quality Assurance include the following.

(1) Procurement documents prior to release for bid.

(2) Exceptions to procurement documents proposed by bidders.

(3) Nondestructive testing procedures.

(4) Quality inspection procedures.

(5) Welding procedures.

(6) Where appropriate, other quality assurance documents submitted by contractors.

Procurement documents are produced under the direction of the Manager-Procurement for contract terms, conditions, and format. Project Design Engineers (PDE) provide necessary technical provisions. Information developed in System Design Specifications and detail design is utilized in preparation of procurement documents. The general scope of the specification is established by project management in coordination with the Owner and communicated to the Project Engineers and the Manager-Procurement. The Project Management directs the review process for the purchase specification. Prescribed routing of the purchase specifications to designated personnel including the Project Quality Control Engineer, assures that the technical content and quality requirements are adequate and coordinated with other related specifications. The reviews of procurement documents are performed using general checklists of essential elements of a procurement document and applicable system design specifications for specific details. The reviews assure that quality requirements are correctly stated, inspectable, and controllable and that there are adequate acceptance criteria. Upon resolution and incorporation of

agreed review comments, the Project Management releases all purchase documents from B&V to the Owner for review or issuance as appropriate, including preliminary copies, bid issues and conformed contract copies. Project Management is responsible to assure that appropriate reviews have been completed and approvals obtained prior to the release of the purchase documents to the Owner for issuance for bidding or contract purposes. Documented evidence of review and approval of procurement documents is maintained in designated locations and is available for verification.

Changes to purchase documents affecting technical and quality requirements, which occur after they have been released for bids, are reviewed by the same individuals or organizations having performed the original preparation and review of the specification. Project Management is responsible to determine that appropriate reviews have been completed and approvals obtained prior to release of formal change orders as appropriate from B&V.

4.3 ADEQUACY OF SUPPLIERS' QUALITY ASSURANCE

The evaluation of prospective contractor's QA program descriptions or QA manuals is normally performed by the Owner. Black & Veatch will normally participate in the bid analysis and when requested by the Owner will assist in evaluating the adequacy of the bidder's QA program.

5.0 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

5.1 CONTROL OF ACTIVITIES AFFECTING QUALITY

Design documents prepared by B&V establish the quality of materials and workmanship and functional requirements of systems, components, and structures. To assure accuracy, these design documents are prepared, reviewed, and released in a controlled manner. This control is provided by adherence to written procedures and instructions (Table 2-2) which delineate the administrative details of what is to be performed, the schedule in which it is to be accomplished, and who is responsible. The Project Manager is responsible for the development and implementation of the necessary instructions, procedures, and standard practices necessary to assure adequacy of the work performed.

The specific sequence of actions required in the preparation; review; and control of instructions, procedures, and drawings varies with document type, purpose, and end use. In the Quality Assurance Program-Nuclear, the Head of the Power Division has established responsibilities for the development and approval of necessary standard procedures. These standard procedures delineate the preparation, review, and approval sequences for both internal procedures and design documents. Procedures, instructions, drawings, specifications, etc. include appropriate quantitative or qualitative acceptance criteria against which the adequacy of the work can be measured.

To assure compliance with these documented policies, instructions, and procedures, each supervisor has the responsibility to review and observe the activities performed under his supervision for conformance to the governing procedures. In addition, each procedure will be critically examined in use to determine that it is effective and adequate for the intended purpose.

5.2 CONSTRUCTION DRAWINGS

The preparation of construction drawings is the responsibility of each Project Design Engineer. The number of, type of and detail included in construction drawings shall be sufficient to define the work required

in the procurement specifications (see Section 4.0). Each construction drawing shall include depiction of details, dimensions, etc of plant configurations. Each construction drawing after initial preparation shall be reviewed by affected engineering disciplines for interfaces. Prior to issuance for fabrication work each construction drawing shall be checked by an independent Checker; approved by the responsible Project Design Engineer; and accepted by a Registrated Professional Engineer.

5.3 ACCEPTANCE CRITERIA

Purchase documents and construction drawings prepared by B&V for the purpose of procuring materials, equipment, or services for the given project will contain appropriate criteria for acceptance and rejection. These criteria will include performance requirements and applicable bases for acceptance of materials and workmanship as prescribed in identified industry codes and standards.

6.0 DOCUMENT CONTROL

6.1 CONTROL PROCEDURES

Design documents, instructions, and procedures used within B&V or issued for the Owner to equipment suppliers, contractors or other parties for the performance of quality affecting activities are effectively controlled to assure that only proper and current documents are used. Approved drawings, specifications, and procedures are provided to organizations and individuals planning or performing the work and to those responsible for verification of compliance. Issuance of documents and changes to documents are controlled by established procedures and distribution lists to assure that they are reviewed for adequacy. Approved documents are released only by authorized individuals and issued to the persons or organizations needing the documents.

(1) Document control measures provide for the following.

(a) Identification of individuals or organizations responsible for preparing, reviewing, approving, and issuing documents and revisions thereto.

(b) Identification of proper documents (references, checklists, etc.) to be used in performing the activity.

(c) Coordination control of interface documents.

(d) Verification that proper documents are being used.

(e) Collection and appropriate indexing and filing of documents used on the project.

(2) Document control procedures also provide for the following.

(a) Establishing distribution lists for documents and changes.

(b) Voiding or recalling documents not intended for current use.

(c) Changes made to approved documents are reviewed and approved in accordance with procedures commensurate with those applied to the original documents.

(d) After approval, changes and revisions are transmitted in a timely manner for implementation.

The current revision numbers of appropriate drawings and other design documents are identified in several indexes which are updated and

distributed on a timely basis to predetermined responsible project personnel. The effective status of Quality Assurance Program-Nuclear documents is maintained by the Division Document Control Center which is responsible for distribution control.

6.2 TYPES OF B&V PREPARED DOCUMENTS AND RESPONSIBILITY FOR CONTROL.

Following is a listing of various document types and the individuals responsible for the review, approval, issuance, and revisions of these documents.

(1) Quality Assurance Program - Nuclear--Head of the Power Division.

(2) Engineering Department Drafting Standards--respective Department Head.

(3) Project Instructions--Project Manager

(4) Project Design Manual--Manager-Design (see Article 3.2.1)

(5) System Design Specification--Manager-Design (See Article 3.2.2)

(6) Component Design Specification--Registered Professional Engineer (see Article 3.3.4)

(7) Procurement Specification--Registered Professional Engineers

(8) Construction Drawings--Registered Professional Engineer

(9) Safety Analysis Reports (B&V input)--Project Engineer-Licensing.

It is the responsibility of the person or persons who approve the above documents to assure that appropriate quality requirements are included. However, specific reviews are performed for this purpose. Quality Assurance Program-Nuclear standard procedures, which include procedures on preparation and content of other quality-related documents, are reviewed by the Quality Assurance Manager and approved by the Head of the Power Division.

A Project Quality Control Engineer reviews each of the following listed documents for quality assurance provisions and consistency with the Quality Assurance Program-Nuclear.

(1) Project Instructions.

(2) System Design Specifications.

(3) Procurement Specifications.

The Project Quality Control Engineer may also review other design documents as a part of routine project responsibilities.

The Quality Assurance Manager is responsible to assure that the Quality Assurance Program-Nuclear and this topical report are consistent.

6.3 INDUSTRY EXPERIENCE REPORTS

Black & Veatch receives the bulletins and circulars from the Office of Inspection and Enforcement of the Nuclear Regulatory Commission. The bulletin and circulars are reviewed and the information is distributed to responsible Project Engineers, Project Design Engineers and others as appropriate to the subject matter. The Project Quality Control Engineers are responsible for distribution of the information.

7.0 CONTROL OF PURCHASED MATERIALS, EQUIPMENT, AND SERVICES

B&V scope of services in this area varies with the types of procurements as presented herein.

7.1 PLANT SYSTEMS AND COMPONENTS PROCURED BY THE OWNER

7.1.1 Planning

B&V plans and schedules B&V internal work in this area, and procurement work external to B&V as requested by the Owner.

7.1.2 Procurement Document Preparation, Review, and Change Control

Procurement document processing is presented in Section 4.0 of this report.

7.1.3 Selection of Procurement Sources

B&V will provide suggested bidders list based on past experience with the suggested bidder or based on review of commercial literature along with evidence of having an ASME N-type stamp, CASE registration, or other appropriate evidence. Remaining work in this area is the responsibility of the Owner.

7.1.4 Purchaser Control of Supplier Performance

Procurement documents identifying the requirements for equipment, materials, and services are prepared by B&V as a part of the design engineering services for the given project.

Manufacturers and construction contractors are required under specific provisions of their respective contracts with the Owner to submit engineering details and data to B&V for review prior to manufacture or fabrication of the products or performance of services.

The information and technical details such as interface data, fabrication and erection drawings, material lists, and instructions are reviewed by Project Design Engineers for conformance to specification requirements. Engineering department specialists assist the Project Design Engineers, upon specific assignment, in review and evaluation of drawings and data submitted by the contractor. The reviewed information and technical details are processed in accordance with established procedures.

Drawings and information prepared by contractors which do not conform to specification requirements are returned to the contractors for correction of deficiencies and resubmittal for review before being accepted for construction.

Remaining work within this area is the responsibility of the Owner.

7.1.5 Other Requirements

Remaining items within this subject area are beyond normal B&V scope of services and are the responsiblity of the Owner.

7.2 TECHNICAL CONSULTING OR SPECIAL ENGINEERING SERVICES SUBCONTRACTED BY B&V

Portions of this Quality Assurance Program apply to the design input or review services of consultants to Black & Veatch when such services affect the quality of safety-related systems, structures, or components of a project. Consultants shall provide services conforming to assignments and quality requirements established by Black & Veatch.

The selection of outside consultants shall be based on previous successful performance of work similar to work under consideration as well as other pertinent factors and shall be approved by the Head of the Power Division. Design activity by consultants shall be initiated and performed under the direction of the Project Manager and in compliance with applicable requirements of this Quality Assurance Program.

The verification by Black & Veatch of consultants' and specialists' performance to contract provisions is obtained by determining compliance to procedures, and review of work performed. The role of consultants and specialists is primarily advisory but each is subject to design control, document control, inspection, and test control as appropriate to the scope of services.

8.0 IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS

Design documents for system components require that the components be identified and traceable to the systems of which they are a part. Component identifiers are used to identify each component in the system. These system and component identifiers are assigned during the preliminary design stages and the identification system is carried throughout the project. Documentation of inspections and tests concerning each component will be required to be identified to the component or system. Other identification numbers, such as heat number, part number, serial number, and other identifiers, when required by code or specification, will be assigned by the manufacturer performing the controlled manufacturing processes. The identification numbers used in the controlled manufacturing processes will be documented and traceable to the established design identification designation included in the purchase document.

9.0 CONTROL OF SPECIAL PROCESSES

Equipment purchase specifications and construction contracts will include requirements for processes such as (!) welding, (2) heat treating, (3) nondestructive testings, (4) stud welding, (5) brazing, (6) hot forming, to be performed under controlled conditions in accordance with the specified codes and standards. The special processes will be performed in accordance with written procedures by qualified operators and the appropriate qualification testing will be documented by the supplier or contractor. Equipment suppliers' procedures will be subject to B&V review.

The requirements for the control of special processes are established in Black & Veatch procurement specifications by reference to national codes, standards, or incorporation of specific supplementary requirements. Each of the procurement specifications for safety-related materials require that supplier submit documents to Black & Veatch. These documents include the procedures for special processes.

In accordance with Black & Veatch Quality Assurance Program - Nuclear Standard Procedures, procedures submitted by the Contractors are processed and reviewed. The results of these reviews are documented and provided to the suppliers. The B&V Quality Assurance Program - Nuclear require examination of the procedures submitted by the contractors' to assure that they comply with the procurement documents and the references in the procurement documents to national codes, standards, and the special requirements.

10.0 INSPECTION

Appropriate acceptance criteria and inspection requirements are included by B&V in the purchase specifications prepared for the project. The inspection methods and procedures utilized to determine acceptability of the product or processes will be the responsibility of each contractor. The appropriate surveillance, receipt, installation, and final inspections will be accomplished by the Owner or its representatives.

II.0 TEST CONTROL

Design documents prepared by B&V will specify appropriate standard testing methods and required performance and proof tests. The organizations accomplishing the testing will be required to accomplish the test in accordance with properly documented procedures and methods. The results of specified performance tests are evaluated by B&V or the Owner to determine acceptability of the component or system for its designated purpose.

12.0 CONTROL OF MEASURING AND TEST EQUIPMENT

Design and procurement documents will include requirements that measuring and testing equipment are appropriately calibrated and controlled to assure accuracy and suitability for the intended functions. The contractors accomplishing the measuring or testing will be required to have procedures and methods to assure that their measuring and testing equipment is properly calibrated and records of the status maintained. The Owner or its representatives will audit the contractors' calibration control procedures.

13.0 HANDLING, STORAGE, AND SHIPPING

Purchase specifications prepared by B&V will include appropriate requirements for handling, shipping, and storing of materials. ANSI N45.2.2 as interpreted in Regulatory Guide 1.38 and Table 2-1 will be used in establishing purchase specification requirements which are judged applicable by the Engineer. Any special treatment required by the manufacturer of a component will be included, as appropriate, in construction requirements for installation and use. The Owner or its representatives will audit for implementation of the specified activities by the contractor.

14.0 INSPECTION, TEST, AND OPERATING STATUS

Equipment purchase specifications and construction contracts prepared by B&V will require that appropriate quality assurance programs are established and in effect as required to control inspection and tests. Identification of the status of inspections and tests at the construction site and identification of the operating status is a function which will be retained and accomplished by the Owner.

15.0 NONCONFORMING MATERIALS, PARTS, OR COMPONENTS

Black & Veatch design activities are subject to quality assurance procedures meeting the requirements of Regulatory Guide 1.64 as listed in Table 2-1. The program provides for identification, reporting to appropriate levels of management, and documenting resolutions of nonconformances identified in the design process.

Upon assignment by the Owner, Black & Veatch will evaluate and recommend a disposition for Procurement Deviation Requests (PDR), which a Contractor submits whenever he expects that a deviation or non-conformance will exist at the time of delivery or installation of an item. Procurement deviation requests are acted upon by the responsible design group and quality assurance personnel in all cases. Both parties must concur before any procurement deviation is approved.

Nonconformances, which impact design, detected during construction will be processed by the Owner's Field Management and/or B&V Field Management in accordance with procedures to assure the originating design organization reviews and concurs with the disposition. Nonconformances are processed in a uniform manner within B&V to assure that the design disciplines, project management, and quality assurance are involved with the disposition.

16.0 CORRECTIVE ACTION

16.1 IMPLEMENTATION OF CORRECTIVE ACTION

Each member of the project organization engaged in nuclear power project design is responsible to document and report to his supervisor deficiencies and errors which he detects in approved and released design documents which, if left uncorrected, could adversely affect the health and safety of the public. Each such deficiency is to be documented on a report of nonconformance or corrective action request and submitted to the appropriate responsible individual defined by standard procedure for initiation of corrective action. Significant deficiencies as defined in 10 CFR 50.55(e) are reported to the Owner.

16.2 EXTENSION AND REPORTING OF CORRECTIVE ACTIONS

Procedures are in effect for determining the cause of the deficiencies in the design documents, for taking corrective action to preclude repetition of errors or omissions, and for documenting the results of corrective actions. During design coordination activities, B&V will notify other affected parties, as appropriate, identifying deficiencies and prescribing or recommending corrective actions necessary to prevent recurrence of deficiencies and errors.

The Head of the Power Division receives a quarterly report concerning the activities of the quality assurance organization including information about non-conformances, corrective action, audits both internal and external. This information is provided to the Head of the Power Division on a quarterly basis such that he may examine it for management action. Also, in accordance with Standard Procedure 2.4, the Head of the Power Division conducts the annual management review of the Quality Assurance Program.

17.0 QUALITY ASSURANCE RECORDS

17.1 ADEQUACY OF QUALITY ASSURANCE RECORDS

The Quality Assurance Program-Nuclear contains provisions for records to be retained in accordance with the requirements of Regulatory Guide 1.88 as listed in Table 2-1. The design and procurement documents prepared by B&V will identify the required records to be submitted. The identification of quality assurance records provides means for correlation between the record and the activity or item to which it applies. The document control methods employed by B&V require that project records including those design documents identified as quality assurance records will have unique document identification numbers assigned to assure that the records are identifiable and retrievable. Documented filing system methods provide for duplicate files to prevent loss or damage of records. Document control procedures and file indexes identify the documents to be maintained as QA records and identify retention periods of the QA records.

The B&V QA Program - Nuclear require the Project Document Control Administrater (1.3.8) to control quality assurance records. Standard Procedures concerning project filing and document control are designed as "on-line" controls of quality assurance records. The specific responsibilities for identifying, indexing, and storing of quality assurance records are identified in the Program. The accumulation of quality assurance records is done on a "day-to-day basis" to assure that the documents are not misplaced, lost, or forgotten. The program requires that duplicate storage be maintained for the records. The day-to-day working file is maintained in controlled access condition in metal filing cabinets in the main office. A duplicate file is maintained in a separate building located remotely from the main office in metal storage cabinets. Records are maintained as "hard copy" or "microform," but in either case the separated and duplicate storage applies.

18.0 AUDITS

Audits will be conducted for the purpose of determining compliance with established policies and procedures and to determine effectiveness of the quality related activities being audited. The B&V audit program will comply with the provisions of Regulatory Guide 1.144 as listed in Table 2-1.

Members of the B&V Quality Assurance Group will audit project activities. The audits will be conducted to verify that the following are being accomplished.

(1) Design documents are appropriately reviewed.

(2) Submittals required by procurement documents are being received by B&V and appropriately reviewed for conformance to specification requirements.

(3) Proposed specification changes are being reviewed and approved before acceptance.

(4) Submittals of records, their current status, and their reviews are documented and maintained.

(5) Administration of the engineering details of contracts is being performed as required in accordance with applicable specifications.

(6) Compliance with the established standard procedures.

The Quality Assurance Manager is charged with the responsibility of preparing audit schedules. It is usual practice to have a six month schedule prepared. Audits are scheduled such that all of the activities affecting quality are audited. The document control, design activities, training activities, corrective action procedures, etc. are subject to audit on an annual basis. Further, audits are scheduled to apply the design of power plant systems. The assigned lead auditors then have the responsibility for developing a detailed audit plan. Once the detailed plans are approved, the lead auditor proceeds to execute the audit.

The assignments for lead auditors are made from the quality assurance group. The quality assurance group does not have direct responsibilities for any activities associated with power plant designs. The Quality Assurance Manager is responsible for making the assignments of

lead auditors. Those specific assignments are always carefully reviewed to assure that the auditor is not an individual who has been involved in an activity. Lead auditors are certified based on experience or training, or a combination of both.

Written plans or checklists are prepared by the assigned auditor(s) of the quality-affecting activity to be audited. The procedures or checklists will identify the records and activities to be evaluated.

Audits will be documented by the responsible lead auditor, either in memoranda, reports, or on special forms depending upon the audit scope and will be submitted to the Division QA Manager and the audited organization for review and action as appropriate. The Quality Assurance Manager will make summary reports on defiency areas, trends, and status of corrective actions at a frequency proper to assure and advise management, but not less than quarterly. These reports will be forwarded to the Head of the Power Division, the Project Manager, the Manager-Design, the Manager-Procurement, and the Manager of Engineering as appropriate.

Individuals designated as action addressees in corrective action requests will be required to prepare and submit a timely response summarizing the corrective actions taken or planned.

The Quality Assurance Manager is responsible to follow up, as appropriate, with subsequent audits to determine that corrective action has, in fact, been carried out. Records of audits pertaining to the project work will be maintained in the project files.

B&V audits are reviewed by the Quality Assurance Manager and are analyzed for trends by the Quality Assurance Group. Summary reports of the results are provided to the Head of the Power Division at least annually for his assessment of quality trends.