

TOPICAL REPORT
BQ-TOP-1

BECHTEL
QUALITY ASSURANCE PROGRAM
FOR
NUCLEAR POWER PLANTS

REV. 3

1636-297

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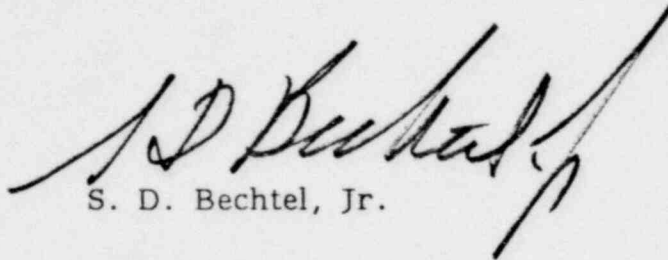
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FOREWORD
AND
QUALITY POLICY STATEMENT

This report establishes the Quality Assurance Program requirements for work performed by or for Bechtel on Nuclear Power Plants designed and/or constructed in accordance with the requirements of the Nuclear Regulatory Commission Regulation 10CFR50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants. The program defined in this report shall be followed by all Bechtel entities for nuclear power projects referencing this report in license applications.

The President of Bechtel Power Corporation is authorized to issue revisions to this report and instructions for implementing the program.



S. D. Bechtel, Jr.

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ABSTRACT

This document describes the Bechtel Quality Assurance Program plan for use by the Bechtel Organization during the design, procurement, and construction of nuclear power plants. This Program plan meets the requirements of the Nuclear Regulatory Commission Regulation 10 CFR 50, Appendix B.

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BECHTEL QUALITY ASSURANCE PROGRAM
FOR NUCLEAR POWER PLANTS

INTRODUCTION

This report describes the Quality Assurance Program applied by Bechtel* to the design, procurement, and construction of nuclear power plants. This report is intended to serve as a standard reference for safety analysis reports, and, for a specific project, requires only identification of the Bechtel scope of services and a list of the manuals from Table 1 applicable to the project to fulfill the requirements of Chapter 17 prescribed in the "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants" and Regulatory Guide 1.70, Rev. 2, September 1975, "Additional Information Quality Assurance During Design and Construction." The entire document will be reviewed annually and revised as necessary. Individuals holding copies of this report as indicated on a controlled copy distribution list will receive copies of all revisions for insertion in their copy.

The Quality Assurance Program described in this report is consistent with the Bechtel overall goals and objectives of maintaining the competence of its service and the quality of its end products at contractually required levels. This Quality Assurance Program is applied by Bechtel to those safety-related structures, systems, and components (Q-List items) identified in appropriate sections of the safety analysis report for which Bechtel has the responsibility for design, procurement, and/or construction (or construction management). The report does not cover preoperational testing activities.

The term "Quality Assurance" has been defined as "all those planned or systematic actions necessary to provide adequate confidence that an item or facility will perform satisfactorily in service." Quality assurance is recognized as a function of the group performing the work and not the sole responsibility of a quality assurance group.

Quality is achieved through the use of skilled personnel, adequate planning, use of suitable tools and procedures, proper definition of job requirements, and appropriate supervision and technical direction. Quality is verified through surveillance, inspection, testing, checking, and review of work activities and documentation. It is Bechtel policy that the organization or group that performs the activity (i.e., Engineering, Procurement, Construction, etc.) is responsible for the generation of a quality product. Quality control and quality verification are performed by individuals who are not directly responsible for performing the work activity. The separation of responsibilities by organization for performance of the work activities and for performance of quality control and quality verification is discussed in Section 1 of this report.

*The term Bechtel is employed in this report to identify the Bechtel Power Corporation and associated companies which may be contractually responsible for all or part of a project.

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In addition, it is Bechtel policy that a quality assurance function consisting of program definition, program coordination, and the review, surveillance, and the audit of quality-related activities is assigned to a group which is independent of the organizations responsible for the work. This group called Quality Assurance is responsible for defining and coordinating the Quality Assurance Program and for monitoring and auditing program activities to verify compliance with established requirements and to review program adequacy. When the term Quality Assurance is applied to personnel titles or procedures, it refers to the personnel and practices of the Quality Assurance Group. The overall Bechtel Quality Assurance Program, which includes the activities of the organizations performing work as well as those performing quality control and quality assurance function, is also referred to as the Bechtel Quality Program.

The Bechtel Quality Program commits to comply with the requirements of NRC Regulations, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," 10 CFR 50 Appendix B. The program also commits to comply with the quality assurance requirements of the ASME Boiler and Pressure Vessel Code, Section III, for items covered by the Code.

The Bechtel program is committed to follow the regulatory positions contained in the following documents*:

- Regulatory Guide 1.28 "Quality Assurance Program Requirements (Design and Construction)(formerly Safety Guide 28) (6/7/72)"
- Regulatory Guide 1.30 "Quality Assurance Requirements for Installation, Inspection, and Testing of Instrumentation and Electric Equipment (formerly Safety Guide 30) (August 11, 1972)"
- Regulatory Guide 1.37 "Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants (3/16/73)"
- Regulatory Guide 1.38 "Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage and Handling of Items for Water-Cooled Nuclear Power Plants (3/16/73)"
- Regulatory Guide 1.39 "Housekeeping Requirements for Water-Cooled Nuclear Power Plants (3/16/73)"

*Specific exceptions to and interpretations of this guidance that have been agreed to on a generic basis are contained in Appendix A of this report. Individual projects may identify additional exceptions. These will be included in the individual Safety Analysis Report (SAR).

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Regulatory Guide 1.58	"Qualification of Nuclear Power Plant Inspection, Examination and Testing Personnel (August 1973)"
Regulatory Guide 1.64	Quality Assurance Requirements for the Design of Nuclear Power Plants, (Rev 2, June 1976)"
Regulatory Guide 1.74	"Quality Assurance Terms and Definitions (February 1974)"
Regulatory Guide 1.88	"Collection, Storage, and Maintenance of Nuclear Power Plant Quality Assurance Records (Rev. 2, October 1976)"
Regulatory Guide 1.94	"Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants (Rev. 1, April 1976)"
Regulatory Guide 1.116	"Quality Assurance Requirements for Installation, Inspection and Testing of Mechanical Equipment and Systems (June 1976)"
Regulatory Guide 1.123	"Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants (October 1976)"
ANSI Standard N45.2.12-1974	"Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants. (Draft 3, Rev. 4, February 22, 1974)"

The terms used in this report follow the definitions provided in ANSI N45.2.10-1973, "Quality Assurance Terms and Definitions," supplemented by the following additional terms and definitions applicable to this report.

1. Administrative Direction (Administrative Supervision): Responsibility for hiring, salary review, and assignment of an individual.
2. Approve: When used in context with Bechtel review of supplier documents, the word "approve" or words of like import, such as "review" and "accept", shall mean, unless the context clearly indicates otherwise, that the supplier shall, before implementing the information in the document, submit the document, obtain resolution of any comments, and obtain authorization to proceed, and shall not mean that a complete check will be performed. Authorization to proceed shall not constitute acceptance or approval of design details, calculations, analyses, test methods or materials developed or selected by the supplier and shall not relieve supplier from full compliance with contractual obligations.

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3. Coordination: Bringing together and assuring communication between independent groups, including responsibility for identification of interface problems, reconciling a position, and arriving at agreement.
4. Division Control: Technical and administrative direction of a division functional manager to his area office counterpart.
5. Division Quality Policies: Instructions defining requirements and responsibilities for accomplishing Quality Program functions. Division Quality Policies and their amendments, for which this report is applicable, are governed by the program described in this report.
6. Formulate: To be responsible for coordination of effort by affected organizations and preparation of documentation describing or defining a policy procedure.
7. Material Certificate of Compliance: Verification document which certifies conformance to the requirements of the applicable material specification.
8. Monitor: To watch over, observe, or examine a work operation. Results of the observations and examination may be recorded; however, signoff responsibility is not included.
9. Project Direction: Directions or instructions concerned with project operations. Includes coordination and day-to-day direction of the activities of project entities receiving technical direction from others but does not include authority to overrule prescribed procedures or technical decisions of such entities.
10. Project Home Office: The division or area office assigned responsibility for management of the project.
11. Q-List Items: Safety-related structures, systems, and components.
12. Quality Assurance Group: The quality assurance group consists of the Vice President, Planning and Quality Assurance - Thermal Power Organization, Division Quality Assurance Managers, and the quality assurance personnel within their department.
13. Quality Policy Statement: Corporate management direction provided in the foreword to this document.

14. Review: Examination of any form of documentation for the purpose of establishing acceptability to the requirements of the function represented by the reviewer. Reviews may range from a thorough investigation to a spot check. Reviews are generally not holdpoints, but signoff evidence of review on the documents or records traceable to the documents is required.
15. Subcontractor: Supplier of construction site services, materials, or equipment. On construction management jobs, contractors under direct contract to the client may provide construction site services.
16. Surveillance: A broad term pertaining to and including both monitoring and witnessing.
17. Surveillance Inspection: Review, observation, or inspection of supplier personnel, material, equipment, processes, and test results at random or selected stages of manufacture for the purpose of determining if an action has been accomplished or a document(s) prepared in accordance with selected requirements of a contract document(s). Surveillance inspection does not take the place of supplier quality programs or assume any responsibility for such programs or product quality. Surveillance inspection is intended to provide a degree of added confidence that supplier materials and equipment meet specific contract requirements. Such inspections will not relieve the supplier or construction contractor of any responsibilities under the applicable contract, or act as waiver by Bechtel or Client of any of the conditions thereof.

For additional information, see Section 7, subsection 7.2, SURVEILLANCE INSPECTION. |

18. Technical Direction: Instructions and directions defining technical requirements for an activity. This may include furnishing prescribed procedures, technical requirements, design approaches, specifications, and design details.
19. Technical Guidance: Providing advice representing a preferred method or approach to a function or activity. This may include establishing general requirements or policy but not specific procedures or instructions.
20. Witness: To watch over, observe, or examine a specific test or work operation which includes signoff responsibility.

Whenever an approved ANSI Standard or Draft (or portion thereof) is referenced herein without qualification, all requirements of the Standard as interpreted by Bechtel Quality Assurance management must be incorporated in the program subject to the modifications in Appendix A of this report or in individual SARs.

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SECTION 1

(17.1.1)

ORGANIZATION

1.1 BECHTEL ORGANIZATION

Figure 1 provides an organization chart for the Bechtel Organization. Nuclear power plant work is performed by Bechtel through Bechtel Power Corporation (Thermal Power Organization) which includes the three power divisions. The Thermal Power Organization is managed by the President of Bechtel Power Corporation.

1.2 THERMAL POWER ORGANIZATION (BECHTEL POWER CORPORATION)

Figure 2 provides more detailed definition of the Thermal Power Organization.

The Thermal Power Organization consists of a general management group (Thermal Power Management) and three operating divisions: Gaithersburg Power Division, Los Angeles Power Division, and San Francisco Power Division.

Thermal Power Management, consisting of the President, Vice President, and a staff, establishes policy and is responsible for providing effective and close communication among the Power Divisions. A Sponsoring Corporate Officer is designated for each of the staff functions. The Sponsoring Corporate Officer for Quality Assurance is the Vice President, Planning and Quality Assurance. The following are the primary responsibilities of the Sponsoring Officer for Quality Assurance:

- o Develops, reviews, and approves new or revised TPO quality policy.
- o Provides guidance on quality policy across the divisions (including coordination of quality functions of external organizations, such as M&QS and Procurement).
- o Evaluates the effectiveness of the Divisions Quality Assurance programs and reports annually on the adequacy of the implementation of the quality programs to the President of Bechtel Power Corporation.

The sponsoring officer for QA has staff support, as required, to assist him in carrying out these responsibilities.

The quality policy statement for the Thermal Power Organization, including the program described by this Topical Report, is authorized (approved for use) by the President of Bechtel Power Corporation. The staff of the Thermal Power Management supports and assists the President in carrying out his responsibilities.

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The three power divisions are separate operating centers with authority and responsibility for the quality of their projects. Each division has operations covering engineering, construction, project management, quality assurance, procurement, division services (cost engineering, planning, and scheduling), and business development. The San Francisco and Los Angeles divisions also sponsor area offices in Ann Arbor and Houston, respectively.

Each power division retains full responsibility for projects assigned to it. Support services are provided to the divisions by centralized functions, such as Procurement and Materials and Quality Services Departments. When performing these services for a division, the centralized functions are responsible to the cognizant Division Management.

1.3 PROCUREMENT

Procurement is a Bechtel service organization and is responsible for the procurement of equipment, materials, and services specified by the Power Divisions. Procurement does not establish technical or quality requirements contained in procurement documents nor does it initiate or approve changes thereto. These functions are the responsibilities of Engineering. The functions of Procurement include:

- 1) Purchasing of equipment, materials, and services. This includes purchases for delivery to the project site and contracting/subcontracting where the work involves field labor.
- 2) Surveillance inspection of equipment, materials, and review of associated quality verification records when required by procurement documents
- 3) Traffic services to control the flow of materials and provide shipping arrangements necessary for efficient delivery to the jobsite
- 4) Field procurement and material handling at the project site providing a fully integrated materials operation from purchase to issuance. It includes receiving, inspection for over, short, and/or damage, warehousing and inventory control, distribution, local purchasing, and subcontracting. This function is the responsibility of the Senior Field Procurement Representative at the jobsite.

Figure 3 identifies the organization of Procurement, Figure 4 identifies the organization of the Procurement Supplier Quality Department, and Figure 14 shows a typical Power Division Procurement organization. As shown in Figures 3 and 14, Division Procurement is the responsibility of the Division Procurement Manager. Division Procurement is supported by the Procurement Services Group, shown on Figure 3, which provides policies, manuals, and procedures to all Division organizations.

The Division Procurement Manager assigned to a Thermal Power Organization Division is responsible for procurement of equipment, materials, and services for projects within that Division. He reports to the respective Manager of Procurement TPO for technical guidance as shown in Figure 3. He receives administrative direction from the management of his Division, as shown on Figures 6, 7, and 8.

As shown in Figure 4, the Division Supplier Quality Managers receive technical direction from the Manager of Procurement Supplier Quality. Administrative direction is the responsibility of the Division Procurement Manager, as shown on Figure 14. The following activities are the responsibility of the Manager of Procurement Supplier Quality and are accomplished with the assistance of the Supplier Quality Managers in each of the Division offices:

- 1) Prepare, maintain, and implement the Procurement Supplier Quality Department Manual
- 2) Prepare the training and development program; train and qualify Procurement Supplier Quality personnel
- 3) Perform surveys and quality program audits at suppliers and offsite subcontractors as required by project and division procedures
- 4) Prepare and implement inspection plans
- 5) Provide qualified personnel and perform surveillance inspection of items; review quality verification documents and release items for shipment
- 6) Review supplier QA program
- 7) Coordinate Procurement Supplier Quality Department activities with other quality functions
- 8) Monitor the adequacy of inspection plans and procedures in use by Supplier Quality personnel

1.4 MATERIALS AND QUALITY SERVICES

The Materials and Quality Services Department (M&QS) is responsible for furnishing specialized metallurgical, quality control, and auditing services to Bechtel divisions. Figure 5 illustrates the organization of the Materials and Quality Services Department.

M&QS responsibilities are:

- 1) To develop and qualify welding and nondestructive examination (NDE) procedures
- 2) To qualify and certify Bechtel nondestructive examination personnel

- 3) To support Engineering and Construction in the preparation of special process procedures and the qualification of personnel using these procedures
- 4) To provide technical guidance to field welding, coating, and NDE personnel
- 5) To support the divisions in the evaluation of supplier and subcontractor welding nondestructive examination and protective coating procedures, and quality program manuals for ASME components and metal structures applications
- 6) To prepare and maintain the Bechtel Quality Assurance Manual for ASME Nuclear Components (BQAM-ASME) and provide liaison with the ASME and authorized inspection agencies in matters associated with compliance with the ASME B&PV Code, BQAM-ASME, and the control of the ASME Code Symbol Stamps
- 7) To assist Quality Assurance in audits of Bechtel field construction which includes compliance with the Quality Assurance Manual for ASME, Section III, Nuclear Components and Bechtel and subcontractor field welding, nondestructive examination, and protective coatings programs
- 8) To assist Procurement with surveys, audits, and evaluations of selected materials and component suppliers and subcontractors
- 9) To consult with Engineering, Procurement, Construction, and Quality Assurance on quality control and failure analysis problems involving materials, welding, protective coatings, and nondestructive examination
- 10) To support Engineering in the preparation of specifications for piping, metal structures, ASME Code components, protective coatings, and the selection of materials

1.5 POWER DIVISIONS

All activities associated with power projects are assigned to one of the power divisions of the Thermal Power Organization. Figures 6, 7, and 8 illustrate the organization of each of these divisions.

The Division Manager is responsible for Bechtel Quality Program functions implemented within his division and authorizes (approves for use) Division Quality Policies.

1.5.1 Management

Each division management organization is uniquely suited to the nature of division activities and the functions directly associated with the office. The typical division management team includes the Division Manager, Manager of Project Operations, Manager of Engineering, Manager of Construction, Manager of Procurement, Manager of Services, Manager of Business Development, and the Quality Assurance Manager. Each of these managers has the direct responsibility and authority for the functions of his department or group.

1.5.2 Quality Assurance

Quality Assurance Managers provide technical and administrative direction to the Quality Assurance Group within the division. A typical Division Quality Assurance Organization is shown in Figure 12. Each Quality Assurance Manager is responsible for:

- 1) Formulating Division Quality Assurance Policies where necessary to implement or supplement quality policy prescribed by the Thermal Power Organization
- 2) Approving quality assurance procedures and instructions which define responsibilities and functions of quality assurance personnel within his division
- 3) Approving quality-related procedures and manuals prepared by departments and projects within his division for conformance to quality assurance policies
- 4) Formulating audit programs and conducting audits and reviews to assure Bechtel management and clients that the quality assurance programs of the division and its projects conform with policies and requirements of Bechtel and the client. Identifying the need for corrective action and assuring follow-up
- 5) Providing periodic reports to the Division Manager and the Vice President, Planning and Quality Assurance - Thermal Power Organization, on the status and adequacy of division and project programs and advising of any problems requiring special attention
- 6) Providing and maintaining a qualified and suitably trained staff of quality assurance engineers to carry out required project and staff functions
- 7) Formulating programs for maintaining the professional competence of personnel within his organization and providing assistance in training and indoctrination programs for division management, engineering, and construction personnel whose activities affect quality

- 8) Coordinating the Quality Assurance Program within the Division through formulation of Division Quality Policy, reviewing and approving departmental quality procedures, direction of the corrective action program, development of project quality assurance programs, and coordinating quality-related activities of the Division with outside services

1.5.3 Engineering

Managers of Division Engineering provide technical and administrative direction to the Engineering Department. Managers of Division Engineering are assisted by Engineering Managers and Chief Engineers. Engineering Managers are responsible for the management and technical direction of assigned projects and for assuring that the projects are provided with adequate personnel and are following division procedures for conduct of engineering activities. Engineering Managers provide administrative direction to the Project Engineer.

The Chief Engineers are responsible for assigning the engineers, designers, and draftsmen required to perform engineering functions within their respective disciplines on projects and for maintaining a staff of specialists and other support personnel to provide technical guidance to the projects. Chief Engineers provide administrative and technical direction to the engineers in their respective disciplines.

In addition to its design responsibilities, the Engineering Department is responsible for:

- 1) Preparing quality program related Engineering procedures and instructions
- 2) Developing and conducting quality program related indoctrination and training programs for Engineering Department personnel
- 3) Preparing specifications for supplier, contractor, or subcontractor quality assurance program requirements

1.5.4 Division Construction

Managers of Division Construction provide technical and administrative direction to the Construction Department personnel. Managers of Division Construction are assisted by Construction Managers, Chief Construction Engineers, where assigned, and the Chief Construction Quality Control Engineer. Construction Managers are responsible for the management and technical direction of assigned projects, and for assuring that construction projects are provided with appropriate personnel and are following prescribed division practices and procedures for conduct of construction activities. Chief Construction Engineers are responsible for providing division standard work procedures to the projects.

Formal quality verification inspection and onsite subcontractor/contractor surveillance inspection activities performed by Bechtel are the responsibility of Construction Quality Control. The Chief Construction Quality Control Engineer supervises the construction quality verification program and is responsible for administrative and technical direction of the Construction Quality Control Engineers.

Chief Construction Quality Control Engineers:

- 1) Prepare and maintain standard construction quality control procedures
- 2) Approve project quality control procedures and instructions
- 3) Hire and assign quality control engineers to the projects
- 4) Train and qualify quality control engineers
- 5) Provide technical and administrative direction to construction quality control engineers

1.5.5 Division Project Operations

A Project Manager is assigned to each power project. (A project involving engineering only may not have a project manager.) Project Managers report to Manager of Project Operations, who provides administrative and technical direction and assures the division's consistent and coordinated application of Bechtel policies and skills for the benefit of the project.

1.5.6 Division Procurement

The Manager, Division Procurement, is responsible for Procurement activities performed for projects within the Power Division. The Project Procurement Manager and his staff are responsible for coordinating Procurement activities for the project, as described in subsection 1.6.4. They receive technical and administrative direction from the Manager, Division Procurement, and project direction from the Project Manager.

The Division Supplier Quality Manager receives administrative direction from the Manager, Division Procurement (requires review by the Manager of Procurement Supplier Quality) and technical direction from the Manager of Procurement Supplier Quality. The Division Supplier Quality Manager assigns Project Supplier Quality Supervisors to division projects and provides them with technical and administrative directions and coordinates with the Manager of Procurement Supplier Quality Department.

Figure 14 illustrates a typical division procurement organization.

1.6 PROJECT ORGANIZATION AND FUNCTIONS

The Project Manager is responsible for project direction to reflect the contract, client requirements, Bechtel policies, and project procedures. The Project Manager is the leader of the Bechtel project team including the Project Engineer, the Field Construction Manager, Project Quality Assurance Engineer, Project Procurement Manager, Project Planner, Project Cost Engineer, Project Startup Engineer, and representatives from other Bechtel groups as required. He provides direction to the project team to assure satisfactory performance. A typical Project Team Organization and its relationship to the division management team is shown in Figure 9.

1.6.1 Project Quality Assurance

The project quality assurance program is directed and controlled by the Project Quality Assurance Engineer (PQAE) who is responsible to assure that quality assurance and quality control actions as listed below are performed throughout the project organization and are accomplished in accordance with the requirements of the project. The PQAE or his representative at the site is responsible for directing and managing the project quality program at the site. Project quality assurance responsibilities include the following:

- 1) Coordinate the functions of the project quality program
- 2) Coordinate project quality-related activities of Engineering, Procurement, and Construction
- 3) Monitor project quality-related functions and adherence to procedures and advise management of the status of program implementation; audit problem areas as determined by the Project Quality Assurance Engineer
- 4) Review supplier and subcontractor quality assurance program requirements in procurement documents, conditional releases of nonconforming items at the construction site, and completed quality verification records packages prior to turnover to the client
- 5) Concur with evaluation of recommended supplier's quality assurance program in accordance with subsection 7.1
- 6) Take stopwork action when warranted
- 7) Identify quality problems, initiate documented action leading to a solution, and verify implementation of solutions
- 8) Review project plans and schedules for quality-related activities to assure timely and effective implementation of the quality assurance functions for the project

- 9) Serve as the focal point for project communication on matters relating to the project quality assurance program
- 10) Provide periodic reports to the Division Quality Assurance Manager and Project Manager evaluating the status of the project quality assurance program and advising of any problems requiring special attention
- 11) Coordinate quality assurance functions within the project and with groups outside the division, such as M&QS and Procurement Supplier Quality
- 12) Assure that quality assurance-related procedures and manuals prepared by or used for the project meet project quality program requirements and initiate revisions when necessary
- 13) Review, prior to use, Procurement Inspection plans and Quality Control instructions for clarity and the existence of the information described in Sections 7 and 10. In addition, evaluate the adequacy of selected plans and instructions by performing an in-depth review of:
 - a. Accuracy of translation of drawing and specification requirements
 - b. Basis for determining inspection level and sequence
 - c. Adequacy of inspection method

This review provides assurance that the total quality program requirement inclusions are complete. Reviews of plans and instructions can be performed on a generic basis. In that case, the PQAE only verifies that the review has been performed.
- 14) Prepare quality assurance descriptions in Safety Analysis Reports

1.6.2 Project Engineering

The Project Engineer is responsible for the conduct of engineering on his project. The Project Engineer may be assisted by one or more Assistant Project Engineers. The Project Engineer provides project direction to the Group Supervisors. He is responsible for ensuring that engineering work under Bechtel cognizance is carried out in accordance with the project direction received from the Bechtel Project Manager and the technical direction received from the Engineering Manager.

The Group Supervisors are responsible for the quality and technical adequacy of the engineering work performed under their guidance and receive their technical direction in these matters from the Chief Engineers for their respective disciplines. The Group Supervisors are assigned a team of engineers, designers, and draftsmen by their respective Chief Engineers. The Project Engineer, group supervisors, engineers, designers, and draftsmen comprise the project engineering team. A typical project engineering team organization is shown in Figure 10. The project engineering team is responsible for all Bechtel engineering design work performed by and for the project and for checking functions performed on the project. Special design support is furnished to the project engineer by specialty groups. The Project Engineer is responsible for such special design work conducted off the project and for requiring that it be subjected to the same degree of checking and control as that conducted on the project. Key design work is also reviewed off the project by personnel on the staff of the Chief Engineer.

The project engineering team has the following responsibilities:

- 1) Prepare calculations, drawings, and specifications which constitute the engineering designs
- 2) Assure that drawings, specifications, procedures, and instructions produced conform to project requirements, Bechtel standards, applicable industry standards, regulatory agency requirements, and the design bases as defined in Safety Analysis Reports
- 3) Prepare specifications for supplier and subcontractor quality assurance programs
- 4) Establish the need for procurement surveillance inspection and audit, and monitor results of same
- 5) Review and approve the design changes and approve those nonconformances with "repair" or "use as is" disposition
- 6) Review drawings, procedures, test data, manuals, and reports submitted to Engineering by suppliers and subcontractors
- 7) Indoctrinate Engineering personnel in the use of Engineering procedures
- 8) Provide design information, criteria, and guidelines to Bechtel field engineering for certain design work which is completed in the field

1.6.3 Project Construction

A Field Construction Manager is assigned to each nuclear plant project involving construction or construction management assignment, and he is responsible for the project field construction performance. The Field Construction Manager is responsible for assuring that construction activities are performed in accordance with the design requirements as established by project engineering and other applicable requirements.

A typical project construction organization is shown in Figure 11.

The project construction organization includes Superintendents who are in direct charge of the crafts (on projects for which Bechtel is assigned direct construction responsibility); Field Engineers who perform field engineering, provide technical guidance and monitoring of construction work; field procurement personnel under the Senior Field Procurement Representative who are responsible for purchase of field-procured items and control of materials prior to release for construction; the Field Contracts Administrator who coordinates activities of field subcontractors; and Construction Quality Control Engineers (assigned by and administratively and technically responsible to the Chief Construction Quality Control Engineer) who are responsible for the Bechtel field quality control program, including performance of all quality verification inspection performed by Bechtel. Construction Quality Control activities are coordinated by the Field Construction Manager.

Field quality control is the responsibility of the Project Construction Quality Control Engineer. Construction Quality Control personnel are responsible for quality verification at the construction site. This includes physical inspection of construction performed directly by Bechtel and surveillance inspection on construction work performed by subcontractors (or contractors for construction management activities). Surveillance inspection by Bechtel Quality Control supplements the quality control program of the subcontractor and determines conformance to quality requirements. This surveillance inspection includes either selected physical inspections at prescribed hold points, or observation and witness of inspections performed by subcontractors, quality control personnel, or both.

Construction Quality Control Engineers:

- 1) Perform Bechtel jobsite quality verification inspection
- 2) Prepare Bechtel jobsite quality control documentation and maintain construction quality control records
- 3) Prepare and approve additions to division approved quality control procedures and instructions
- 4) Perform surveillance of subcontractor/contractor quality program implementation when the subcontractor/contractor has responsibility for first-level quality control.

Project Supplier Quality Supervisors report to the Division Supplier Quality Manager for technical and administrative direction. The functions of the Project Supplier Quality Supervisors are:

- 1) Coordinate project procurement surveillance inspection activities with project engineering and Procurement Supplier Quality
- 2) Comment on technical specifications prior to issuance for bids
- 3) Initiate supplier surveys, Supplier Quality assignments, and coordinate supplier audits with Procurement Supplier Quality
- 4) Review and accept procurement surveillance inspection reports
- 5) Give project direction on project Supplier Quality assignments to the Bechtel Supplier Quality Representative

Field procurement services are provided to the project construction team through the senior field procurement representative at the jobsite. The senior field procurement representative receives project direction from the Field Construction Manager and/or the Project Procurement Manager, and technical and administrative direction from the Field Procurement Manager.

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SECTION 2
(17.1.2)

QUALITY ASSURANCE PROGRAM

2.1 SCOPE

The program described in this report is applied to the design, procurement, and construction of those structures, systems, and components (items) whose satisfactory performance is required to prevent accidents which may cause undue risk to the health and safety of the public or to mitigate the consequences of such accidents if they were to occur. These items are defined as safety related and are identified in the safety analysis report for the project.

2.2 POLICY

The Bechtel Quality Program described in this report is designed to comply with the requirements of the NRC Regulations and the practices prescribed by American National Standards, client requirements, and Bechtel policies. The program assigns the responsibility for quality to the organization responsible for performing the work and includes as a basic requirement that individuals responsible for verifying and checking are independent of the individual or group responsible for performing the work. Additionally, independent review, audit, and surveillance are performed by individuals not affiliated with the organizational entities responsible for performance of the work.

The President of Bechtel Power Corporation is responsible for the overall quality policy of the Thermal Power Organization. Division Quality Assurance Managers assist in the development of revisions and/or additions to TPO Quality Policies for review and approval of the Vice President, Planning and Quality Assurance. Division Quality policies and quality assurance procedures of the divisions are formulated by the Quality Assurance Managers in the divisions who receive policy guidance from the Vice President, Planning and Quality Assurance, and report directly to management of the division. Division policies are authorized for use within the division by the Division Manager. Quality assurance practices for individual projects are implemented through the Division Quality Assurance Managers. Project, department, and division quality practices are subject to audit by Quality Assurance.

Coordination of the Quality Program within the Thermal Power Organization is the responsibility of the Vice President, Planning and Quality Assurance. The Quality Program is defined by Division Quality Policies formulated by Division Quality Assurance Managers.

These policies are implemented through procedures and manuals issued by the various departments and groups. The implementing procedures are approved for policy compliance and the program requirements of this report by Quality Assurance management (see Table I). Project quality programs incorporate required division policies and procedures

suitably modified to meet the scope of the project and client requirements. The Project Quality Assurance Engineer is responsible for coordinating the development of the project quality program and assuring that appropriate approvals are obtained. Project and division Quality Assurance personnel monitor and/or audit project program activities for compliance with approved procedures and policies. The Project Quality Assurance Engineer coordinates project quality-related activities. QA personnel have the responsibility and authority to carry out these functions, including identification of program problems, initiation of action to resolve such problems, and final verification that the action was taken and the problem satisfactorily solved.

The Project Quality Program includes policies and procedures which define the responsibility and authority of each group within the project and identifies documents to be prepared and their distribution. Bechtel project communication is assured through the close physical relationship of project participants and the requirements for formal documentation and reporting.

Communication between the client QA organization and Bechtel depends on contractual relationships and the nature of the utility organization. The Project Quality Assurance Engineer is the focal point for quality program communication. Formal quality assurance program reporting is performed either through the Project Manager or directly by the Project Quality Assurance Engineer. In either case, the Project Quality Assurance Engineer is responsible for coordinating preparation of quality program communication. Day-to-day communication on problems involving engineering, procurement, and construction may be carried out directly between the Bechtel group responsible for the activity and appropriate utility personnel. However, the Project Quality Assurance Engineer is furnished copies of this correspondence, as appropriate.

Supplier and subcontractor quality control includes provision of specifications by Engineering requiring suppliers and subcontractors to execute appropriate quality programs; surveillance inspection of suppliers by the Procurement Supplier Quality Department, or by Construction Quality Control for onsite subcontractors; and surveillance and audit of these activities by Quality Assurance personnel, the Procurement Supplier Quality Department staff, and/or Materials and Quality Services.

Control of construction activities performed directly by Bechtel includes in-process technical guidance and monitoring of the work by field engineering personnel who are independent of direct construction craft supervision; quality verification inspection and surveillance by Construction Quality Control; and audits by Quality Assurance personnel supplemented by Materials and Quality Services personnel.

2.3 STOPWORK

The program provides Quality Assurance personnel with stopwork authority over certain portions of project activity, and this authority is delineated in procedures. In addition, control of further processing of unacceptable work is provided by appropriate hold and release points as follows:

- 1) Design. Unsatisfactory work with respect to design documents prepared by Bechtel is controlled through the independent review process (prescribed by written procedures) and the refusal of the checker/reviewer to sign off the acceptance of the document which blocks its further processing and issue for use. Each non-Bechtel design document for which project engineering has an interface and review responsibility is logged upon receipt and has affixed a standard Bechtel stamp which signifies the status of the document when it is returned to the originator. Any status other than permission to proceed automatically sets in motion follow-up and close-out actions.
- 2) Procurement. Bechtel control over Supplier work is as follows: the Procurement Supplier Quality Representative, when required by procurement documents, must authorize supplier release for shipment (for purchased items) and may recommend stoppage of work on selected activities through designated contractual channels in situations which, if uncorrected, would render the item unacceptable for release. In cases of gross deficiencies or violations, procurement documents provide contractual relief, including termination, and these measures can be used when necessary.
- 3) Construction. Construction Quality Control has two primary mechanisms to control further processing of unacceptable work. These are the nonconforming material control system and the authority to refuse acceptance of completed work. Quality Control has authority to recommend stoppage in situations which, if uncorrected, would render the item nonconforming or unacceptable. In cases of contractor or subcontractor work, Construction Quality Control exercises controls similar to Procurement in 2) above.

2.4 PROGRAM DOCUMENTATION

Division Quality policies,* procedures, and instructions are contained in the documents listed in Table I. Appendix B of this report lists the Division Quality Policies for nuclear work and identifies their scope and relationship to 10 CFR 50 Appendix B.

Figure 13 is a graphic presentation of the relationship of documents that comprise the quality program for projects. Each of these documents is authorized by the division or department manager responsible for the activity. (Copies of Bechtel standard documents in Table I are available for review by regulatory authorities and clients, and controlled copies of those designated by an asterisk are available upon request through the client to cognizant regulatory bodies.)

Division and Department standard procedures and practices form the basis for the Quality Assurance Program on each nuclear project. The procedures and instructions contained in these standard manuals, modified to meet specific project requirements, are supplemented where necessary by specific work instructions and checklists where used. Project quality program manuals either contain or reference the procedures and manuals which comprise the Project Quality Program. These project manuals are controlled and maintained by the project team.

Each project has the responsibility for preparing and maintaining documentation defining project design criteria and applicable codes, standards, and regulatory requirements. Further, each project has the responsibility for preparing and maintaining organization charts and documentation defining interface responsibilities among various Bechtel groups and other major non-Bechtel project participants, such as the plant owner and the nuclear steam supply system supplier.

2.5 PERSONNEL

Bechtel personnel participating in the Quality Program are provided with specific indoctrination and training covering the project procedures applicable to their work. This is accomplished by general discussions of specific procedures and individual training by project supervision and staff specialists. Similar programs are employed for indoctrination of individuals assigned to staff and specialist groups. Records are maintained showing completion of indoctrination and training. Indoctrination and training is conducted in accordance with written procedures.

* These policies define what is required and who is responsible for preparing procedures and instructions to implement the requirements. Specific methods for accomplishing the requirements are not included; however, essential features of the program are prescribed.

In addition to the basic indoctrination and training programs and performance reviews, certain minimum education and experience guidelines have been established for various positions responsible for managing and directing program activities. While these are used for guidance in selecting candidates for these positions, they are not considered absolute requirements when other factors, such as the individual's demonstrated capability and staff technical support available to him, provide assurance that appropriate managerial and technical skill will be applied.

The basic qualification requirements for key management positions in the quality groups are an advanced degree with five or more years of appropriate management and quality assurance experience, or a bachelor's degree with eight or more years of appropriate experience. Additional pertinent experience is considered in lieu of a bachelor's degree.

The basic qualification requirements for supervisory and project quality functions, such as Project Quality Assurance Engineer, Project Construction Quality Control Engineer, etc., are an advanced degree with two or more years of appropriate supervisory and quality-related experience or a bachelor's degree with five or more years of appropriate experience. Additional pertinent (technical) experience is considered in lieu of a bachelor's degree. Records are maintained showing qualifications of key management, supervisory, and project personnel in quality groups.

The following specific qualification requirements are applied:

- 1) Personnel performing pressure boundary and structural welding and nondestructive examination are required to meet applicable qualification requirements of ASME Code, SNT-TC-1A, or other appropriate codes and standards.
- 2) Quality Control Personnel - Construction Quality Control Engineers and home office Quality Control staff and supervision will be qualified in accordance with the provisions of Regulatory Guide 1.58 (August 1973) or SNT-TC-1A, as applicable.
- 3) Audit Personnel - Personnel performing audits will be qualified in accordance with the appropriate requirements of ANSI N45.2.12.
- 4) Procurement Supplier Quality Representatives - A formal training program, developed by the Procurement Supplier Quality Department, is required for Supplier Quality Representatives assigned nuclear plant purchase orders. This program is defined in the Bechtel Procurement Supplier Quality Manual (PSQM) and conforms to the applicable requirements of Regulatory Guide 1.58 (August 1973).

2.6 PROGRAM CONTROL

Personnel performing quality assurance and quality control functions are provided with several means for controlling adherence to the quality program requirements. These include:

- 1) Various levels of approvals described in Sections 1 and 2.2 of this report
- 2) Stopwork as described in Section 2.3 of this report
- 3) Inspection and review hold points for engineering documents, supplier work and documentation, and construction activities as described in various sections of this report
- 4) Nonconformance and corrective action procedures as described in Sections 15 and 16 of this report

In all the above instances, decision of the assigned individual performing the quality assurance function is controlling, subject only to appeal by the line organization through their management and to the cognizant quality function management. In any case, personnel performing quality assurance and quality control functions have the authority to identify quality problems and initiate action leading to their solution.

The final authority on project quality program matters rests with the Project Quality Assurance Engineer, subject only to appeal by the Project Manager to the Division Quality Assurance Manager.

Resolution of disputes which are not resolved at lower levels is as follows:

The final authority on division quality program matters rests with the Division Quality Assurance Manager. The final authority on TPO quality policy rests with the Vice President, Planning and Quality Assurance - TPO. In either case, the authority is subject only to appeal to the Division Manager and the President of Bechtel Power Corporation, respectively.

Quality-related activities, such as inspection and test, are performed with appropriate equipment and under suitable environmental conditions.

2.7 PROGRAM EVALUATION

The following reports and activities provide information to the Vice President, Planning and Quality Assurance, from which he prepares a

report to the President of Bechtel Power Corporation evaluating the adequacy of the quality assurance program:

1. Quarterly reports by the Division Quality Assurance Managers, the Manager of Procurement Supplier Quality, and the Manager of Materials and Quality Services (including their summary of quality problems and audits)
2. The results of Division Quality Assurance Managers quality program coordination meetings, conducted at least semi-annually
3. Audits or reviews of quality activities in the Divisions and support services as directed by the Vice President, Planning and Quality Assurance

The above-listed reports and activities are also used to recommend action on the part of the Division Quality Assurance Managers, develop new policies, or other action as deemed appropriate by the Vice President, Planning and Quality Assurance.

2.8 MANAGEMENT REVIEW

Management reviews of the status and adequacy of the quality assurance program are accomplished through periodic reports and presentations by Quality Assurance Management personnel to their respective managers, and through reviews of quality assurance management audit reports. Meetings are held on a regular basis at both TPO and division management level. Meetings at the TPO level are coordinated by the office of the Vice President, Planning and Quality Assurance, and the division level meetings are conducted by the Division Quality Assurance Manager.

The overall TPO Quality Assurance Program and each Division Quality Assurance Program, including support service organization Quality Assurance Programs, are reviewed annually by individuals outside the quality assurance function. These reviews are performed by management above or outside the QA organization for TPO and Division Management. The results of these reviews are documented and submitted to division and corporate management.

Management reports contain summary data on the status of outstanding audit and corrective action items and identify the status of other significant quality program activities which may include items such as training and qualification programs; development of standard procedures, work plans, and other documents; status of industry standards; and other external issues of interest. These reports and discussions combined with other reports on overall division performance are used by TPO and division management above the level of Quality Assurance Manager to assess the scope, implementation, and adequacy of the quality assurance program.

The status of the project quality assurance program is reported regularly to cognizant management by the Project Quality Assurance Engineer. These reports identify quality problems and summarize results of project quality assurance activities. Project quality program status also is identified and evaluated through management audit reports which are conducted in accordance with the provisions of Section 18. Audit reports are reviewed by cognizant quality assurance management and copies are submitted to division management and cognizant department management. The Division Quality Assurance Manager is responsible for monitoring these reports and other information received from the project such as 50.55e reports and Part 21 reports, and for summarizing this information in reports to division management and the Vice President, Planning and Quality Assurance - Thermal Power Organization. The Quality Assurance Manager's report of the project includes review and evaluation of reports of client and NRC audits and reviews.

2.9 PREOPERATIONAL TESTING AND PLANT TURNOVER

The quality program described in this report covers design, procurement, and construction activities. The client is responsible for the quality program during the preoperational testing phase. As defined in the scope of work for a project, Bechtel, in conjunction with the client, performs advance planning for control of managerial and technical interfaces between Bechtel, the client, the NSSS supplier, and other contractors during preoperational testing and plant turnover.

SECTION 3
(17.1.3)

DESIGN CONTROL

Engineering department policies, standards, design guides, procedures, and instructions are employed for control of engineering design work to meet technical and regulatory requirements. These controls identify responsibilities and provide procedures to assure that the design requirements are correctly translated into the final design. The controls also provide for preparation of appropriate documentation to permit review of the process used and of the results obtained. The controls provide for the identification and specification of appropriate quality standards and for control of changes and design interfaces.

Design criteria are assembled by the project during the initial stages of design. These criteria include the criteria contained in safety analysis reports and other project requirements. The design criteria are maintained current and serve as a basis for preparation of the final design.

The design control program incorporates measures for identification and control of design interfaces among the various engineering disciplines on the project, between the project and technical support groups within Bechtel, and of such external interfaces as nuclear steam supply system supplier, other equipment suppliers, subcontractors performing design work, and the client (plant owner). These measures include: (a) identification of technical responsibilities of the various design groups and provisions for coordination of design documents among them, (b) description of responsibilities of and provisions for coordination with other design and engineering support groups within Bechtel, and (c) definition of interfaces and control of communication with organizations external to Bechtel.

Essentially all engineering documents are prepared by project personnel and include drawings, specifications, design analyses, system descriptions, and technical reports. They are verified or checked in accordance with Engineering Department Procedures. Project Group Supervisors (Figure 10) are responsible for all engineering work performed within their discipline and for approval of engineering documents prepared within their groups. Procedures and instructions for verification and checking of drawings, calculations, and specifications are included in the procedures governing the preparation of these documents or in separate procedures or instructions. These procedures identify the positions responsible for verification or checking and require that design errors are identified and followed up through correction. Verifiers and checkers on the project are required to verify the incorporation of required corrections. Documents cannot be released without verification or checking.

When design verification or checking is accomplished by an individual, it is performed by a person other than the originator or the immediate supervisor of the originator, who has adequate qualifications to have originated the work. If, in an exceptional circumstance, the originator's immediate supervisor is the only technically qualified individual available, the design verification or checking will be conducted by the supervisor with the following provisions:

- a. The other requirements of Regulatory Guide 1.64 will be met.
- b. The justification will be individually documented and approved by the next level of supervision.
- c. Quality Assurance audits will include review of the frequency and effectiveness of the use of the immediate supervisor to assure that this provision is used only in exceptional circumstances.

Design work, including verification or checking, of specialists external to the project, such as M&QS, Geotechnical, Hydraulics, and Stress is performed in accordance with project procedures or specialist group procedures meeting the requirements of this Topical Report. Such work must be reviewed and accepted by responsible project personnel for applicability to the project.

Key design documents for systems and structures important to safety are subject to design verification, which may be accomplished by:

- a. Critical design reviews, either individual or interdisciplinary
- b. Alternate calculations, or
- c. Qualification testing

Design verification is performed for the following key documents: system descriptions, flow diagrams, piping and instrument diagrams, control logic diagrams, electrical single-line diagrams, structural systems for major facilities, site arrangement, and equipment location drawings. Specifications, calculations, and computer programs in support of the key documents are verified. Documentation of the design verification is provided by a design verification report signed by the appropriate individual.

The above-listed key design documents are normally prepared for a nuclear power plant. Some of the key documents may not be prepared where a limited facility for a nuclear plant is designed.

When design verification is accomplished by an interdisciplinary design review, the review team will be composed of individuals knowledgeable of the type of system or structure and the requirements thereof. They may or may not have participated directly in the design of that particular system or structure. An individual who has participated directly in the design shall not be responsible for the independent design verification of his discipline.

The above description of design verification of key design documents satisfies the regulatory position of Reg. Guide 1.64, June 1976.

Design documents other than key design documents, identified above, shall be checked for technical correctness and conformance to design input requirements.

Engineering Department Procedures establish the extent of checking, the duties of the checker, and the extent of his responsibility for which he attests with his signature or initials. The signature or initials of the checker and date affixed on the design document in accordance with the Engineering Department Procedure satisfies the regulatory position of Reg. Guide 1.64, June 1976. Traceability of characteristic signatures and initials to the individual will be provided.

TPO designated Chief Engineers coordinate and assist in the preparation of certain generic "standard" and "guide" documents. Standard documents include design standards, standard details, standard specifications, and technical topical reports. Guide documents include design guides, guide key documents, guide specifications, and Regulatory Guide positions. Generic "standard" and "guide" documents which are pre-engineered to a level suitable for direct project adoption are subject to checking, review, and design verification as described in this Section. Standard or guide documents which have been qualified by a design verification need only be verified by a project for their applicability to project requirements. The acceptability of any significant changes to the qualified standard document must also be verified and documented.

As a matter of policy, Bechtel uses accepted industrial standards, specifications, and materials. Prototype testing is encouraged for equipment suppliers whose components have not previously demonstrated adequate performance. Prototype testing is not normally applicable to Bechtel design work; however, selected design details may be verified by test. When prototype testing is used for design verification, the test requirements are specified by Bechtel.

Design changes, including field changes, are subjected to design control measures commensurate to those applied to the original design. Checking and review of design changes are performed by the Project Engineering team to the same level as that of the original design. Changes to design requirements or completed designs produced by Project Engineering, which may be proposed by suppliers, subcontractors, or Bechtel construction, must be reviewed and accepted by Project Engineering.

In the case of proposed changes to the original design initiated at the construction site, documentation of the design change and acceptance by field engineering are required. Acceptance of the design change by project engineering is required prior to the point where the installation would become irreversible without extensive demolition and rework. For design changes proposed by suppliers, acceptance of the design change by project engineering is required prior to shipment of the item to the jobsite.

In all cases, approval of the proposed design change by project engineering is required prior to fuel load for plants under construction, or in the case of an operating plant, prior to relying on the component, system, or structure to perform its safety-related function.

Certain detail design work described below may be performed by Bechtel Field Engineering. This work is performed in accordance with requirements and within limits prescribed by Project Engineering and is not subject to design verification or checking as described above. The nature and scope of Field Engineering design work will vary with each Engineering discipline. Civil Field Engineering design affecting safety-related structures, systems, and components is limited to functions such as the design of form details for concrete placement and design of temporary supports for reinforcing and embedded steel. There is no safety-related structural design performed by Field Engineering. Instrumentation and Electrical Field Engineering design functions include the preparation of isometric drawings of electrical conduit and instrumentation tubing using sizes, separation, instrument location, and support criteria supplied by Project Engineering and the detailing and selection of hangers and supports from approved designs and spacing criteria provided by Project Engineering. Piping Field Engineering design functions are normally limited to the preparation of isometric drawings and detailing of small (two-inch nominal and under) pipe, using sizes, materials, routing, and support criteria provided by Project Engineering.

Suppliers are not allowed to change Bechtel design requirements or Bechtel-reviewed supplier design documents without obtaining approval by Bechtel Project Engineering. Construction site changes to engineering design are documented by means of change notices or change requests which require authorization by Project Engineering. Significant or unique changes are authorized individually; Project Engineering may give written authorization in the form of specifications or other instructions to Field Engineering to make routine changes. Field Engineering has the authority to approve changes to design details in cases where the original design details were prepared by Field Engineering.

SECTION 4
(17.1.4)

PROCUREMENT DOCUMENT CONTROL

All procurement actions for Q-List items and services, including off-the-shelf items and bulk commodities, whether performed by home office or field procurement groups, employ technical and quality requirements established by project engineering.

Project engineering prepares (or provides) the technical and quality requirements appearing in procurement documents. These activities are governed by the same policies and procedures as those applied to design documents. Engineering and procurement department procedures delineate the sequence of quality-related action to be accomplished in preparation, review, approval, and control of procurement documents and changes thereto.

Project engineering is responsible for assuring that applicable regulatory requirements, design bases, supplier quality assurance program requirements, and other requirements which are necessary to obtain and verify quality are included or referenced in the procurement documents.

While the project engineering team is responsible for preparation of specifications for supplier, contractor, or subcontractor quality assurance programs, these specifications are based upon program policy formulated by Quality Assurance and guidance provided in approved Engineering Department Procedures and standard engineering specifications. The specifications are reviewed for appropriate quality program requirements by Project Quality Assurance.

Procurement documents include specific technical specifications for the equipment and services to be furnished which define specific codes, standards, tests, inspections, and records to be applied or furnished. The procurement documents also include quality assurance requirements either in separate specifications which define requirements for the supplier's quality assurance program or by incorporating appropriate requirements in the technical specifications and associated documents. Quality programs may be specified by invoking the appropriate sections and elements of ANSI N45.2-1971, appropriate supplementary ANSI Quality Assurance Standards, and the ASME Boiler and Pressure Vessel Code, as applicable, or by incorporating requirements equivalent to those of these standards. The procurement documents also establish provisions for surveillance, inspection, and audits (including access to the supplier's and subsupplier's facilities and records for audit), provide for extension of the applicable requirements to subtier procurements, include provisions for control and approval of supplier nonconformances, and establish requirements for preparation and delivery of documentation. Specific requirements for documents which must be submitted for review, approval, and/or verification are provided.

Engineering Department Procedures provide for establishing quality assurance requirements in procurement documents. Technical quality requirements are reviewed by technical personnel. Programmatic aspects are reviewed by Quality Assurance as described above, and the review also assures that the document was prepared, reviewed, and approved in accordance with the approved procedures. Procurement documents normally contain general acceptance criteria. These are reviewed by suppliers, subcontractors, or Bechtel Construction Quality Control upon receipt of the documents to verify and supplement acceptance criteria.

Evidence of review and approval of procurement documents is available for verification.

The following describes the sequence of steps in preparation of Bechtel home office procurement documents and review of bids:

- 1) Technical and quality requirements for procurement documents are originated by Project Engineering.
- 2) Quality assurance requirements are reviewed by the Quality Assurance Engineer.
- 3) Project Engineering forwards the procurement document requirements to Procurement.
- 4) Procurement prepares a formal bid request package which is forwarded to the bidders.
- 5) Bids are received and reviewed for commercial terms by Procurement and forwarded to Project Engineering for technical evaluation. Project Engineering and Procurement select a recommended supplier. Quality program evaluation may be performed by Procurement Supplier Quality or, for jobsite contractors and subcontractors, by Construction Quality Control.
- 6) The Project Quality Assurance Engineer concurs with the evaluation of the recommended supplier's quality assurance program.
- 7) The Project Engineer approves the bid recommendations, obtains other necessary approvals, and forwards them to Procurement.
- 8) After receipt of necessary approvals, the purchase order/subcontract is issued by Procurement.

On Construction Management jobs, the client may place orders directly, in which case selected functions of the Procurement Department are performed by the client.

The following describes the sequence of steps for Bechtel Field Procurement:

- 1) Field Engineering prepares requisitions employing technical and quality assurance requirement specifications which have been established by Project Engineering and have been reviewed by Quality Assurance.
- 2) The Project Construction Quality Control Engineer reviews the field material requisition to verify inclusion of specified quality assurance requirements.
- 3) Field Engineering forwards the material requisition to the Senior Field Procurement Representative.
- 4) The Senior Field Procurement Representative prepares a bid request package which is forwarded to bidders.
- 5) Bids are received and reviewed for commercial terms by the Senior Field Procurement Representative and forwarded to Field Engineering for technical evaluation and selection of recommended supplier. Quality program evaluation is normally performed by Project Engineering but may be performed by Construction Quality Control or Procurement Supplier Quality.
- 6) The Quality Assurance Engineer reviews and concurs with the evaluation of the recommended supplier's quality assurance program.
- 7) Field Engineering approves the bid recommendation, obtains other necessary approvals, and forwards it to the Senior Field Procurement Representative.
- 8) After receipt of necessary approvals, the purchase order/subcontract is issued by the Senior Field Procurement Representative.

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SECTION 5
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INSTRUCTIONS, PROCEDURES, AND DRAWINGS

The documented instructions and procedures governing the program were identified in Section 2.

Procedures and manuals governing the activities of organizations and groups performing quality-related functions include procedures for the preparation and review of instructions, procedures, and drawings.

Documented instructions from Project Engineering to Construction, subcontractors, and suppliers is in the form of engineering specifications and addenda or change notices thereto, drawings, and drawing change notices. These documents contain, reference, or require procedures and instructions, as appropriate, and provide necessary acceptance criteria. When approved by Project Engineering, these documents are released for construction work.

Bechtel procurement documents require suppliers and subcontractors to submit specified drawings and procedures to Bechtel for acceptance prior to start of fabrication or construction. Bechtel reviews of these documents are performed to determine that interfacing design features are compatible with overall design and installation requirements and that procedures are acceptable.

Procedures for construction activities are prepared by Construction and contained in a procedures manual. These procedures describe, define, or specify administrative and functional requirements for performing construction activities. Procedures of this nature include training of personnel; jobsite housekeeping; storage, maintenance, and handling of items; document control; changes to design documents; reviewing supplier engineering documents; and field requisitioning of items and services.

Field Engineering (construction) prepares other procedures when engineering documents require amplification to perform various discipline activities associated with fabrication, cleaning, erection, installation, test, repair, modification, etc., of items.

The requirements, procedures, and instructions for the Construction Quality Control activities are contained in the Construction Quality Control Manual. The elements of this manual include qualifications, indoctrination, certification, and training; inspection, examination, and test control; control of nonconforming items; field procurement control; control of measuring and test equipment; documentation and records control; final inspection and turnover; and contractor and subcontractor control.

Assurance that work is accomplished in accordance with approved instructions, procedures, and drawings is obtained through the various levels of surveillance, inspection, and audit described in other sections of this report.

SECTION 6
(17.1.6)

DOCUMENT CONTROL

The program documents identified in Section 2 provide means for document control. These include procedures providing Engineering, Procurement Inspection, and Construction controls for the review, approval, and release of documents and changes thereto.

Documents pertaining to quality-related items, as identified in this paragraph, are required to be controlled. The documents listed in Table I are on controlled distribution. Instructions, procedures, specifications, drawings, procurement documents, inspection plans, design calculations, design criteria, field change requests, safety analysis reports, and inspection test procedures are identified by control registers or index lists. Nonconformance reports, supplier deviation reports, corrective action reports, documentary evidence of design reviews, memoranda, and correspondence are identified by logs which provide for traceability of closeout action.

Document control centers for the project are set up in the Project Engineering office and the jobsite. Controlled documents are released, received, controlled, and distributed through these centers.

Engineering Department procedures prescribe the requirements for preparation, control, and distribution of design documents. Approved drawings and specifications prepared by Project Engineering are issued to organizations and individuals responsible for performing the work and to those responsible for inspection*. Control registers, issued periodically, identify the drawings, specifications, and other design output documents and their current status.

Transmittal forms are employed to forward drawings and specifications and require that signed receipts be returned from the addressee.

Changes made to approved design documents by Project Engineering or proposed by Field Engineering are reviewed and approved by Project Engineering in accordance with established procedures which provide that changes are reviewed in the same manner as the original issue.

Supplier-submitted documents, such as drawings, specifications, procedures, manuals, and other data, are controlled through the use of control logs which provide identification and status of supplier documents. Transmittal forms are used to return and show approval status

* Bechtel Procurement Supplier Quality Representatives receive copies of the transmittal notices listing the documents and their approval status but normally do not receive copies of the documents. These are available at the supplier's plant for the Supplier Quality Representative.

of evaluated supplier documents. Bechtel Procurement Supplier Quality Representatives are informed as to the current status of supplier documents, and copies of applicable supplier documents are formally transmitted to the construction site with provision for receipt acknowledgement.

The project construction organization at the jobsite employs standard prescribed procedures for control of the distribution of approved drawings, specifications, and other documents. These procedures include provisions for field receipt, review and distribution of approved documents, and for appropriate marking or destruction of obsolete documents.

Approved changes are promptly included in governing documents or controlled change notices provided for interim revision. Changes may not be implemented without appropriate documented approvals. When a specified number of change notices have been issued or after a designated period of time, change notices must be incorporated in the governing document.

Controls to ensure that work activities are conducted in accordance with the necessary procedures or other documents take several forms. These controls include the following:

- 1) Procurement documents
- 2) Appropriate department or group manuals and procedures
- 3) Engineering compliance monitored by Quality Assurance
- 4) Supplier compliance monitored by Procurement Supplier Quality
- 5) Construction compliance monitored by Construction Quality Control and Quality Assurance

The Bechtel surveillance inspection program includes procedures governing the initial inspection visit which are designed to identify necessary documentation and verify that the controls are in place for preparation and approval of procedures prior to performance of work governed by the procedure. Construction inspection planning includes identification of documents required, and these must be available for use prior to performing inspections governed by the procedure.

Control of documents in the engineering and construction offices is regularly audited by Quality Assurance personnel. In addition, Construction Quality Control assures that construction work is performed in accordance with current approved design documents as an integral part of their quality verification inspection program.

SECTION 7
(17.1.7)

CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

7.1 SUPPLIER EVALUATION AND SELECTION

Files of suppliers and subcontractors are maintained by Procurement. These files identify suppliers and subcontractors who have demonstrated their ability to provide quality material, equipment, or services, or who have been established as capable by survey. Suppliers' and subcontractors' quality history files contain information on scope of services and capability, and results of recent shop surveys and audits. Periodic reports identifying data contained in quality history files are issued by Procurement Supplier Quality to interested groups within the divisions.

The Materials and Quality Services Department reviews welding and nondestructive examination procedures for work involving compliance with the ASME Boiler and Pressure Vessel Code and for fabrication of metal structures and protective coating procedures. Materials and Quality Services reviews and evaluates these documents and provides Procurement with information for summary listings of the approved vendor information on file. This information is available to projects for assistance in identification and evaluation of qualified sources.

Procurement Supplier Quality Department procedures include provisions for source surveys which may be used to supplement data in a supplier's quality history file. Requests for source survey are initiated by Purchasing or Engineering in cases where inadequate historical data is available to evaluate the supplier's capability to produce the commodity.

Prior to award*, the following technical and quality requirements must be met:

- 1) Determination by Engineering that the source is responsive to the technical requirements of the specification
- 2) Determination by Engineering and Quality Assurance that the supplier or subcontractor quality program is capable of meeting the specified requirements. This may be based on evaluations by Procurement Supplier Quality for manufacturing suppliers or Construction QC for jobsite contractor or subcontractor.

* In some instances it may be necessary to place a contract without fully satisfying these criteria. For these cases, the criteria shall be met prior to start of related work activities.

The quality program evaluation may be achieved by review of controlled program manuals previously submitted and evaluated by responsible Bechtel personnel; manuals and procedures submitted to Bechtel, or made available for Bechtel review in the bidders' facilities in connection with the specific procurement; or an evaluation of performance on previous Bechtel procurements.

In addition, supplier program evaluation may be based on review of the supplier's quality history, source survey results, or analysis of bid for responsiveness to quality program requirements contained in the procurement documents.

For work covered entirely by ASME Boiler and Pressure Vessel Code, Section III requirements, possession of the appropriate Certificate of Authorization constitutes an acceptable minimum requirement for bidder qualification. When an award is made, appropriate sections of 10 CFR 50, Appendix B, shall apply.

Evaluation of suppliers of standard off-the-shelf items which are produced to a manufacturer's standard quality program is based on published data (catalogues, etc.) for conformance to engineering requirements and the use of historical quality performance data and source surveys.

7.2 SURVEILLANCE INSPECTION

For purchased items, the primary responsibility for quality rests with the supplier. Technical control of supplier work is provided by Project Engineering through review of specified supplier documents, including drawings and procedures. Engineering is also responsible for providing or accepting supplier-proposed resolutions to discrepancies encountered. Inspection of supplier's work is the responsibility of supplier's inspection department. Bechtel Procurement Supplier Quality Representatives perform surveillance inspection of supplier's work which may include specific measurements and examinations performed by the Supplier Quality Representative but generally includes monitoring and witnessing of inspections and tests performed by the supplier's quality control organization. Bechtel Supplier Quality Representatives frequently spot-check the dimensions, surface finish, and protective coatings, visually examine welds, review test reports and radiographs, and other details.

Project Engineering identifies procurements (both home office and field) requiring source surveillance inspection and audit. Procurement may recommend additional items. Manufactured or fabricated Q-List items, such as vessels, heat exchangers, pumps, piping subassemblies, valves, electrical panels, etc., are included in surveillance inspection and audit programs. Items which are typically excluded from the surveillance inspection program include standard off-the-shelf items and bulk commodities where required quality can be adequately determined by receipt inspection or post-installation checkout or test. Also excluded are materials where important physical and chemical properties are independently verified on samples taken at the supplier's facilities or at the jobsite.

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For Q-List items, Bechtel Procurement Supplier Quality Representatives perform their surveillance inspection in accordance with inspection plans and instructions. These plans are prepared by Procurement Supplier Quality based on instructions in the Procurement Supplier Quality Department Manual and may be modified by Project Engineering. They provide for identification of witness and hold points, identification of the examinations and tests which are selected to be witnessed by the Bechtel Supplier Quality Representative, and documentary evidence of completion of each witness and hold point operation, test, or examination. A supplier may not proceed with the work beyond a hold point without written agreement or waiver of hold points from Procurement Supplier Quality based on agreement from Project Engineering and the PQAE.

It is the responsibility of the Supplier Quality Representative to verify, to the extent required by his inspection plan, that the supplier has met the quality requirements contained in the procurement documents before the material or equipment is released for shipment. This responsibility of the Supplier Quality Representatives is met through surveillance inspection which includes observations and checks at random of selected intervals (or points) of materials of construction, in-process fabrication, heat treatment, welding, examination, testing, dimensions, preparation for shipment, marking, tagging, and quality verification. Bechtel Supplier Quality Representatives do not perform nondestructive examinations or tests on material and equipment at suppliers' plants. Such examinations and tests are performed by the supplier and selectively witnessed or otherwise monitored by the Supplier Quality Representative.

Typical surveillance inspection plans have sections that describe the scope and define application, establish responsibilities, describe pre-planning activities to be performed prior to making initial contacts with a supplier, describe the activities to be performed during the initial, progressive, and final inspection visits, and describe reporting requirements.

Procurement inspection may be performed by resident or area Supplier Quality Representatives assigned to several suppliers. Reports documenting inspections performed, tests witnessed, and discrepancies observed are prepared by the Supplier Quality Representative and distributed to appropriate Engineering, Construction, Procurement, and Quality Assurance personnel. Bechtel Supplier Quality Representatives are responsible for assuring that their inspections of material, equipment, and specified documentation conform to the requirements of the inspection plan and/or instructions and for releasing inspected items for shipment. Bechtel Supplier Quality Representatives have the authority to refuse release of nonconforming material.

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Consistent with the complexity of the inspection assignment, the Supplier Quality Representative will review with the supplier the requirements of the applicable surveillance inspection plan. During the initial visit, the Supplier Quality Representative will discuss the following:

- 1) The quality requirements of the procurement documents
- 2) The applicable requirements of the governing codes and standards
- 3) The requirements for Bechtel Engineering approvals
- 4) The requirements for Bechtel inspection at principal sub-supplier plants
- 5) The requirements for qualification of welders, nondestructive examination personnel, and inspection, examination, and testing personnel
- 6) The requirements for Bechtel Supplier Quality witness and hold points, including release for shipment
- 7) The requirements for complete and accurate supplier quality verification documentation prior to release for shipment
- 8) The supplier's responsibilities for the quality of subtier items

In addition, the Supplier Quality Representative will establish witness and hold points in accordance with the guidelines established by the applicable inspection plans and procurement documents. During the course of progressive inspection, the Supplier Quality Representative has the prerogative to make other inspections and witness other examinations and tests necessary to determine the supplier's compliance with the requirements of the procurement documents.

Surveillance inspection of jobsite subcontractors on Bechtel construction jobs and contractors on Bechtel construction management jobs is the responsibility of Construction Quality Control utilizing Quality Control Instructions and Inspection Records provided by procedures contained in the Construction Quality Control Manual.

Contractors on Bechtel construction management jobs are responsible for monitoring the effectiveness of their inspection program and those of their subcontractors.

7.3 RECEIVING INSPECTION

Receiving inspection practices conform to the requirements of Regulatory Guide 1.38 (3/16/73). These are performed in accordance with Quality Control Instructions by Construction Quality Control personnel or suitably trained personnel under the supervision of Construction Quality Control.

Documentary evidence that the item conforms to procurement documents, required to be available at the construction site prior to installation, or use as a conforming item, includes as follows:

- 1) For Bechtel procured* and inspected items not covered by ASME Boiler and Pressure Vessel Code requirements, a certificate of conformance** (signed by an authorized representative of the supplier identifying the specific technical requirements met by the item by referencing the appropriate Bechtel specification and other governing codes and standards) and acknowledgement that the Bechtel Procurement Supplier Quality Representative has reviewed the required documentation and has released the item. This may be obtained by having the certificate signed by the Bechtel Supplier Quality Representative to verify that he has reviewed applicable supplier documentation supporting the certificate and released the items, or by receipt of a separate teletype or report from the Supplier Quality Representative indicating that his inspection is complete and the item has been released. Receipt of the certificate of conformance and the Bechtel Procurement Supplier Quality Representative release constitutes documentary evidence that materials and equipment conform to procurement requirements and may be installed. If the balance of the documentation package required by the procurement documents is received prior to or with the shipment, the certificate of conformance may be waived.
- 2) For Bechtel procured and inspected items covered by ASME Boiler and Pressure Vessel Code requirements, the same requirements prevail as above, plus the appropriate Code Data Report.
- 3) For Bechtel procured and noninspected items, all quality verification documentation required to be submitted with the procurement documents must be reviewed and verified (as a part of receiving inspection) at the construction site by Quality Control personnel, such as Construction Quality Control or Procurement Supplier Quality personnel.
- 4) For nuclear steam supply system supplier furnished items, appropriate certification from the NSSS supplier in accordance with his quality program

* Also applies to cases of Bechtel client (applicant) procured items for which Bechtel is acting as agent for the client.

** The certificate of conformance conforms to ANSI N45.2.13.

- 5) For cases when procurement documents do not require the supplier to furnish quality verification documentation, satisfactory receiving inspection results constitute the necessary documentary evidence that items conform to procurement documents.

Standard off-the-shelf items are visually inspected for identification and condition at receipt.

Complete quality verification record packages are requested for delivery prior to, or with, the shipment. Documented control measures, with provisions for follow-up, are provided to expedite receipt of quality verification packages which are delayed beyond the time of shipment. Completed quality verification records packages received at the construction site are checked for completeness and traceability by quality control personnel, such as Construction Quality Control or Procurement Supplier Quality personnel and audited by Quality Assurance. Project Engineering may elect to have selected quality verification documentation delivered to the design office for review by so specifying in procurement documents.

7.4 SUPPLIER AUDITS

The supplier control program provides for periodic audits of selected suppliers' quality assurance programs as described in Section 18. Design subcontractor and consulting program work is monitored by Project Engineering.

SECTION 8
(17.1.8)

IDENTIFICATION AND CONTROL OF MATERIALS,
PARTS, AND COMPONENTS

Identification requirements are determined during the generation of specifications and design drawings. Procurement documents provide the requirements for identification of purchased items.

Parts, components, subassemblies and equipment, and partially fabricated items may be identified by stenciled or etched markings, strip marking, imprinted tape, color coding, and tags. Large quantities of small items, unless specifically required by code or standard, may be identified as to heat, batch, lot, or specification by applying markings to bags, bins, tanks, or other suitable containers. Identification of installed or assembled items requiring traceability may be transferred to inspection records or as-built documents if desired and is required if markings are hidden or subject to obliteration during fabrication or installation.

Organizations receiving materials, parts, or components verify that these are properly identified and are accompanied by appropriate documentation. Provisions are made for handling and storing items to retain identification and to prevent intermixing.

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SECTION 9
(17.1.9)

CONTROL OF SPECIAL PROCESSES

The requirements of the ASME Boiler and Pressure Vessel Code are invoked, as applicable, in the Bechtel program. Special processes requiring procedure and/or personnel qualification beyond those required by the code are identified in technical specifications by reference to appropriate industry codes and standards, where available, or by specific identification in the technical specification. Supplier and subcontractor special process qualification data are subject to review by Bechtel.

Special processes performed by Bechtel Construction, including welding, nondestructive examination, protective coating, cleaning and flushing, are performed in accordance with the requirements of applicable codes and standards. The requirements for welding and nondestructive examination comply with applicable portions of the ASME Boiler and Pressure Vessel code, American Welding Society Standards, and the Society of Nondestructive Testing (SNT-TC-1A and supplements), as applicable. Cleaning and flushing procedures and personnel qualifications conform to the requirements of Regulatory Guide 1.37 (3/16/73).

Other unique special processes or work operations identified by the nuclear steam system supplier or Project Engineering are properly qualified and performed by trained personnel in accordance with specified technical requirements.

Current qualification records of procedures, equipment, and personnel are maintained at the jobsite. Active files are maintained in the home office, and copies are provided to each affected project of qualification records covering special processes and procedures. Projects are required to maintain up-to-date lists of personnel qualifications and/or applicable equipment qualifications for special processes. Controls are provided to assure that personnel qualification records are regularly reviewed, and the appropriate requirements for requalification are implemented. Implementation of these controls is verified by Construction Quality Control personnel and audited by Quality Assurance with the assistance of Materials and Quality Services.

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SECTION 10
(17.1.10)

INSPECTION

As described in Section 7, suppliers' and subcontractors' programs are subject to surveillance inspection by Bechtel Procurement Supplier Quality Representatives and Construction Quality Control Engineers as applicable.

The responsibilities for inspection of Bechtel construction work are identified in Sections 1 and 2. Quality verification inspection, witness of testing activities, and evaluation of test results are performed by Construction Quality personnel who are independent of field engineering and craft supervision. Quality Control Engineers are assigned by and receive administrative and technical direction from the Chief Construction Quality Control Engineer in the division or area office. The overall inspection program is monitored by resident construction site Quality Assurance personnel and audited by Division Quality Assurance.

Inspection, witness of testing activities, and evaluation of test results are performed in accordance with procedures contained in the Construction Quality Control Manual supplemented by construction quality control instructions, or work operations and planning documents. Inspection planning includes receiving inspection, construction and installation inspection, and testing.

Quality control instruction and inspection records are prepared to cover onsite receiving, maintenance, installation, testing, and subcontracted work activities performed during the construction phase. These are the controlling documents used by Quality Control Engineers for performance of onsite quality verification activities. These identify what inspections are required, the inspection acceptance/rejection criteria, how and by whom the inspections are to be performed, and the sequence. They are available prior to inspection.

Inspection and acceptance criteria are derived from engineering design documents, supplier information, and construction procedures. Standard inspection instructions to be used on the project are approved by the Chief Construction Quality Control Engineer.

In addition, all work covered by the ASME Boiler and Pressure Vessel Code, Section III, is also subject to independent inspection by authorized Code Inspectors in accordance with the Code rules.

Inspection procedures or instructions and records provide the following information:

- 1) Reference to applicable documents such as drawings, specifications, and procedures

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- 2) Identification of prerequisites and special process control requirements, such as personnel, procedure, or equipment qualification
- 3) Identification of characteristics to be inspected
- 4) Individuals or groups responsible for performing the inspection
- 5) Acceptance criteria (explicit or by reference) obtained from specifications, drawings, supplier instructions, and construction standards
- 6) A description of the method of inspection and equipment to be used or reference to an appropriate procedure
- 7) Identification of frequency of inspection or sampling plan
- 8) Record of results of the inspection, including any special documentation, and sign-off by the inspector
- 9) Verification that all inspection operations are complete and acceptable

The personnel qualification procedures include provisions to maintain and periodically review records of inspectors' qualifications to ensure that they are kept current.

Inspections of modifications, repairs, and replacements are performed either in accordance with the original inspection procedure, instruction or plan, or special procedures or plans appropriate to the work activity.

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SECTION 11
(17.1.11)

TEST CONTROL

Tests required to qualify, demonstrate, or assure quality of procured items or completed construction are defined in engineering drawings, specifications, or test procedures.

Construction tests are an extension of construction inspection. Construction testing is conducted to demonstrate that the equipment installation is complete and that the electrical systems are properly wired. Test plans or procedures, and test reports and records are used to demonstrate that completed tests have met test objectives.

System cleaning, flushing, instrument and control settings, and performance demonstration are part of the preoperational and startup test program. Preoperational and startup testing is normally under the control of the client. Bechtel startup engineers may provide assistance to the client in the preparation of startup procedures and supervision of startup tests. Bechtel startup engineers are independent of the construction and the client's operating organization and are qualified to collect, analyze, and evaluate test results in accordance with the requirements of Regulatory Guide 1.28 (6/7/72).

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SECTION 12
(17.1.12)

CONTROL OF MEASURING AND TEST EQUIPMENT

The Bechtel Construction Quality Control Program provides for calibration, maintenance, and control of measuring and test equipment used by Bechtel in construction. Procedures provide for unique identification of each instrument or equipment item requiring calibration or checking, establishment of calibration schedules based upon the elapsed time or usage cycles, and provisions for identification of calibration status by tags, labels, or markings applied to the item. Records are maintained to show the status of items under the calibration program.

Inspection procedures require that the inspector check calibration labels or tags as well as apparent proper functioning of the instrument prior to use to assure that the calibration period has not lapsed and the equipment is in proper working order.

The identification of measuring and test equipment used in performing tests is entered in the test records when the validity of the test result is critically dependent on the accuracy of the test equipment.

Calibration standards are traceable to nationally recognized standards, or the basis for calibration is properly documented. Calibration standards have an uncertainty (error) requirement of no more than 1/4 of the tolerance of the intended use of the equipment being calibrated. A greater uncertainty (error) is acceptable when limited by the state of the art.

Provisions for contractor's control of measuring and test equipment are included in procurement documents by specifying ANSI N45.2-1971, Section 13. The Bechtel surveillance inspection program of contractor's activities includes review of this element in the contractor's program. Contractors are required to apply practices similar to those described for the Bechtel program.

Performance and adequacy of supplier, contractor, subcontractor, and Bechtel construction programs for control of measuring and test equipment are verified by surveys or audits performed by Bechtel Procurement Supplier Quality, Quality Control, or Quality Assurance personnel, as applicable.

SECTION 13
(17.1.13)

HANDLING, STORAGE, AND SHIPPING

The requirements for packaging, marking, and shipping are specified in procurement documents for Q-List items by reference to ANSI N45.2.2-1972 or by provision of specific technical requirements which meet the intent of this standard.

Procedures for equipment and system cleaning and flushing and cleanliness control conform to the appropriate requirements of Regulatory Guide 1.37 (3/16/73).

For supplier, contractor, or subcontractor work, special handling, storage, shipping, and preservation requirements are identified in technical specifications which either provide, or require the vendor or subcontractor to provide, the required procedures and instructions. The packaging, handling, and shipping practices of the suppliers are subject to review by Bechtel Procurement Supplier Quality Representatives at the source prior to shipment for compliance with requirements defined in procurement documents.

At the construction site, materials and equipment are received, inspected, stored, and maintained in accordance with standard field procedures supplemented by special procedures and requirements issued by project engineering or furnished by suppliers. Materials and equipment are physically inspected upon arrival at the jobsite and moved into prescribed storage areas or to the installation site if adequate protection is available. Immediate movement to the installation site is permitted if it would eliminate multiple handling and is compatible with the construction schedule. Special environmental conditions, such as inert gas, specific moisture content levels, and temperature levels prescribed in procedures or specifications, are controlled at the site.

Procedures are provided, as appropriate, for handling special items and for the care and maintenance of material handling equipment. Otherwise, standard material handling methods are used to ensure care and protection against physical damage. Special handling instructions and procedures for major or special items are included in procedures reviewed by Project Engineering or Bechtel construction specialists. Personnel responsible for handling these major or special items will be qualified to the extent required by these special handling instructions and procedures. Preparation for and performance of rigging operations involving major equipment, such as reactor vessels, steam generators, and pressurizers, are witnessed by Bechtel construction rigging specialists.

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SECTION 14
(17.1.4)

INSPECTION, TEST, AND OPERATING STATUS

Construction procedures and inspection instructions provide for identification of inspection status of receipt inspection or work-in-process by using work sequence plans, inspection records, physical locations, tags, markings, or other devices compatible with the item, system, or operation being inspected or tested. Progress of work is entered in records, and status identification is changed to reflect current conditions. At the completion of construction, a tagging system is employed to visually indicate the operating status of equipment and systems which are in test or rework. Records of test results are prepared and maintained.

Work is performed according to prescribed sequences required to assure quality, and in accordance with the provisions contained in this report. Inspection points may be deferred or waived without generation of a nonconformance report only when specifically provided for in the governing procedure. Inspection points can be deferred only when the element can be inspected at a later time in the sequence and a later hold point exists. In these cases, the inspection records or checklists are not completed until the inspection point is picked up at a later date. If physical control of the item is required to prevent its inadvertent use or installation beyond the point where the inspection can be performed, the item is tagged or otherwise identified and conditionally released with a limit placed on future work operations.

Procedures or instructions include identification of the individuals or groups responsible for application and removal of status indicators.

Field Engineering and supervisory personnel are authorized to apply and remove identifying tags, markings, and labels on equipment in accordance with approved field procedures. Quality Control personnel are the only ones authorized to direct application and removal of inspection status indicators. Bechtel, in cooperation with the plant owners' operating personnel, establishes a tagging procedure which delineates those authorized for applying and removing tags during preoperational testing phases.

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SECTION 15
(17.1.15)

NONCONFORMING ITEMS

Suppliers and subcontractors are required to advise Bechtel of all nonconformance from procurement documents or Bechtel-approved designs for which the recommended disposition is "repair" or "use as is." Bechtel reserves the right to accept or reject the disposition. Bechtel requires suppliers to submit proposed repair procedures for major nonconformances for approval by project engineering prior to their use. Reports of nonconformances identified by Bechtel personnel are prepared by the supplier, Bechtel Procurement Supplier Quality Representatives, or Project Engineering to assure complete and adequate documentation. Copies of completed nonconformance reports are forwarded to the jobsite prior to, or with, the release of the item; or identification of outstanding nonconformances are included in the Supplier Quality Representative's release.

Nonconformances discovered during Bechtel receiving inspection or construction activities are controlled and documented in accordance with a standard Quality Control procedure. The procedure provides for identification and documentation of the nonconformance and control of the item, identifies the authority for approval of proposed resolution, and provides for documentation of reinspection results. Important elements of the procedure include requirements to:

- 1) Tag and segregate whenever practical
- 2) Determine interim disposition by Project Field Engineering
- 3) Have Project Engineering approve "repair" or "use as is" dispositions
- 4) Advise Project Engineering after implementation for standard preapproved repair procedures
- 5) Provide conditional release of nonconforming items upon approval of Quality Control and Quality Assurance
- 6) Review completed nonconformance reports by Quality Assurance to establish need for corrective action. Repetitive nonconformances are reported to higher levels of management for review and resolution on a generic basis.

The authority for disposition of nonconforming items follows the rules for approval of design changes described in Section 3 of this report. Field Engineering personnel are authorized to provide for disposition involving "reject," "rework" (if Bechtel performed the original work), or "repair" (for those cases where standard preapproved repair procedures have been provided by Project Engineering). Other "repair" and "use as is" dispositions require Project Engineering approval prior

to their implementation. Quality Control reviews dispositions to determine that they are fully responsive to the conditions described in the nonconformance report and is responsible for review and verification of the disposition, including reinspection of rework and repair dispositions applying inspection processes at least equivalent to that applied to the original work. "Use as is" dispositions must be referred to the responsible design group for approval. "Repair" or "use as is" dispositions on nonconformances to procurement requirements at a supplier's plant must be approved by Project Engineering.

Nonconforming items discovered at final inspection which cannot be corrected by rework or completion of originally prescribed processing are required to be identified, tagged, and/or segregated. Discrepancies in work not yet submitted for final inspection which can be corrected by rework or completion of work processes are not considered to be nonconformances. For construction work performed by Bechtel, no further work can proceed on the nonconforming item until an approved disposition is implemented, unless a conditional release is approved by Construction Quality Control and Quality Assurance. Suppliers, contractors, or subcontractors, as required by procurement documents, apply similar procedures involving their quality assurance functions. Bechtel Procurement Quality Supplier Representatives are instructed to withhold release for shipment until all nonconformances have been resolved or an interim disposition is approved by Project Engineering.

The program also provides for the participation of the ASME Authorized Inspector for nonconformance dispositions on Code covered items.

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SECTION 16
(17.1.16)

CORRECTIVE ACTION

The corrective action program provides procedures for prompt identification and correction of conditions adverse to quality which may require corrective action. Corrective action, when initiated, shall be documented. A decision that corrective action is not required need not be documented.

Within the Bechtel program, the identification of situations which may need corrective action is accomplished through review of nonconformance reports, supplier surveillance activities, quality assurance surveillance and monitoring programs, and quality assurance audits. Corrective action is controlled and documented by means of corrective action reports and the associated procedure. These provide for (a) the identification and reporting by any member of the project team of situations or occurrences which warrant corrective action, (b) determination of the cause and identification of the corrective action to be taken by the responsible organization, (c) reporting the cause and corrective action to proper level of management, (d) final verification by the Project Quality Assurance Engineer that corrective action has been taken, and (e) review by Quality Assurance management for implication or effect on other work.

Corrective action involving design documents, investigation of cause, and actions taken to preclude recurrence is applied to errors detected after the design document is issued for use. Such errors, detected after the design document is issued for use, are formally documented and are reviewed for corrective action. These are documented by design change notices, revision block entries, or reports, such as supplier discrepancy reports, field nonconformance reports, startup reports, or feedback from utilities during operation of the plant. Significant problems are also reviewed for programmatic corrective action by Quality Assurance.

This program also provides for the evaluation of conditions reported which may require reporting to the NRC by Bechtel clients in accordance with the requirements of 10 CFR 50.55(e).

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SECTION 17
(17.1.17)

QUALITY ASSURANCE RECORDS

The requirements of Regulatory Guide 1.28 (6/7/72) are applied to Bechtel activities. Records produced as a result of the quality program are prepared and maintained by project groups, suppliers, and subcontractors as their work is being performed.

Project engineering records are retained by the project engineering team as work is performed. It is normal practice to microfilm documents at regular intervals, unless duplicate copies are available at an alternate location. Provisions for collection of completed records in the design office, or at the jobsite, and the criteria for storage and retention recommended in ANSI N45.2.9-1974 are applied to quality records.

Documentation of the design review process is prepared and maintained in accordance with Section 3 of this report. Design changes may be issued on an interim basis by means of change notices. However, these are ultimately incorporated in revisions to the governing documents, unless the change is a limited waiver (e.g., "use as is" on a nonconformance report) which does not generally apply to the design document. Copies of released drawings, specifications, technical reports, and similar documents are placed in Engineering office files, Construction office files, and submitted to the client. At the completion of engineering, final copies of these records are provided to the client. Bechtel Engineering retains control of design calculations and analyses. These are available for review by client and appropriate regulatory bodies.

Supplier records which identify as-built status and verify quality of the work are requested from the supplier and placed in construction site quality record files. In some instances, with the agreement of Bechtel and the client, suppliers are permitted to retain custody of certain records if retention procedures and storage facilities are adequate and access is provided to the Bechtel client.

Completed quality verification records, including nonconformance reports for "repair" and "use as is" dispositions, are placed in quality record files. The client and appropriate regulatory groups are provided access to these files while they remain in Bechtel custody. At the completion of the Bechtel assignment, these files are turned over to the client.

The requirements and guidelines for receipt, control, and retention of permanent quality assurance records contained in Regulatory Guide 1.88 (Rev. 2, October 1976), in accordance with provisions of Appendix A of this report and ASME Boiler and Pressure Vessel Code, Section III, are employed for the control of construction site quality record files. Identification of the records and method of turnover to the client are established for each project through agreement between Bechtel and the client.

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October 1979

SECTION 18
(17.1.18)

AUDITS

A comprehensive program of audits is conducted by Bechtel covering the various activities of the Quality Assurance Program.

The Bechtel audit program includes both monitoring of daily activities conducted by Quality Assurance personnel at the construction site or home office as well as formal periodic team audits performed by personnel independent of project activities. The combination of project and division Quality Assurance management audits of Bechtel activities satisfies the requirement for annual audits of the applicable elements of the Quality Assurance program. Audit activities include the following:

- 1) Audits of Project Engineering activities by Quality Assurance personnel. These audits are planned, scheduled, and documented. Results are reported to the Project Engineer, Project Manager, and the immediate functional supervisor of the office Quality Assurance Engineer.
- 2) Audits of field Construction activities (including contractors for Bechtel Construction Management jobs) by Quality Assurance personnel. These audits are planned, scheduled, and documented. Results are reported to the Field Construction Manager, Project Manager, and the immediate functional supervisor of the Quality Assurance Engineers.
- 3) Audits of Supplier activities by the Procurement Supplier Quality Department.
- 4) Audits of Project Engineering, Procurement, Construction, and Quality Control activities by Quality Assurance audit teams under the direction of Division Quality Assurance Managers, assisted by Materials and Quality Service specialists and others as required. These audits are conducted at least annually and results are reported to the management of the function audited, cognizant project management, and division management. A summary of the results of these audits is reported by the Division QA Manager to the Vice President, Planning and Quality Assurance.
- 5) Audits of division engineering technical staff and services activities performed on an annual basis under the direction of the Division Quality Assurance Managers. These audits cover those groups doing design and/or review outside direct control of the Project Engineer. Results of these audits are reported to the manager or supervisor of the

function audited and division management. A summary of the results of these audits is reported by the Division Quality Assurance Manager to the Vice President, Planning and Quality Assurance - Thermal Power Organization.

- 6) Audits of Procurement and Materials and Quality Service activities conducted annually by Quality Assurance personnel under the direction of the Vice President, Planning and Quality Assurance - Thermal Power Organization. These audits are conducted for the benefit of all divisions, and division Quality Assurance personnel participate in the audits. Results of these audits are reported to cognizant management of the audited group, quality assurance management in each division, and the Vice President, Planning and Quality Assurance - Thermal Power Organization.

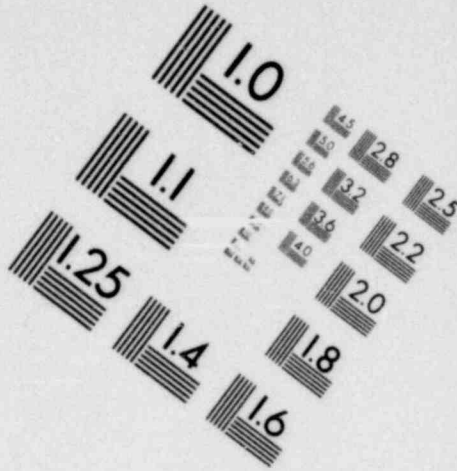
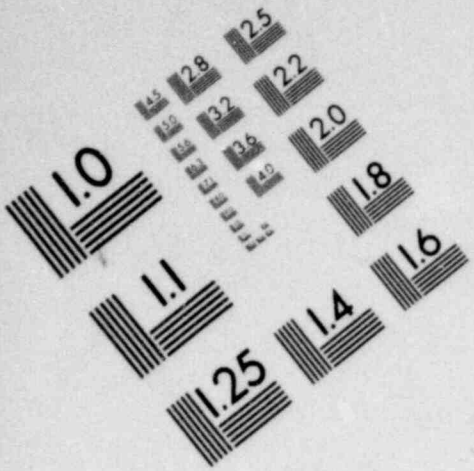
The purpose of the audit program is to assure compliance with all aspects of the QA program. Specifically, the audit program includes:

- 1) Audits conducted to assure that specialists, consultants, suppliers, contractors, and subcontractors are following their required programs for activities affecting quality, including activities associated with site features which affect plant safety
- 2) Audits of all quality-related procedures. Such procedures include essential steps in the preparation, review, and control of design output documents; preparation, review, and control of procurement documents; indoctrination and training programs; and requests for proposals and evaluation of bids.

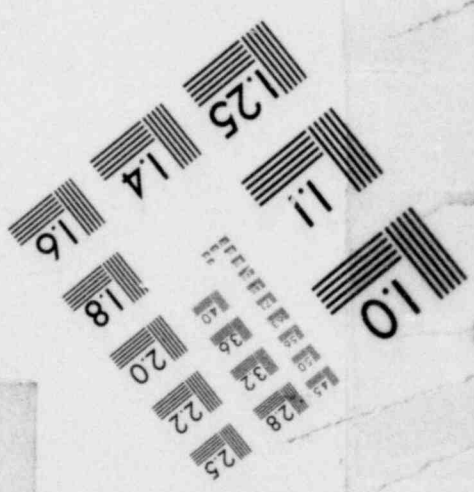
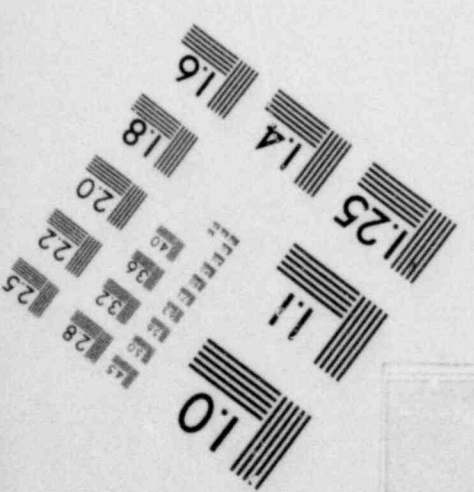
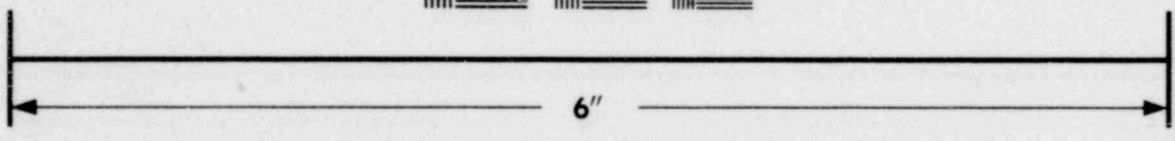
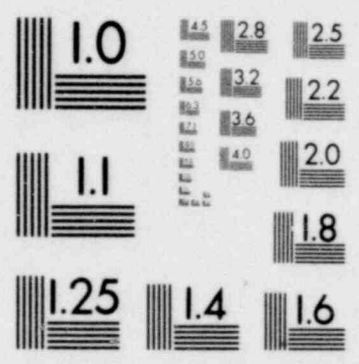
Audit frequencies vary, depending upon the nature and importance of the activity being performed and results achieved. The preceding listing provides information on frequency of management audits. Audits of activities are initiated early enough in the project cycle to assure effective implementation of the Quality Assurance Program, typically within three to six months after the start of work on activities affecting quality, and continue at regular intervals throughout the duration of the activity.

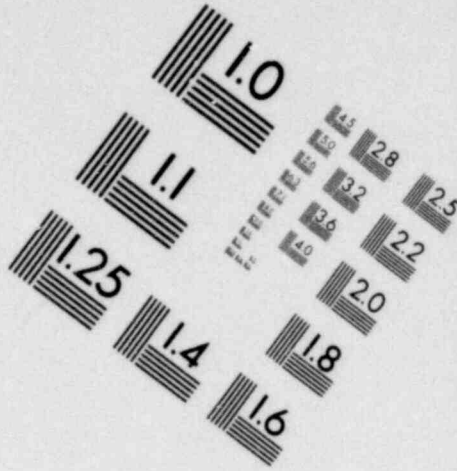
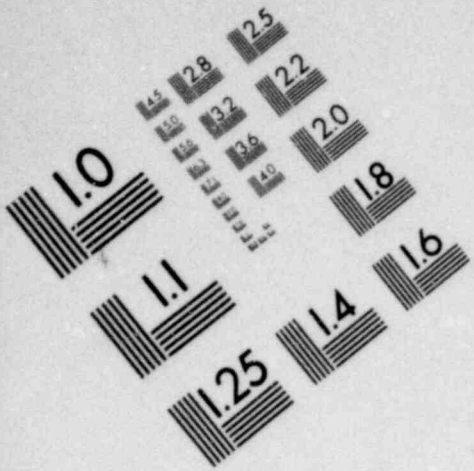
Audit findings are documented, reviewed with supervision having responsibility in the audit area, and reported to management; management audit reports include assessment of overall program implementation and direct attention to significant problem areas.

Audit programs include provisions for identification of deficiencies, determination that corrective action is defined, and follow-up to verify that timely corrective action has been taken and is effective. Audits include selective review and evaluation of quality-related procedures, instructions, work practices, and examination of items and records. Records of audits are available to projects.

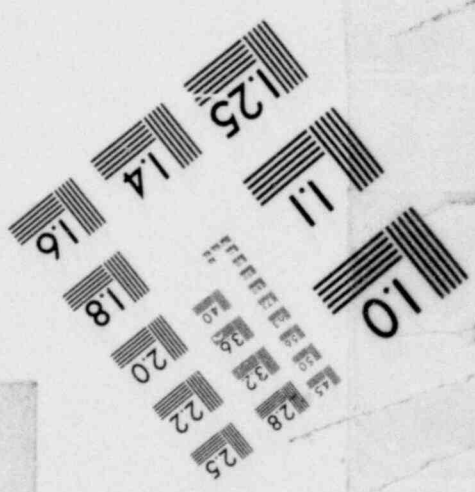
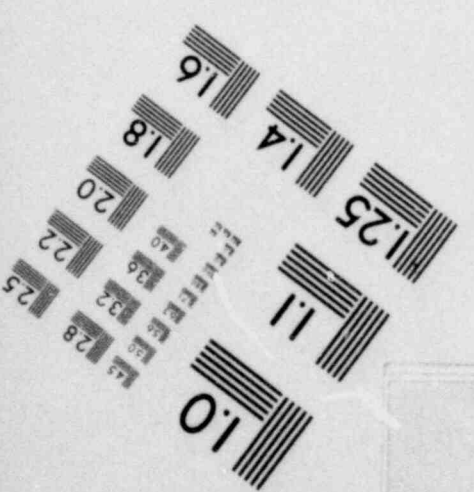
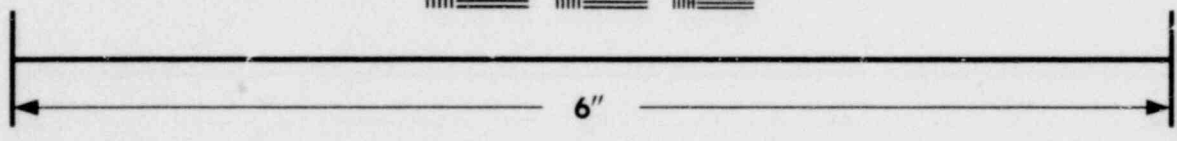
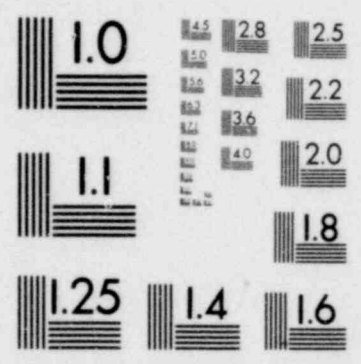


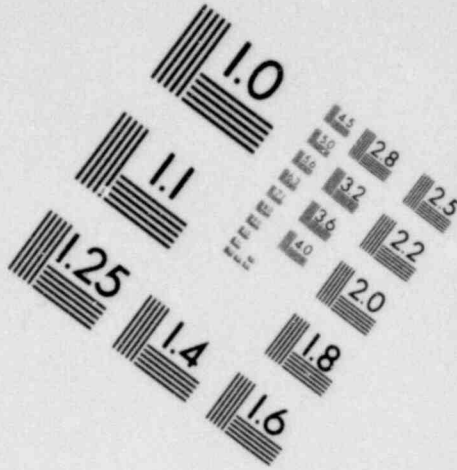
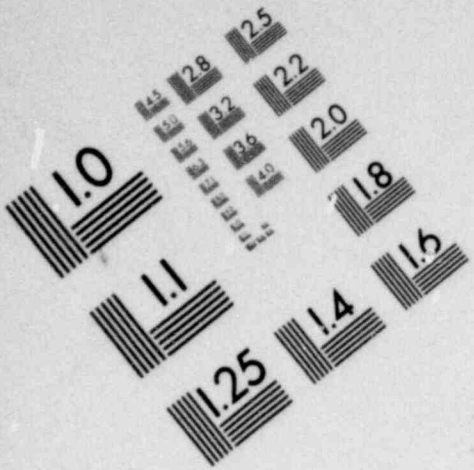
**IMAGE EVALUATION
TEST TARGET (MT-3)**



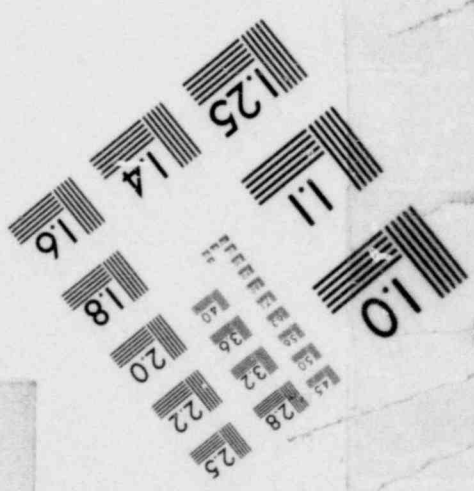
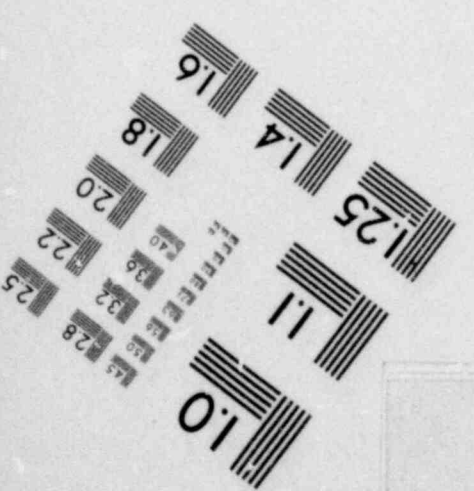
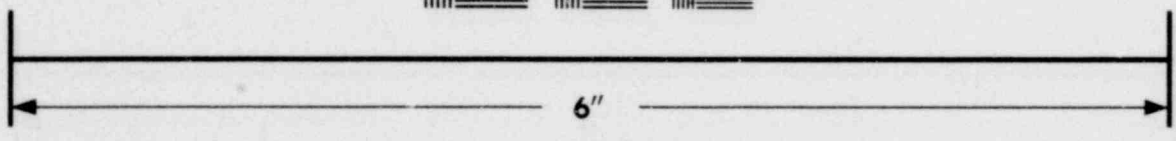
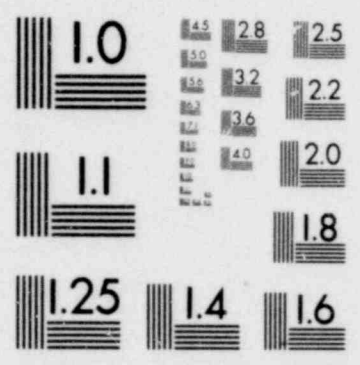


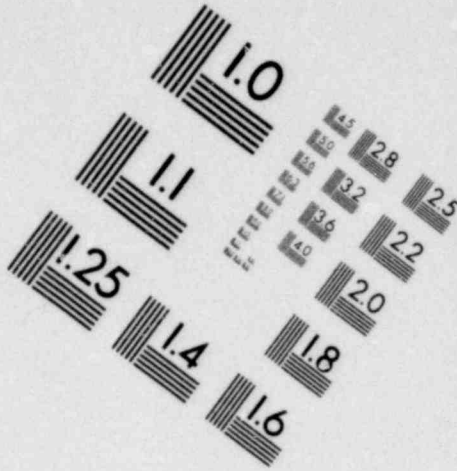
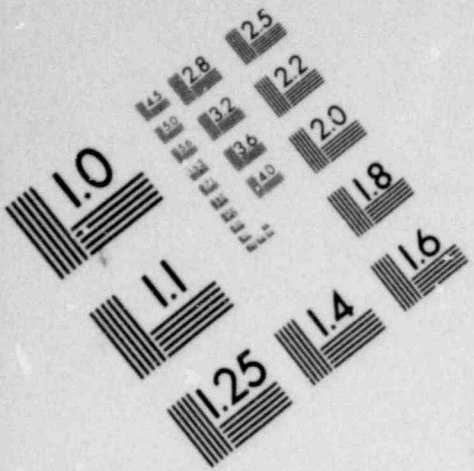
**IMAGE EVALUATION
TEST TARGET (MT-3)**





**IMAGE EVALUATION
TEST TARGET (MT-3)**





**IMAGE EVALUATION
TEST TARGET (MT-3)**

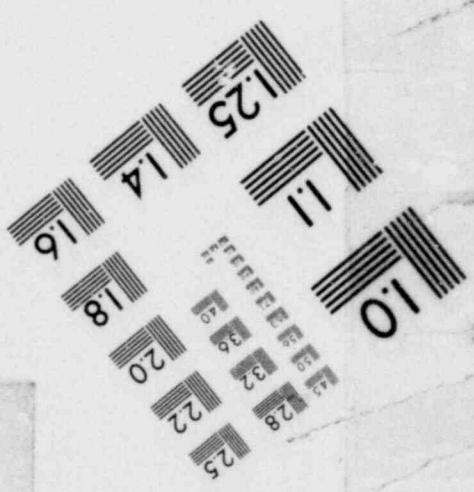
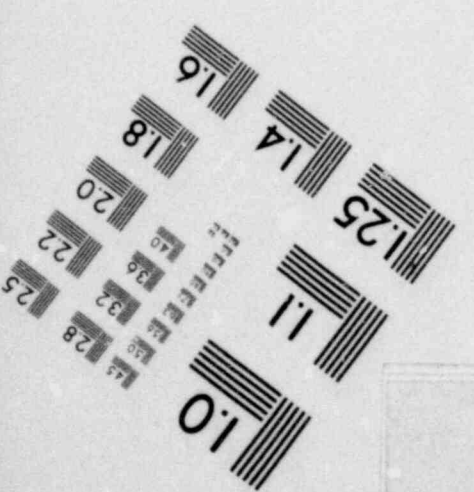
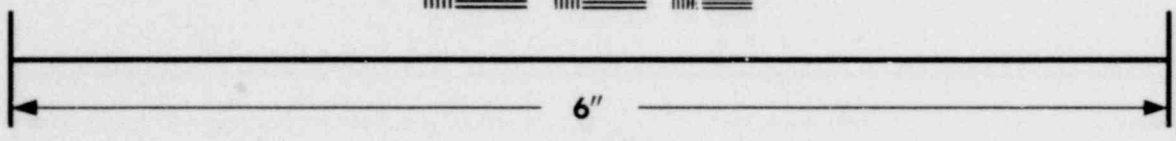
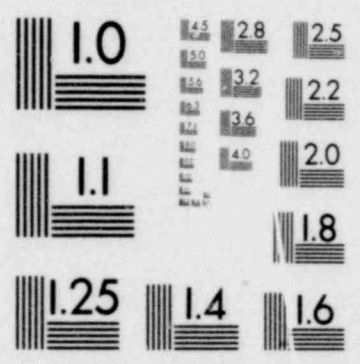


TABLE I

BECHTEL QUALITY PROGRAM DOCUMENTS

<u>Document</u>	<u>Originating Authority</u>	<u>Review for QA Policy and Program Requirements</u>	<u>Authorizing Approval</u>	<u>Contents</u>
*Division Quality policies (Division QA Manual)	Division QA Manager	QA-TPO	Division Manager	Division policy supplementing and implementing TPO Quality Policy
*Bechtel Quality Assurance Manual- ASME Nuclear Components (BQAM- ASME III)	Manager-M&QS	QA-TPO**	President and appropriate Authorized Code Inspection Agency	Policies and procedures for overall Bechtel program applicable to ASME work
*Procurement Supplier Quality Manual	Manager Procurement Supplier Quality	QA-TPO**	Manager Procurement Supplier Quality	Procurement Supplier Quality procedures
*Construction Quality Control Manual	Division Chief Constr. QC Engineer	Division QA Manager	Manager Division Construction	Definition of responsibilities and procedures for Construction Quality Control activities
Division QA Procedures	Division QA Manager	NA	Division QA Manager	Procedures for conducting Division QA activities

*Available on request to appropriate regulatory agencies.

**Includes review by Division QA Managers.

Note: Revisions to these documents require the same review and approval as the original.

1637.001

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TABLE I (Continued)

BECHTEL QUALITY PROGRAM DOCUMENTS

<u>Document</u>	<u>Originating Authority</u>	<u>Review for QA Policy and Program Requirements</u>	<u>Authorizing Approval</u>	<u>Contents</u>
Engineering Department Procedures and Instructions	Designated Individuals	Division QA Manager***	Manager Division Engineering***	Definition of responsibilities and procedures for design, design review, and document control in the engineering departments
Construction Procedures (Quality Program related)	Construction	Division QA Manager	Manager Division Construction	Responsibilities and practice for construction site activities, including standard work plans
Procurement Manuals (Quality Program related)	Procurement	QA-TPO**	Cognizant Procurement Managers	Procedures for home office and field procurement necessary to follow TPO Quality Policy
M&QS Procedure and Policy Guides (Quality Program related)	Manager M&QS	QA-TPO**	Manager M&QS	Policies and procedures for performing M&QS functions
Project Manuals Procedures (Quality Program related)	Cognizant Project Team Member	PQAE	Cognizant Managers	Note 2

**Includes review by Division QA Managers.

***Area office EDPs are reviewed and approved by the area office QA Manager and area office Manager of Engineering.

Notes: 1 Revisions to these documents require the same review and approval as the original.

2 There are provisions for project unique modifications to the above documents to delineate specific project requirements but not depart from the program requirements of this report. Review and approval authority for such modifications are defined within the governing procedures.

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1637 003

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THE CHAIRMAN, VICE CHAIRMAN, AND PRESIDENTS ARE EXECUTIVE SPONSORS OF THE ORGANIZATIONS REPORTING TO THEM

THE BECHTEL ORGANIZATION

PRINCIPAL OPERATING COMPANIES
BECHTEL POWER CORPORATION - BECHTEL INCORPORATED - BECHTEL CORPORATION

SEPTEMBER 14, 1979

- SAN FRANCISCO
AL KHOBAR
AMMAN
EDMONTON
GAITHERSBURG
HOUSTON
JAKARTA
JOHANNESBURG
KUWAIT CITY
LONDON
LOUISVILLE
MADRID
- MELBOURNE
MEXICO CITY
NORWALK
PARIS
RIO DE JANEIRO
SANTIAGO
SEOUL
TAIPEI
TEHRAN
TOKYO
TORONTO
VANCOUVER
WASHINGTON, D.C.

- COMPANY AFFILIATIONS
■ BECHTEL POWER CORPORATION
▲ BECHTEL INCORPORATED
◆ BECHTEL CORPORATION

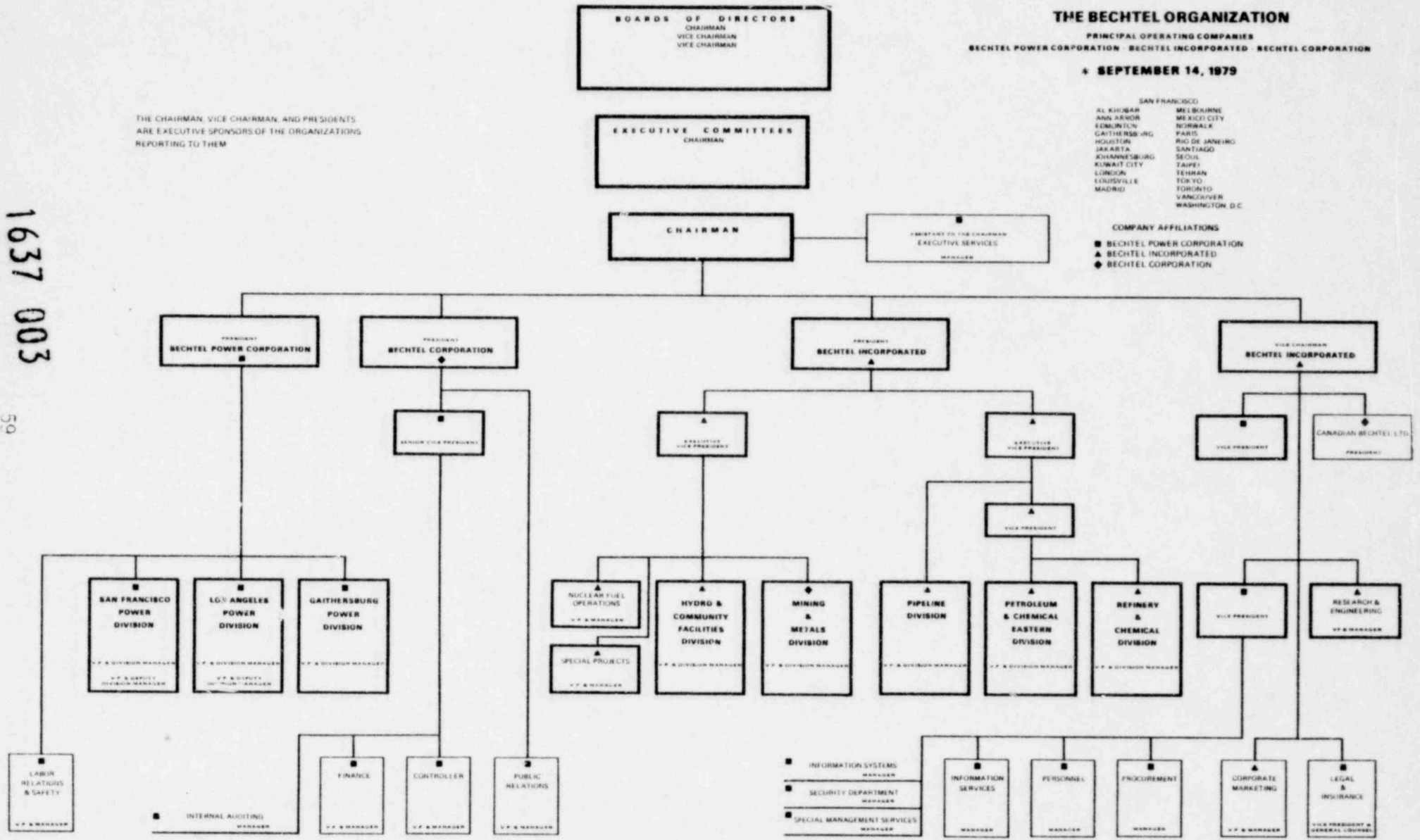
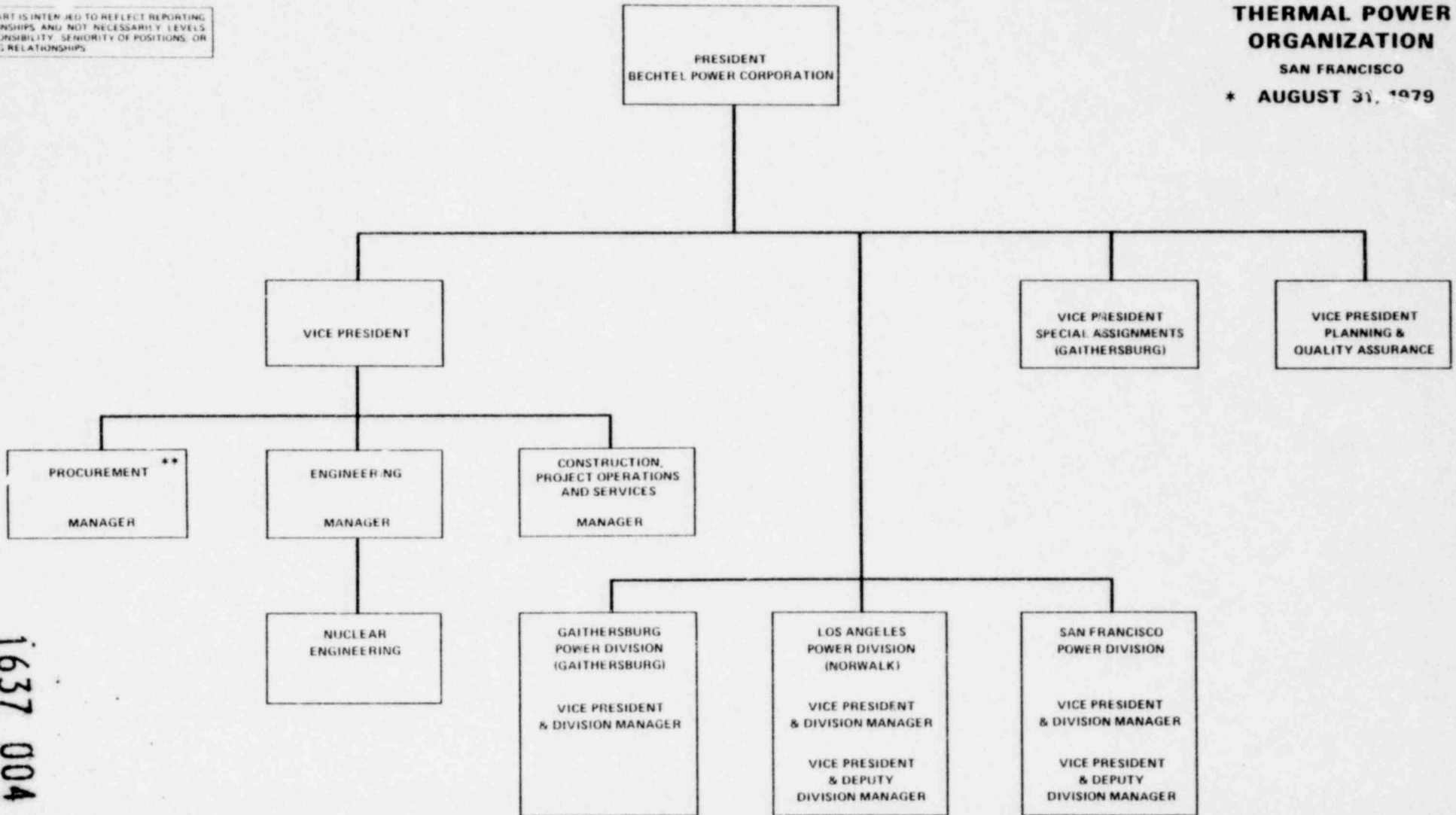


FIGURE 1
BQ-TOP-1
REV. 3
OCTOBER 1979

* REPLACES CHART DATED JUNE 26, 1978

THIS CHART IS INTENDED TO REFLECT REPORTING RELATIONSHIPS AND NOT NECESSARILY LEVELS OF RESPONSIBILITY, SENIORITY OF POSITIONS, OR WORKING RELATIONSHIPS.

THERMAL POWER ORGANIZATION
 SAN FRANCISCO
 * AUGUST 31, 1979



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1637 004

NOTE:
 ALL PERSONNEL BASED IN HOME
 OFFICE UNLESS OTHERWISE INDICATED.

FIGURE 2
 BQ-TOP-1
 REV. 3
 OCTOBER 1979

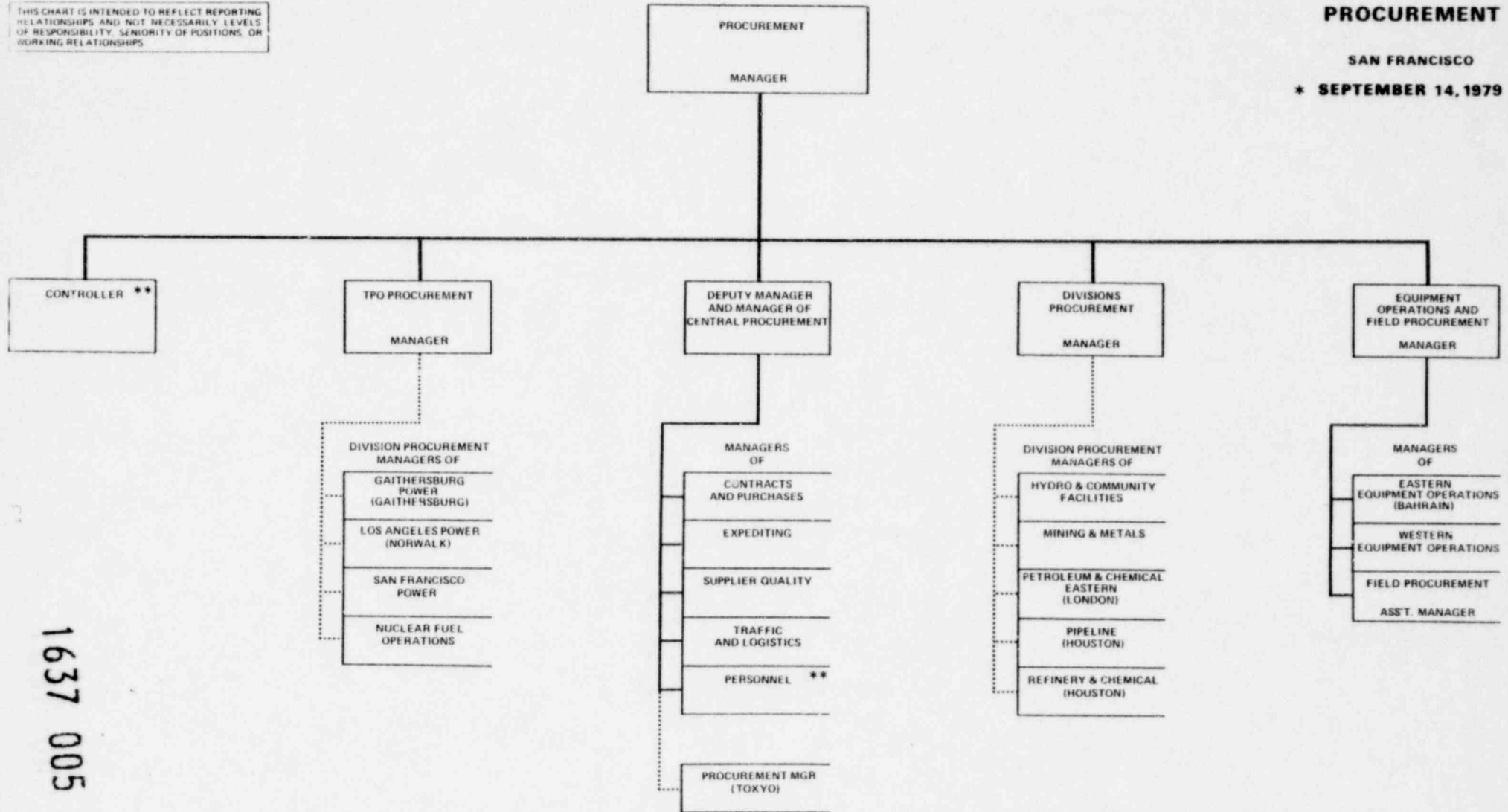
** RECEIVES FUNCTIONAL GUIDANCE FROM THE
 APPLICABLE SAN FRANCISCO SERVICE ORGANIZATION
 * REPLACES CHART DATED FEBRUARY 21, 1979

THIS CHART IS INTENDED TO REFLECT REPORTING RELATIONSHIPS AND NOT NECESSARILY LEVELS OF RESPONSIBILITY, SENIORITY OF POSITIONS, OR WORKING RELATIONSHIPS

PROCUREMENT

SAN FRANCISCO

* SEPTEMBER 14, 1979



1637 005

NOTE: ALL PERSONNEL BASED IN HOME OFFICE UNLESS OTHERWISE INDICATED

FIGURE 3
BQ-TOP-1
REV. 3
OCTOBER 1979

..... FUNCTIONAL REPORTING
 ** RECEIVES FUNCTIONAL GUIDANCE FROM THE APPLICABLE SAN FRANCISCO SERVICE ORGANIZATION
 * REPLACES CHART DATED MAY 11, 1979

SUPPLIER QUALITY ORGANIZATION

REV. 1, DATE: APRIL 1, 1978

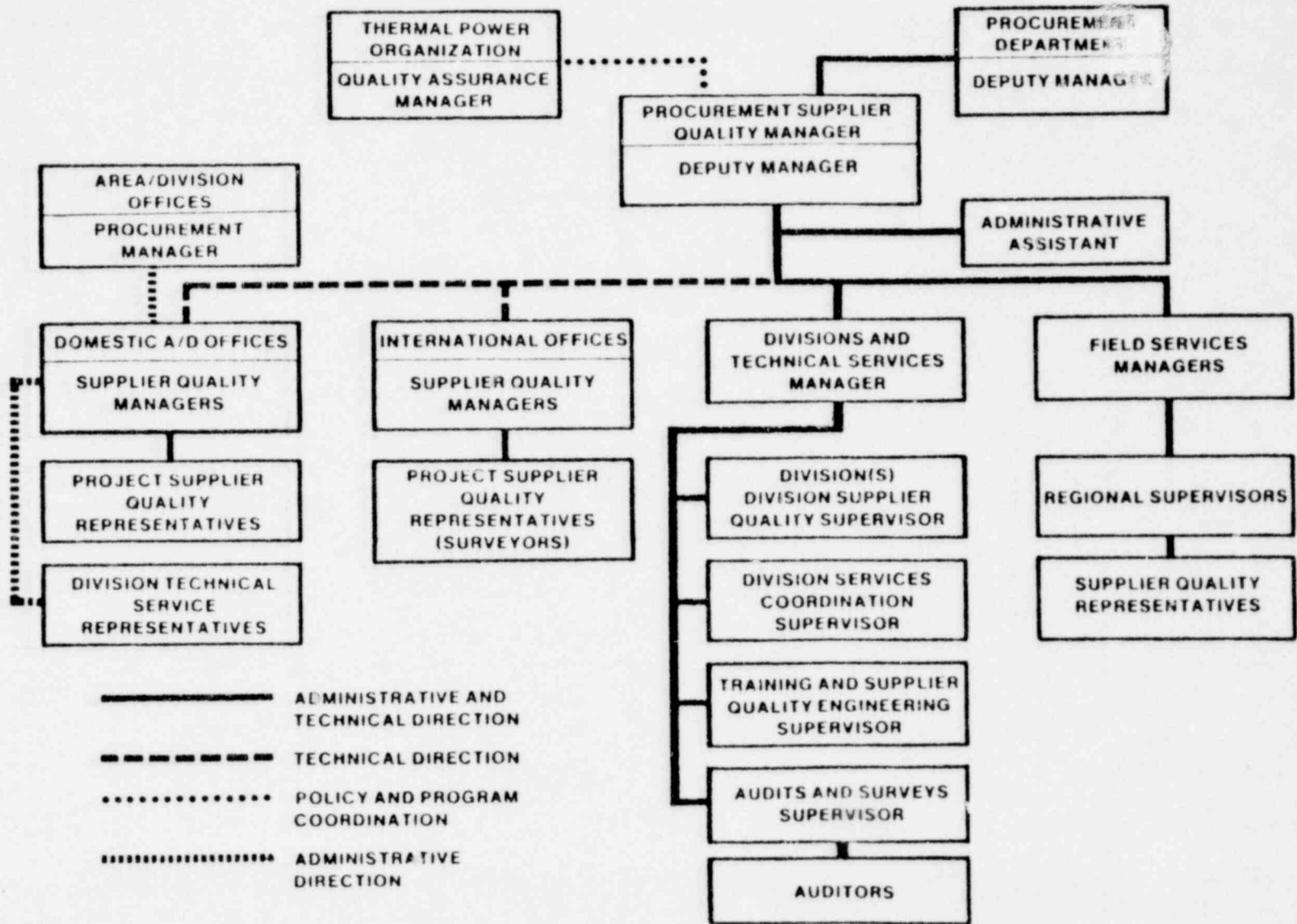


FIGURE 4
BQ-TOP-1
REV. 3
OCTOBER 1979

MATERIALS & QUALITY SERVICES
SUPPORTIVE TO THE THERMAL POWER
ORGANIZATION

THIS CHART IS INTENDED TO REFLECT REPORTING
RELATIONSHIPS, AND NOT NECESSARILY LEVELS
OF RESPONSIBILITY, SENIORITY OR POSITIONS OR
WORKING RELATIONSHIPS.

February 1, 1979

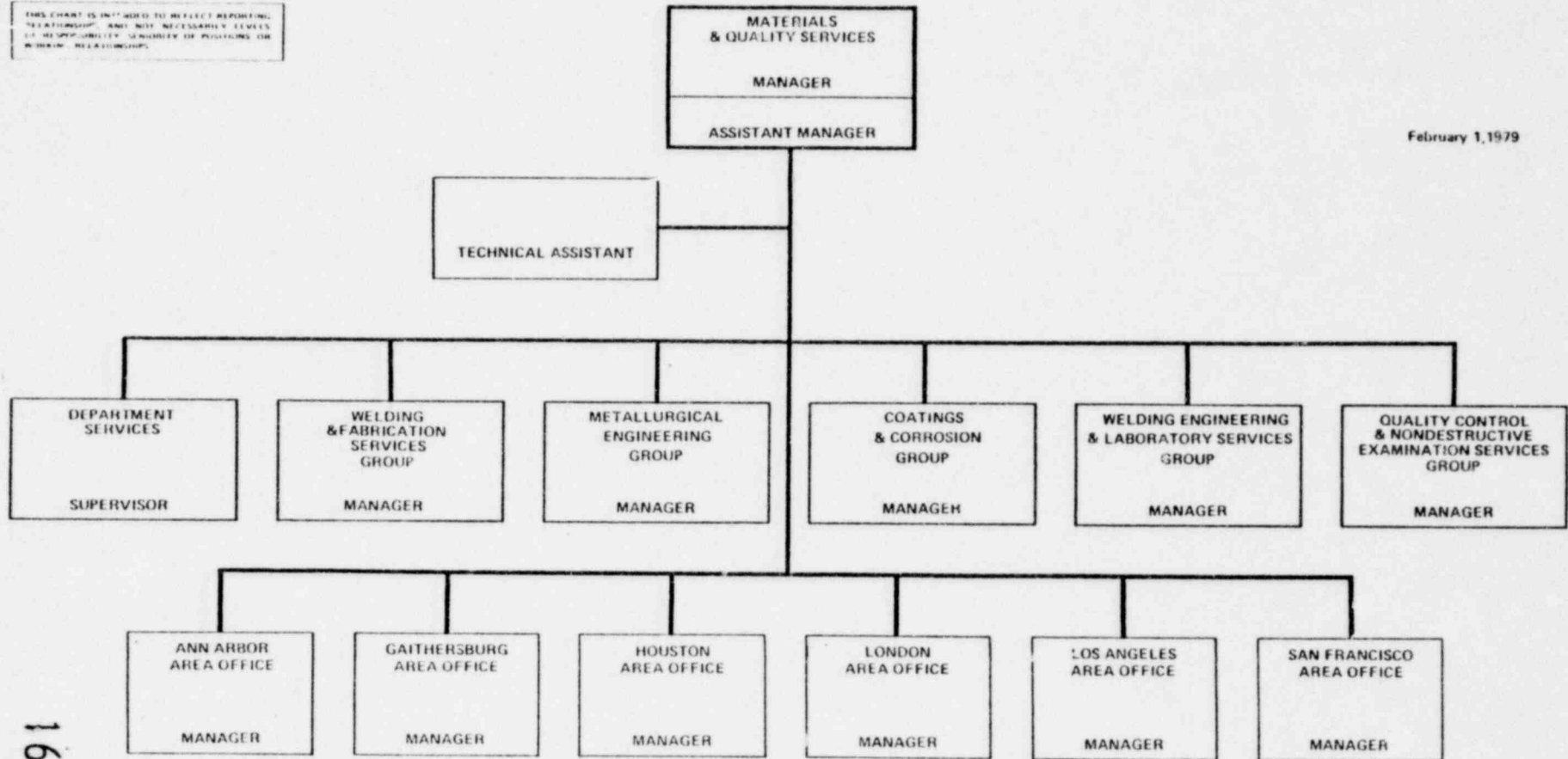


FIGURE 5
BQ-TOP-1
REV. 3
OCTOBER 1979

52

1637 007

THIS CHART IS INTENDED TO REFLECT REPORTING RELATIONSHIPS AND NOT NECESSARILY LEVELS OF RESPONSIBILITY, SENIORITY OF POSITIONS, OR WORKING RELATIONSHIPS

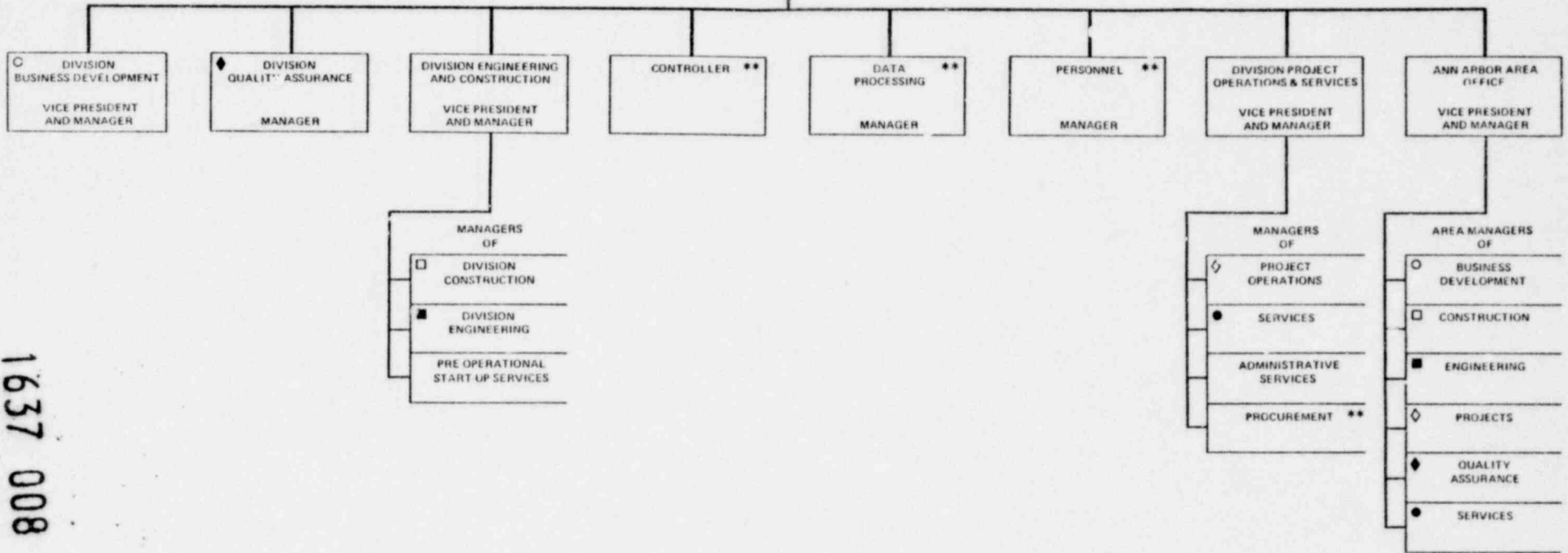
SAN FRANCISCO POWER DIVISION

SAN FRANCISCO
* AUGUST 15, 1979

DIVISION CONTROL

- BUSINESS DEVELOPMENT
- CONSTRUCTION
- ENGINEERING
- ◇ PROJECT OPERATIONS
- ◆ QUALITY ASSURANCE
- SERVICES

SAN FRANCISCO POWER DIVISION
VICE PRESIDENT AND DIVISION MANAGER
VICE PRESIDENT AND DEPUTY DIVISION MANAGER



1637 008

NOTE:
ALL PERSONNEL BASED IN DIVISION HOME OFFICE UNLESS OTHERWISE INDICATED

FIGURE 6
BQ-TOP-1
REV. 3
OCTOBER 1979

** RECEIVES FUNCTIONAL GUIDANCE FROM THE APPLICABLE SAN FRANCISCO SERVICE ORGANIZATION
* REPLACES CHART DATED SEPTEMBER 7, 1978

THIS CHART IS INTENDED TO REFLECT REPORTING RELATIONSHIPS AND NOT NECESSARILY LEVELS OF RESPONSIBILITY, SENIORITY OF POSITIONS, OR WORKING RELATIONSHIPS

LOS ANGELES POWER DIVISION

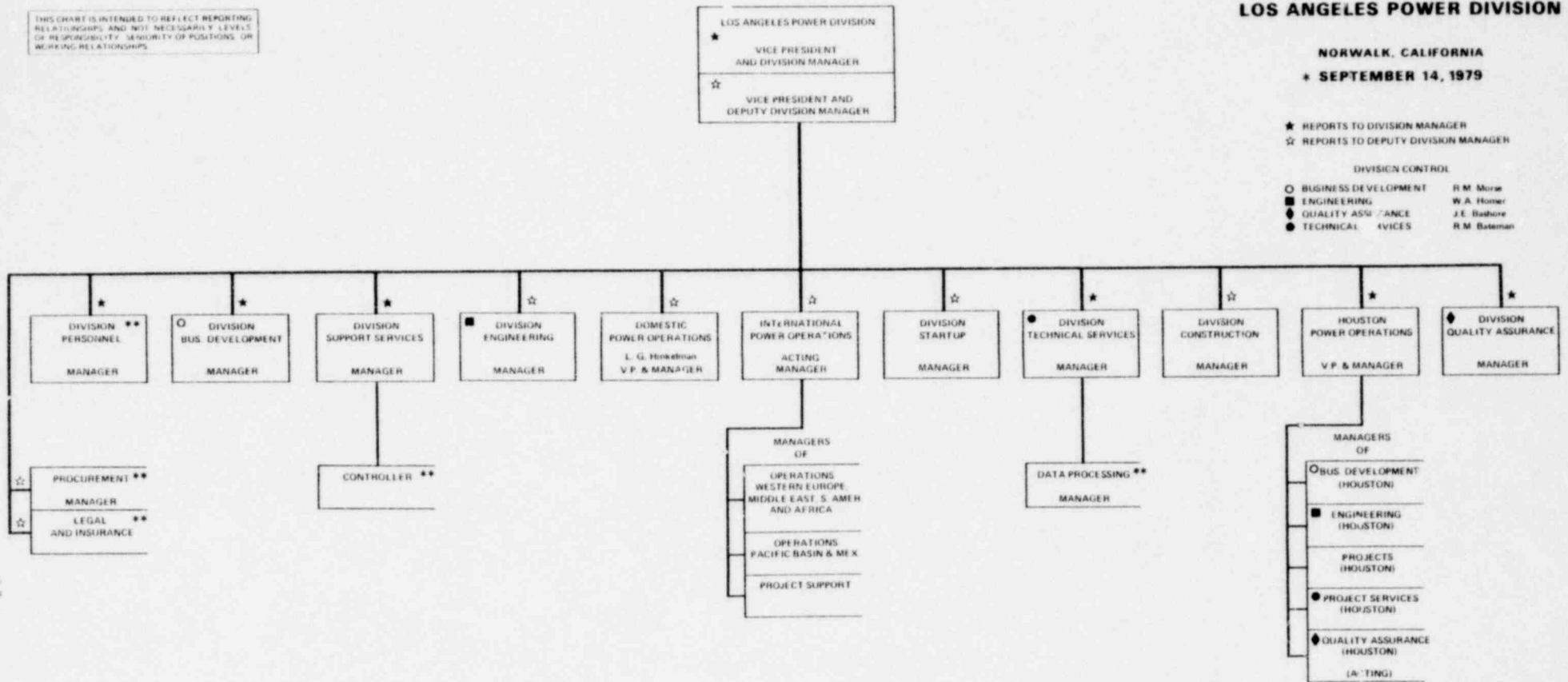
NORWALK, CALIFORNIA

* SEPTEMBER 14, 1979

★ REPORTS TO DIVISION MANAGER
☆ REPORTS TO DEPUTY DIVISION MANAGER

DIVISION CONTROL

○ BUSINESS DEVELOPMENT R.M. Morse
■ ENGINEERING W.A. Homer
● QUALITY ASSURANCE J.E. Babore
● TECHNICAL SERVICES R.M. Bateman



NOTE:
ALL PERSONNEL BASED IN DIVISION HOME OFFICE UNLESS OTHERWISE INDICATED

FIGURE 7
BQ-TOP-1
REV. 3
OCTOBER 1979

** RECEIVES FUNCTIONAL GUIDANCE FROM THE APPLICABLE SAN FRANCISCO SERVICE ORGANIZATION

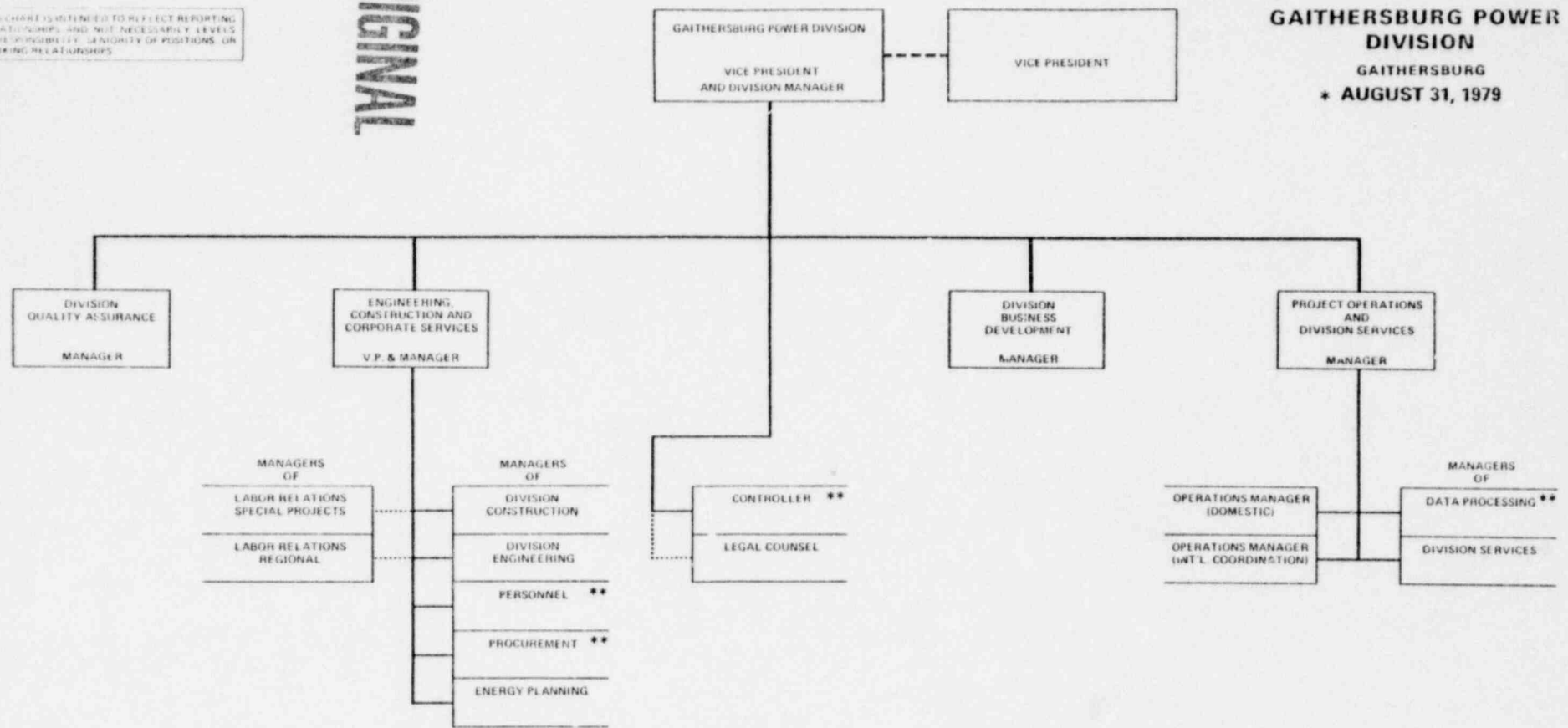
★ REPLACES CHART DATED MAY 25, 1979

1637 009

POOR ORIGINAL

THIS CHART IS INTENDED TO REFLECT REPORTING RELATIONSHIPS AND NOT NECESSARILY LEVELS OF RESPONSIBILITY, SENIORITY OF POSITIONS, OR WORKING RELATIONSHIPS.

GAITHERSBURG POWER DIVISION
GAITHERSBURG
*** AUGUST 31, 1979**



NOTE
 ALL PERSONNEL BASED IN DIVISION HOME OFFICE UNLESS OTHERWISE INDICATED

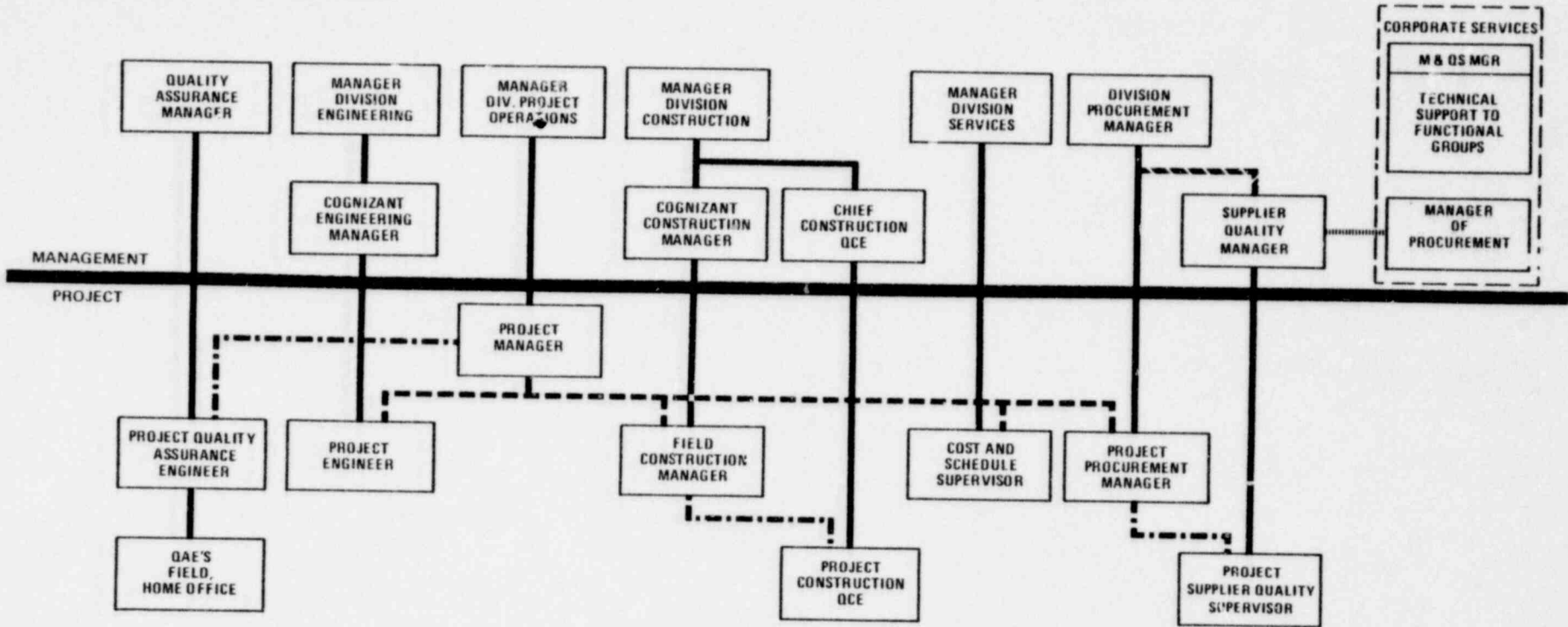
1637 018

FIGURE 8
BQ-TOP-1
REV. 3
OCTOBER 1979

----- ACCEPTS ASSIGNMENTS FROM DIVISION BUT REPORTS TO SF HOME OFFICE
 ** RECEIVES FUNCTIONAL GUIDANCE FROM THE APPLICABLE SAN FRANCISCO SERVICE ORGANIZATION
 * REPLACES CHART DATED SEPTEMBER 7, 1978

PROJECT TEAM ORGANIZATION (TYPICAL)

THIS CHART IS INTENDED TO REFLECT REPORTING RELATIONSHIPS AND NOT NECESSARILY LEVELS OF RESPONSIBILITY, SENIORITY OF POSITIONS, OR WORKING RELATIONSHIPS.



LEGEND

- TECHNICAL & ADMIN. DIRECTION ONLY
- PROJECT DIRECTION
- PROJECT COORDINATION
- TECHNICAL DIRECTION
- ADMINISTRATIVE DIRECTION ONLY

1637 011

FIGURE 9
BQ-TOP-1
REV. 3
OCTOBER 1979

PROJECT ENGINEERING ORGANIZATION (TYPICAL)

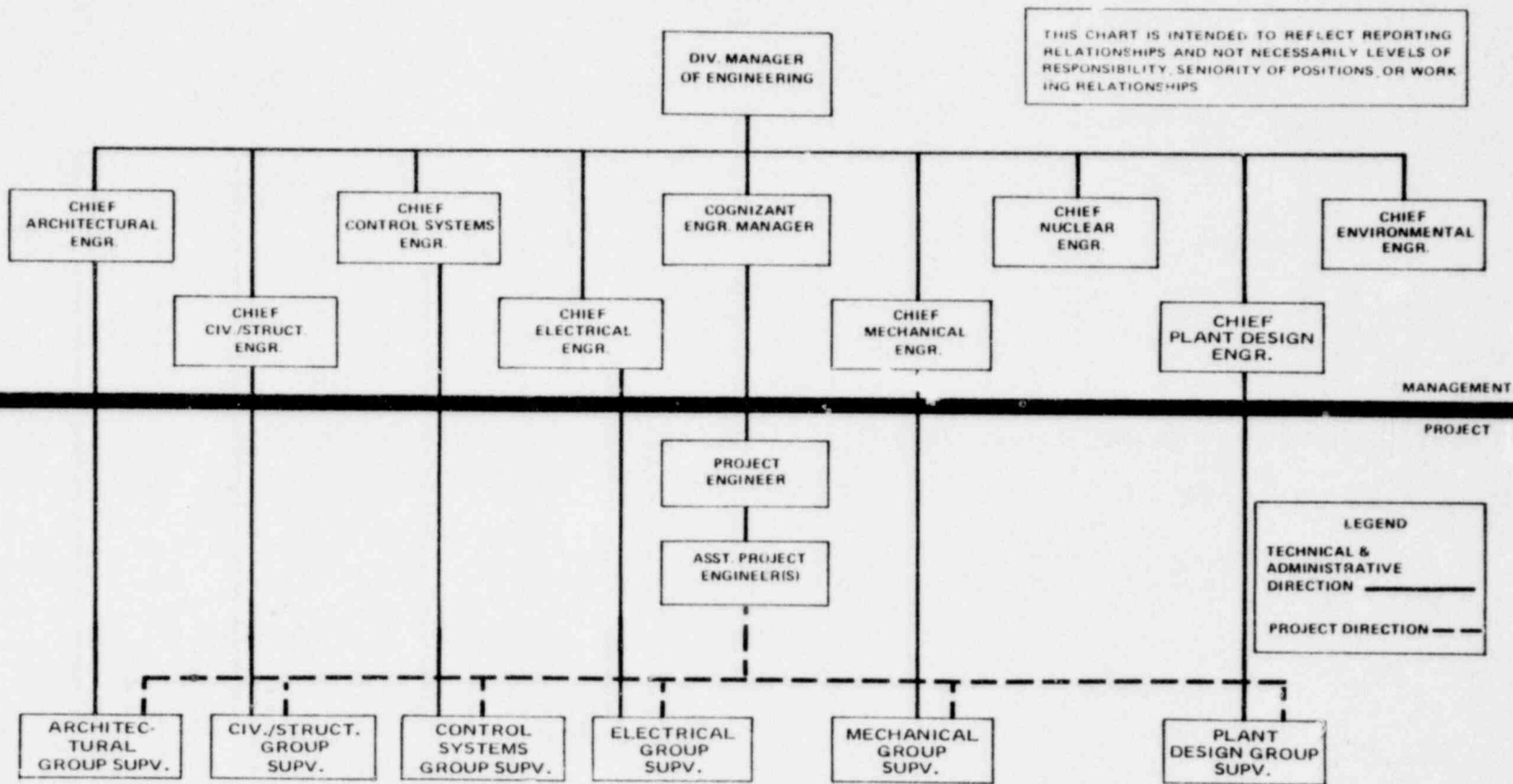
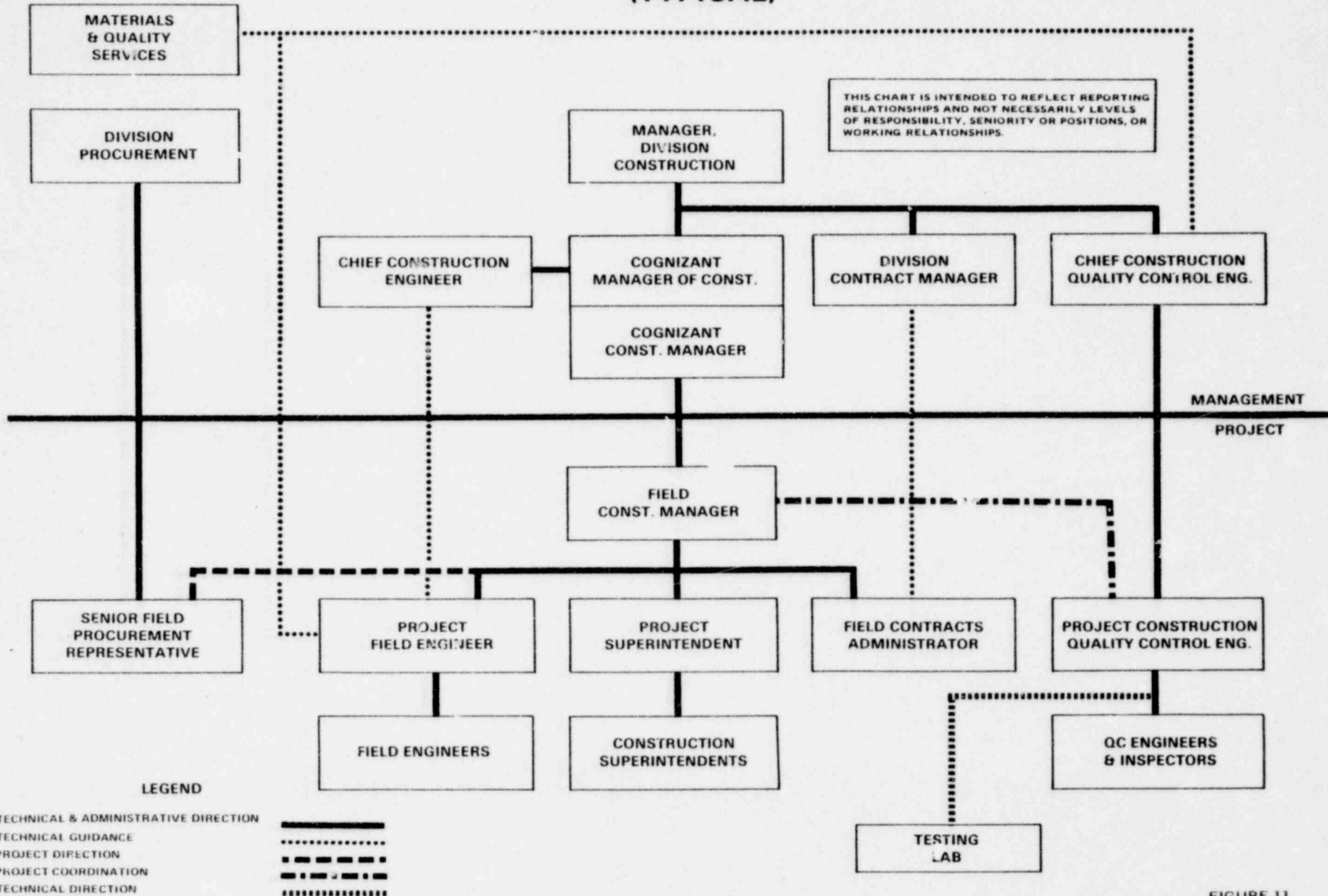


FIGURE 10
 BQ-TOP-1
 REV. 3
 OCTOBER 1979

1637 012

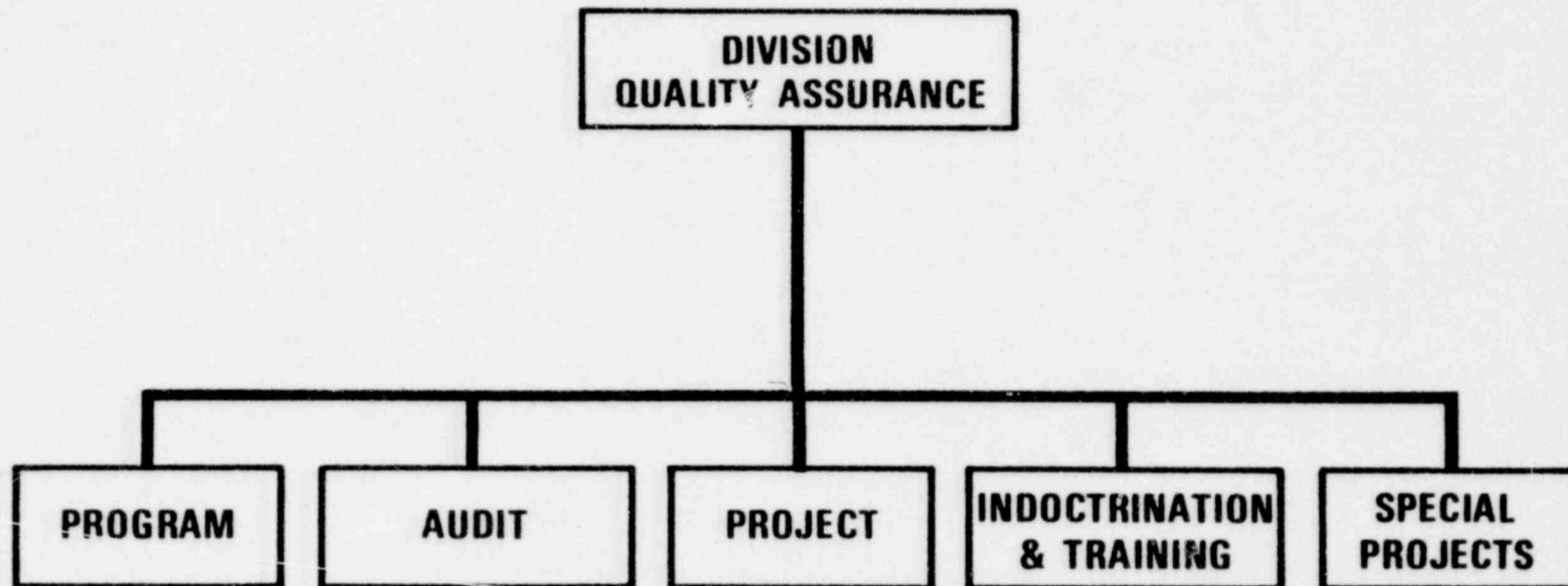
PROJECT CONSTRUCTION ORGANIZATION (TYPICAL)



50
1637 013

FIGURE 11
BQ-TOP-1
REV. 3
OCTOBER 1979

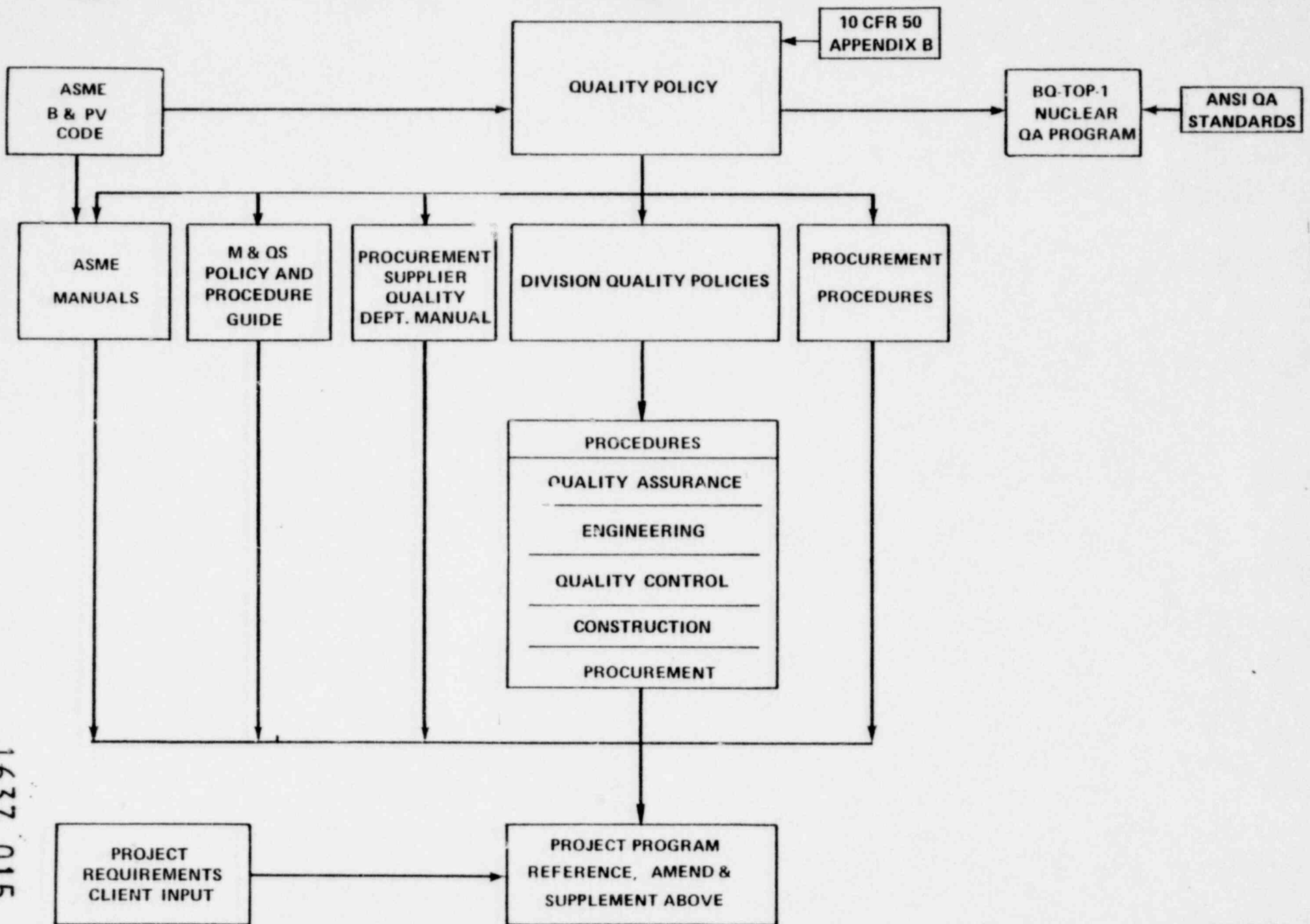
**DIVISION
QUALITY ASSURANCE ORGANIZATION
(TYPICAL)**



1637 014

FIGURE 12
BQ-TOP-1
REV. 3
OCTOBER 1979

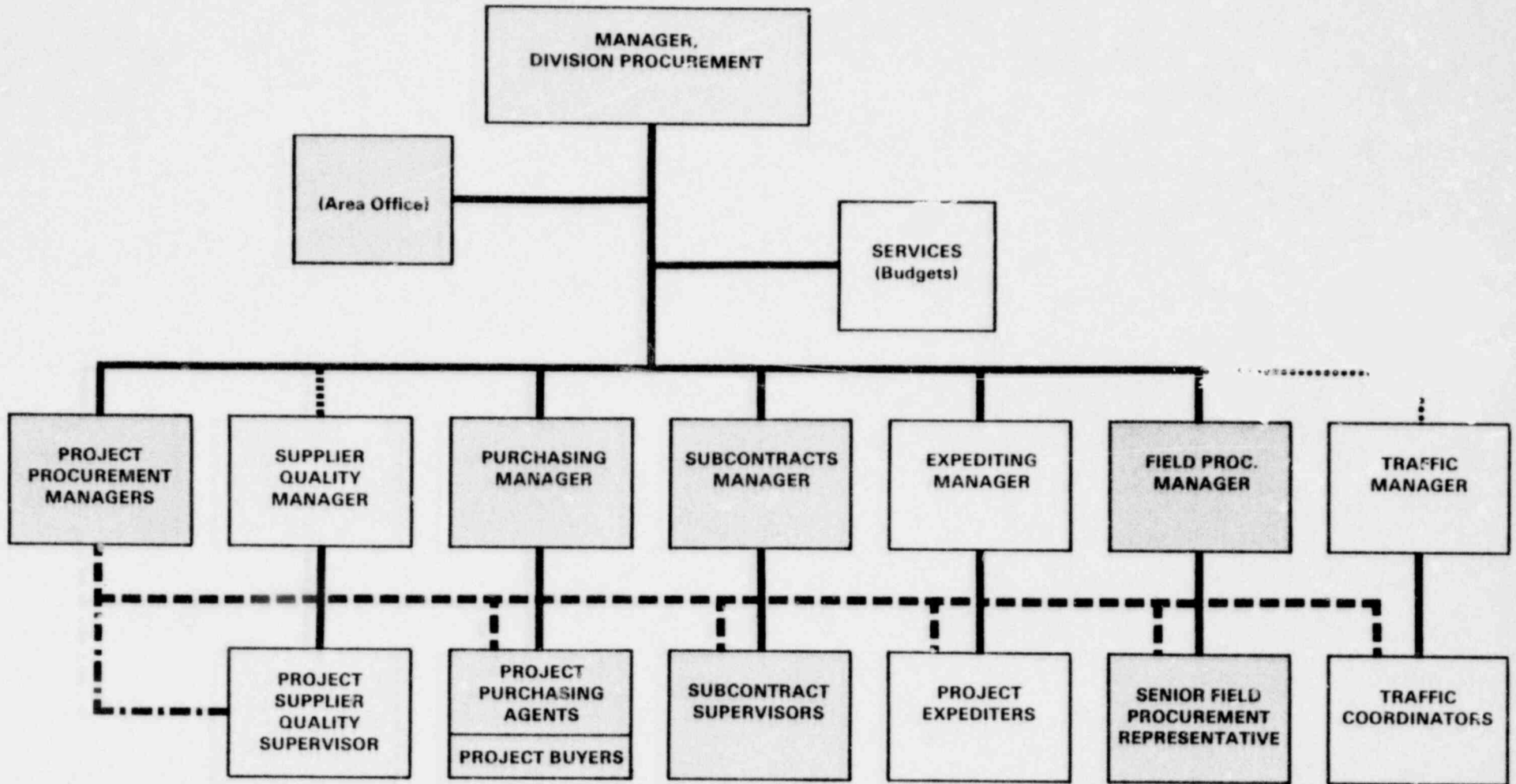
QUALITY PROGRAM DOCUMENTS



1637 015

FIGURE 13
BQ-TOP-1
REV. 3
OCTOBER 1979

TYPICAL POWER DIVISION PROCUREMENT ORGANIZATION



LEGEND

- TECHNICAL & ADMINISTRATIVE DIRECTION
- - - - -** PROJECT DIRECTION
-** ADMINISTRATIVE DIRECTION
-** TECHNICAL GUIDANCE
- · - · -** PROJECT COORDINATION

SHADING INDICATES QUALITY AFFECTING RESPONSIBILITIES

FIGURE 14
BQ-TOP-1
REV. 3
OCTOBER 1979

1637 016

APPENDIX A

BECHTEL POSITION ON QA NRC REGULATORY GUIDES
AND ANSI STANDARDS

Page	Title
A-2	Regulatory Guide 1.30 (ANSI N45.2.4-1972, IEEE 336, Installation, Inspection, and Testing Requirements for Instrumentation and Electric Equipment During the Construction of Nuclear Power Generating Stations)
A-3	Regulatory Guide 1.37 (ANSI N45.2.1-1973, Cleaning of Fluid Systems and Associated Components During Construction Phase of Nuclear Power Plants)
A-4	Regulatory Guide 1.38 (ANSI N45.2.2-1972, Packaging, Shipping, Receiving, Storage, and Handling of Items for Nuclear Power Plants [During the Construction Phase])
A-6	Regulatory Guide 1.39 (ANSI N45.2.3-1973, Housekeeping During the Construction Phase of Nuclear Power Plants)
A-7	Regulatory Guide 1.58 (ANSI N45.2.6-1973, Qualifications of Nuclear Power Plant Inspection, Examination, and Testing Personnel)
A-14	Regulatory Guide 1.64, Revision 2, June 1976 (ANSI N45.2.11-1974, Quality Assurance Requirements for the Design of Nuclear Power Plants)
A-16	Regulatory Guide 1.88, Revision 2, October 1976 (ANSI N45.2.9-1974, Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants)
A-17	Regulatory Guide 1.94 (ANSI N45.2.5-1974, Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants)
A-18	Regulatory Guide 1.116, June 1976 (ANSI N45.2.8-1975, Supplementary Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems for the Construction Phase of Nuclear Power Plants)
A-20	Regulatory Guide 1.123, October 1976 (ANSI N45.2.13-1976, Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants)
A-22	ANSI N45.2.12-1974, Draft 3, Rev. 4, February 22, 1974, Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants

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Regulatory Guide 1.30 (ANSI N45.2.4-1972, IEEE 336, Installation, Inspection, and Testing Requirements for Instrumentation and Electric Equipment During the Construction of Nuclear Power Generating Stations)

The requirements of the referenced standard will be applied to the Bechtel Quality Program for construction of safety-related items as interpreted in the regulatory position as modified and interpreted below.

- 1) Section 1.2, Applicability. The standard is applied to the items and systems identified in paragraph 1.1.1 and to additional systems depending on the nature and scope of the work to be performed and the importance of the item or service involved.
- 2) Section 2.1, Planning. The required planning is frequently performed on a generic basis for application to many installations on one or more projects. This results in standard procedures or plans for installation and inspection and testing which meet the requirements of the standard. Individual plans for each item or system are not normally prepared unless the work operations are unique. However, standard procedures or plans will be reviewed for applicability in each case. Installation plans or procedures are also limited in scope to those actions or activities which are essential to maintain or achieve required quality.

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Regulatory Guide 1.37 (ANSI N45.2.1-1973, Cleaning of Fluid Systems and Associated Components During Construction Phase of Nuclear Power Plants)

The requirements of the referenced standard as modified in the regulatory position will be applied to cleaning activities specified or applied by Bechtel to safety-related items as modified and interpreted below.

- 1) Section 2.1, Planning. The required planning is frequently performed on a generic basis for application to many installations on one or more projects. This results in standard procedures or plans for installation and inspection and testing which meet the requirements of the standard. Individual plans for each item or system are not normally prepared unless the work operations are unique. However, standard procedures or plans will be reviewed for applicability in each case. Installation plans or procedures are also limited in scope to those actions or activities which are essential to maintain or achieve required quality. This is consistent with Section II, Paragraphs 2 and 3 of ANSI N45.2-1971 which provides for examination, measurement, or testing to assure quality or indirect control by monitoring of processing methods. However, final cleaning or flushing activities will be performed in accordance with procedures specific to the system.
- 2) Section 4, Preinstallation Cleanliness. This section states, "Items should not be delivered to the point of installation site sooner than necessary unless the installed location is considered a better storage area." As an alternate to this requirement, items may be delivered to the installation site sooner than absolutely necessary when determined to be advantageous for other considerations, for example, reduced handling or easier access, thereby reducing susceptibility to handling damage. In all such cases, equipment stored in place will be protected in accordance with Section 5 of ANSI N45.2.1.
- 3) Section 3.1.2, Bechtel interprets the lighting level of 100 footcandles to be guidance. It is Bechtel's normal practice that the lighting level for determining "metal clean" of accessible surfaces of piping and components is determined by the inspector. Typically he uses a standard two-cell flashlight supplemented by other lighting as he deems necessary.

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Regulatory Guide 1.38 (ANSI N45.2.2-1972, Packaging, Shipping, Receiving, Storage, and Handling of Items for Nuclear Power Plants [During the Construction Phase])

The requirements of the referenced standard as modified and interpreted in the regulatory position will be applied to the Bechtel Quality Program during the construction phase as described in Section 13 of this report, subject to the following clarifications and as modified and interpreted below.

- 1) Section 2.7, Classification of Items. The four-level classification system may not be used explicitly. However, the specific requirements for each classification as specified in the standard will be applied to the items suggested in each classification and for similar items.

Classification differing from Section 2.7 will be considered acceptable provided no degradation is assured; for example, electric motors designed for outside service may be stored in a level C area rather than a level B.

- 2) Section 6.2, Storage Areas. Paragraph 6.2.1 requires control and limited access to storage areas. In lieu of and to amplify this paragraph, the following will be applied:

"Access to storage areas for levels A, B, and C will be controlled by the individual(s) responsible for material storage." Level D items will be stored in a site area which will have access control consistent with Zone IV of ANSI 45.2.3-1973. While the areas will be posted to limit access, other positive controls (other than that for the overall site area) or guards may not be provided.

- 3) Section 5.5, Correction of Nonconformances. This section provides for "rework" and "use as is" dispositions for nonconforming items. As an alternate, the "repair" disposition (as defined in ANSI N45.2.10-1973) will also be used.
- 4) Section 6.2.4, Storage of Food and Associated Items. Controlled areas, within storage areas, will be established for the storage of food, drink, and salt tablets. These areas will be controlled through normal supervision and inspection.
- 5) In Section 8, the control of documentation and records shall be in accordance with Section 17 of this report.

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- 6) Appendix, A 3.4.2, Inert Gas Blankets. There may be cases involving large or complex shapes for which an inert or dry air purge flow is provided rather than a static gas blanket in order to provide adequate protection due to difficulty of providing a leakproof barrier. In these cases a positive pressure purge flow may be utilized as an alternative to the leakproof barrier.

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Regulatory Guide 1.39 (ANSI N45.2.3-1973, Housekeeping During the Construction Phase of Nuclear Power Plants)

The requirements of the referenced standard will be applied to the Bechtel Quality Program for construction of safety-related items except as modified or interpreted below.

- 1) Section 2.1, Planning. The required planning is frequently performed on a generic basis for application to many installations on one or more projects. This results in standard procedures or plans for installation and inspection and testing which meet the requirements of the standard. Individual plans for each item or system are not normally prepared unless the work operations are unique. However, standard procedures or plans will be reviewed for applicability in each case. Installation plans or procedures are also limited in scope to those actions or activities which are essential to maintain or achieve required quality.
- 2) Alternative equivalent zone designations and requirements may be utilized to cover those situations not included in the subject standard; for example, situations in which shoe covers and/or coveralls are required but material accountability is not. In addition, zones might be combined into the next more restrictive category in order to reduce total number of zones.

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Regulatory Guide 1.58, dated August 1973 (ANSI N45.2.6-1973, Qualification of Nuclear Power Plant Inspection, Examination and Testing Personnel)

The requirements of the referenced standard, as modified and interpreted in the regulatory position will be applied to the Bechtel Quality Program during the construction phase as described in Section 2.5 of this report, subject to the following clarifications:

- 1) Substitute new Sections 1.1 and 1.2 and modify first paragraph only of 1.3.

Section 1.1, Scope

This standard delineates the requirements for qualification of personnel who perform inspection, examination, and testing to verify conformance to specified requirements of nuclear facility items (structures, systems, and components of nuclear power plants, fuel reprocessing plants, plutonium processing plants, and plutonium fabrication plants) whose satisfactory performance is required to prevent postulated accidents which could cause undue risk to the health and safety of the public; or to mitigate the consequences of such accidents if they were to occur. The requirements may also be extended to other items of nuclear facilities when specified in contract documents.

Section 1.2, Applicability

The requirements of this standard apply to personnel who perform inspections, examinations, and tests during fabrication prior to and during receipt of items at the construction site, during construction, during preoperational and startup testing, and during operational phases of nuclear facilities. The requirements of this standard do not apply to personnel who perform inspections for government or municipal authorities, or who perform as authorized inspectors in accordance with the ASME Boiler and Pressure Vessel Code.

The requirements of this standard are not intended to apply to personnel who only perform inspection, examination, or testing in accordance with employer practices which are in compliance with "Recommended Practice No. SNT-TC-1A," since these personnel are certified in accordance with the requirements of SNT-TC-1A and its applicable supplements. The requirements of this standard are optional, at the discretion of the employer, for application to personnel who perform calibration, or to craftsmen who perform installation checkouts as part of their basic installation responsibility to ready the installation for preoperational testing.

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This standard is to be used in conjunction with ANSI N45.2-1971.

The requirements apply to personnel of the owners, architect-engineers, nuclear facility system designers and system suppliers, plant designers and plant constructors, equipment suppliers, outside testing agencies, and consultants. Other standards or codes may contain qualification requirements for personnel, such as nondestructive examination personnel as required by the ASME Boiler and Pressure Vessel Code, and Quality auditor personnel as may be required by Quality Systems or Quality Assurance Program standards. When this is the case, this standard is not to be interpreted to require a duplication of effort.

Section 1.3, Responsibility

It is the responsibility of each organization participating in the project to assure that only those personnel within their respective organizations who meet the requirements of this standard are permitted to perform inspection, examination, and testing activities covered by this standard that verify conformance to quality requirements.

- 2) Since this standard does not apply to personnel who perform nondestructive examinations, delete subsection 2.2.2.
- 3) Section 2.2.3, Evaluation of Performance.

The job performance of inspection, examination, and testing personnel shall be reevaluated at periodic intervals not to exceed three years. Reevaluation shall be by evidence of continued satisfactory performance or redetermination of capability in accordance with subsection 2.2. If, during this evaluation or at any other time, it is determined by the responsible organization that the capabilities of an individual are not in accordance with the qualifications specified for the job, that person shall be removed from that activity until such time as the required capability has been demonstrated. Any person who has not performed inspection, examination, or testing activities in his qualified area for a period of one year shall be reevaluated by a redetermination of required capability in accordance with subsection 2.2.

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- 4) The requirements of this standard shall apply only to personnel who perform inspection, examination, and testing, and accordingly, Sections 3 and 3.1 shall be revised to read:

3. Qualifications

3.1 General

The requirements contained within this section define the minimum capabilities that qualify personnel to perform inspections, examinations, and tests which are within the scope of this standard.

There are three levels of qualification. The requirements for each level are not limiting with regard to organizational position or professional status, but rather, are limiting with regard to functional activities which are within the scope of this standard.

Following is the recommended personnel education and experience for each level. These education and experience recommendations should (be treated to recognize that other factors may provide reasonable) assurance that a person can competently perform a particular task. Other factors which may demonstrate capability in a given job are previous performance or satisfactory completion of capability testing.

- 5) The education and experience requirements shall make provision for personnel who have not graduated from high school, or who have earned an Associate degree. Accordingly, paragraphs 3.1.1, 3.1.2, and 3.1.3 shall be revised to read:

3.1.1 Level I

- (1) Two years of related experience in equivalent inspection, examination, or testing activities, or
- (2) High school graduation and six months of related experience in equivalent inspection, examination, or testing activities, or
- (3) Completion of college level work leading to an Associate degree in a related discipline plus three months of related experience in equivalent inspection, examination, or testing activities

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3.1.2 Level II

- (1) One year of satisfactory performance as a Level I, or
- (2) High school graduation plus three years of related experience in equivalent inspection, examination, or testing activities, or
- (3) Completion of college level work leading to an Associate degree in a related discipline plus one year of related experience in equivalent inspection, examination, or testing activities, or
- (4) Four-year college graduation plus six months of related experience in equivalent inspection, examination, or testing activities

3.1.3 Level III

- (1) Six years of satisfactory performance as a Level II, or
- (2) High school graduation plus ten years of related experience in equivalent inspection, examination, or testing activities; or high school graduation plus eight years of experience in equivalent inspection, examination, or testing activities, with at least two years as Level II. At least two years of this experience should be associated with nuclear facilities; or, in lieu of two years' experience, the individual shall have training sufficient to be acquainted thoroughly with the quality assurance aspects of a nuclear facility, or
- (3) Completion of college level work leading to an Associate degree and seven years of related experience in equivalent inspection, examination, or testing activities. At least two years of this experience should be associated with nuclear facilities; or, in lieu of two years' experience, the individual shall have training sufficient to be acquainted thoroughly with the quality assurance aspects of a nuclear facility, or

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(4) Four-year college graduation plus five years of related experience in equivalent inspection, examination, or testing activities. At least two years of this experience should be associated with nuclear facilities; or, in lieu of two years' experience, the individual shall have training sufficient to be acquainted thoroughly with the quality assurance aspects of a nuclear facility.

6) Section 3.2.1, Physical (revise to read):

Bechtel shall identify any special physical characteristics needed in the performance of each activity. Personnel requiring these characteristics shall have them verified by examination at intervals not to exceed one year.

7) Section 3.2.2, Technical (revise to read):

a. Level I Personnel Capabilities

A Level I person shall be capable of performing the inspections, examinations, and tests that are required to be performed in accordance with documented procedures and/or industry practices. The individual shall be familiar with the tools and equipment to be employed and shall have demonstrated proficiency in their use. The individual shall also be capable of determining that the calibration status of measuring and test equipment is current, that the measuring and test equipment is in proper condition for use, and that the inspection, examination, and test procedures are approved.

b. Level II Personnel Capabilities

A Level II person shall have all the capabilities of a Level I person. Additionally, a Level II person shall have demonstrated capabilities in planning inspections, examinations, and tests; in setting up tests, including preparation and setup of related equipment, as appropriate; in supervising or maintaining surveillance over the inspections, examinations, and tests; in supervising and certifying lower level personnel; in reporting inspection, examination, and testing results; and in evaluating the validity and acceptability of inspection, examination, and test results.

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c. Level III Personnel Capabilities

A Level III person shall have all the capabilities of a Level II person. In addition, the individual shall also be capable of evaluating the adequacy of specific programs used to train and test inspection, examination, and test personnel whose qualifications are covered by this standard. The individual shall also be capable of reviewing and approving inspection, examination, and testing procedures and of evaluating the adequacy of activities to accomplish the inspection, examination, and test objectives.

8) Section 4, Performance (revise to read):

Personnel who are assigned the responsibility and authority to perform functions covered by this standard shall have as a minimum the level of capability shown in Table 1. When a single inspection or test requires implementation by a team or group, personnel not meeting the requirements of this standard may be used in data-taking assignments or in plant or equipment operation provided they are supervised or overseen by a qualified individual participating in the inspection, examination, or test.

9) Section 5, Records (revise to read):

A file of records of personnel qualification shall be established and maintained by the employer. Collection, storage, and control of records required by this standard shall be in accordance with Regulatory Guide 1.98 as modified by this report.

NOTE:

Regarding inspection, test, and examination during fabrication before receipt at the construction site, Bechtel fulfills this requirement by specifying applicable requirements of ANSI N45.2.6 or the equivalent (the Standard N45.2.6 may not be listed as a requirement in a procurement document) tailored to the nature of the procurement and commensurate with the degree of skill and qualification necessary for inspection, test, and examination. For example, on simple inspections using go-no-go techniques or simple linear measurements within broad tolerance bands, the requirements of ANSI N45.2.6 would not apply; a satisfactory equivalent being routing inspection instructions and personnel assignments by supervision.

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TABLE 1
MINIMUM LEVELS OF CAPABILITY FOR PROJECT FUNCTIONS

Project Function	L-I	Level L-II	L-III
Recording inspection, examination, and testing data	X	X	X
Implementing inspection, examination, and testing procedures	X	X	X
Planning inspections, evaluations, and tests; setting up tests, including preparation and setup of related equipment		X	X
Evaluating the validity and acceptability of inspection, examination, and testing results		X	X
Reporting inspection, examination, and testing results		X	X
Supervising equivalent or lower level personnel		X	X
Qualifying lower level personnel		X	X
Evaluating the adequacy of specific programs used to train and test inspection, examination, and testing personnel			X
Reviewing and approving inspection, examination, and test procedures			X
Evaluating the adequacy of activities to accomplish inspection, examination, and test objectives			X

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Regulatory Guide 1.64, Revision 2, June 1976 (ANSI N45.2.11-1974, Quality Assurance Requirements for the Design of Nuclear Power Plants)

The requirements of the referenced standard as modified by the regulatory position will be applied to Bechtel Quality Program for safety-related items.

The following interpretations of the standard serve to clarify the Bechtel program in relation to this regulatory guide.

- 1) Section 3.1, Design Input Requirements, General. This section implies that all necessary design input (as listed in Section 3.2) should be available prior to the start of a design activity. In practice, certain design activities are initiated before the firm input requirements are available. (For example, foundation designs prepared based on preliminary information or equipment sizes and mounting, embedded conduit run based on preliminary estimates of circuit requirements, etc.) The design phase QA program will be structured to ensure that all necessary design input is available before completion of final design of the work affected by the input and that final design input is available for use in verification of the final design.
- 2) Section 4.1, Design Process, General. Paragraph 3 implies traceability back from final design to the source of design input. In practice, a literal interpretation of this is not always possible. For example, final design drawings do not identify the related calculations. This paragraph will be interpreted to mean that it shall be possible to relate the criteria used and analyses performed to the final design documents and that record files will permit location of analyses supporting specific design output documents.
- 3) Section 4.2, Design Analyses. This section implies a requirement for retention of all calculations. In principle, it is considered good practice for the responsible engineer or engineering organization to retain all final calculations, and this will be done for all manual calculations covered by the Bechtel program. However, for computer programs only documentation of the design input, assumptions made in the analyses, results obtained, and evidence of verification will be retained since permanent retention of all versions of all computer programs is not considered practical or necessary if sufficient information is available for a competent individual to verify the results using the input and assumptions.

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- 4) Section 10, Records. In-process documentation, relating to checking and coordination of drawings (for example, check and coordination prints) or copies of marked-up specifications used to solicit comments shall be retained until the drawing or specification is approved and issued for use outside of Bechtel Engineering. Such in-process documents will be available for review/audit until the document is approved, but may be discarded once the document has been approved. In the first sentence of the second paragraph the phrase "final design documents" shall mean those documents which are the latest revision that has been issued for use.
- 5) Regulatory Position, Section C-2: If, in an exceptional circumstance, the originators' immediate supervisor is the only technically qualified individual available, the design verification or checking will be conducted by the supervisor with the following provisions:
 - a. The other requirements of Regulatory Guide 1.64 will be met.
 - b. The justification will be individually documented and approved by the next level of supervision.
 - c. Quality Assurance audits will include review of the frequency and effectiveness of the use of the immediate supervisor to assure that this provision is used only in exceptional circumstances.

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Regulatory Guide 1.88, Rev. 2, October 1976 (ANSI N45.2.9-1974, Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants)

The requirements of the referenced standard, as modified and interpreted in the regulatory position, will be applied to the Bechtel Quality Program during the design and construction phase, as described in Section 17 of this report, subject to the following clarifications:

- 1) Section 1.4, Definitions. Quality Assurance Records - A document is considered completed when it has finished full processing and has been issued for use in design, procurement, construction, or manufacturing.
- 2) Section 1.4, Definitions. Authenticated Records - Those records which are clearly identified as a statement by the individual or organization holding responsibility. Handwritten signatures are not required if the document or printout is clearly identified as a statement by the reporting individual or organization.
- 3) For Appendix A, an installation shall be considered to be in an "as constructed" condition if it is installed within the tolerances established by Project Engineering indicated in the design output documents.

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Regulatory Guide 1.94 (ANSI N45.2.5-1974, Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants)

The requirements of the referenced standard will be applied to the Bechtel Quality Program for construction of safety-related items as follows:

Any exceptions to ANSI N45.2.5 and/or Regulatory Guide 1.94 will be resolved with the NRC during licensing on an individual project basis.

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Regulatory Guide 1.116, June 1976 (ANSI N45.2.8-1975, Supplementary Quality Assurance Requirements for Installation, Inspection and Testing of Mechanical Equipment and Systems for the Construction Phase of Nuclear Power Plants)

The requirement of the referenced standard as modified and interpreted in the regulatory position will be applied to the Bechtel quality program for construction of safety-related items except as modified and interpreted below.

- 1) Section 1.1, Scope. The term "important items" will be interpreted to apply to those activities or quality attributes of an item or service that could affect a nuclear safety-related characteristic. For example, if a barrier is required for leakage control, but serves no structural function, the leaktight characteristic would be considered "important," but appearance, dimensional requirements, and structural features would not necessarily be considered important; or if a pump casing is required for coolant boundary integrity, but the pump does not have to operate to provide for nuclear safety, those attributes which affect its operation would not be considered important from the standpoint of nuclear safety.
- 2) Section 2.1, Planning. The required planning is frequently performed on a generic basis for application to many installations on one or more projects. This results in standard procedures or plans for installation and inspection and testing which meet the requirements of the standard. Individual plans for each item or system are not normally prepared unless the work operations are unique. However, standard procedures or plans will be reviewed for applicability in each case. Installation plans or procedures are also limited in scope to those actions or activities which are essential to maintain or achieve required quality.
- 3) Section 3.3, Process and Procedures. The terms "installation site," "installation area," and "site" used in this standard shall be interpreted as follows:
 - a) "Installation site" or "site" will be interpreted the same as "construction site." When applied to documents, these may be at the central office or work area document control station.
 - b) Installation area - Immediate proximity of location where work is to be performed.
- 4) Section 3.5(e), Site Conditions. This requirement will be applied only if subsequent correction of adjacent nonconformances could damage the item being installed.

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- 5) Section 4.6, Care of Items. Bechtel, acting as Constructor or Construction Manager, is assumed to have authority and is the "responsible organization" for temporary usage of equipment or facilities unless specifically prohibited by contract or in writing from the client. All other conditions and considerations for temporary use in this section will be applied.

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Regulatory Guide 1.123, October 1976 (ANSI N45.2.13-1976, Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants)

The requirements of the referenced standard as modified and interpreted in the regulatory position will be applied to the Bechtel Quality Program during the design and construction phases except as modified and interpreted below:

- 1) Section C.2 of the Regulatory Guide - The quality assurance program requirements for control of procurement of safety-related items and services are established in accordance with the requirements of ANSI N45.2.13, normally by invoking portions of ANSI N45.2 as well as other applicable codes and standards, or by invoking other specific requirements which meet the standard. The appendix to N45.2.13 is used for guidance in making this determination. For safety-related parts of Code items not covered by the Code, such as nonpressure retaining parts, or for Code items performing safety-related functions other than pressure retaining, the requirements of the Code program:
 - a) Shall be extended to cover such parts and quality-related activities when the requirements of the Code program meet the ANSI Standard, or
 - b) Shall be supplemented by the applicable quality assurance requirements in accordance with ANSI N45.2.13 (as endorsed by Regulatory Guide 1.123) to cover the appropriate quality-related activities for which the Code program requirements are not equivalent

For those parts or items covered by the Code, only the quality assurance requirements of the Code will apply. The invoking of N45.2.13 by specific reference is not required.

- 2) Section C.3 of the Regulatory Guide - A corrective action system may, depending upon complexity and/or importance to safety of the item or service provided, be imposed upon the supplier. When a corrective action system is imposed on a supplier, the applicable elements of Section 9.0 of the standard will be included and its implementation will be verified by Bechtel.
- 3) Section C.4 of the Regulatory Guide - Applicable information concerning the method(s) of acceptance of an item or service will be made available to receiving inspection personnel.

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- 4) Section 4.2.a of the Standard - When evaluation of a supplier is based solely on historical supplier data, these data will primarily include Bechtel's records that have been accumulated in connection with previous procurement actions. Data that includes experience of users of identical or similar products of the prospective supplier and product operating experience will be used if they become available to Bechtel; however, such data are normally available only to those involved in plant operations.
- 5) Section 10.2.d of the Standard - The requirements of this section are interpreted as follows: The person attesting to a certificate shall be an authorized and responsible employee of the supplier and shall be identified by the supplier.
- 6) Bechtel's position relative to ANSI N45.2.13-1976, Section 10.2.f, Verification of the Validity of Supplier Certificates and the Effectiveness of the Certification System, is as follows: The verification of the validity of supplier certificates and the effectiveness of the certification system are accomplished as an integral part of the total supplier control and product acceptance program, and no separate Bechtel system exists that addresses itself solely to such verification. The degree of verification required will depend upon the type of item or service and their safety importance. The means of verification may include source witness/hold points, source audits, and document reviews; independent inspections at the time of material receipt; user tests on selected commodities, such as concrete components; and tests after installation on selected components and systems. All of these means verify whether or not a supplier has fulfilled procurement document requirements and whether or not a certification system is effective.

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ANSI N45.2.12-1974, Draft 3, Rev. 4, February 22, 1974, Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants

The requirements of this standard will be applied to the Bechtel Quality Program as modified and interpreted below:

- 1) Section 1.4, Definitions. Add the following:

Auditor - Any individual who performs any portion of an audit, including lead auditors, technical specialists, and others, such as management representatives and auditors in training.

Lead Auditor - An individual whose experience and training qualifies him to organize and direct an audit, report audit findings, and evaluate corrective action.

Program Deficiencies - Failure to develop, document, or implement effectively any applicable element of the quality assurance program required by ANSI N45.2.

- 2) Section 2.3, Training. Revise the wording of this section to make it consistent with the added definitions, i.e., replace the words "Auditing personnel, including technical specialists" with "Auditors."
- 3) Section 2.4, Maintenance of Proficiency. "Qualified Auditors" should be replaced with "Lead Auditors." Proficiency need only be maintained by the person responsible for planning, conducting, reporting, and closing out the audit.
- 4) Section 3.1, General, Audit System. Revise the following sections for consistency with the added definitions: (a) 3.1.4 To identify nonconformances and program deficiencies; and (b) 3.1.5 To verify correction of identified nonconformances and program deficiencies.
- 5) Section 3.4.2, (Scheduling). Audits of Bechtel suppliers performing continuing work for one or more Bechtel projects are conducted as a minimum on an annual basis; audits of suppliers performing limited duration assignments are conducted at least once during the life of the contract. This requirement may be waived when evidence exists of continuing satisfactory performance including surveillance by Procurement Supplier Quality Department. This waiver is based on an annual review by Procurement Supplier Quality with concurrence of the Project Quality Assurance Engineer. Results of these reviews are placed in supplier quality history files.

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The annual audit requirement shall not apply to standard off-the-shelf items and bulk commodities where required quality can adequately be determined by receipt inspection or post-installation checkout or test.

- 6) Section 3.4.3.6, (Verification). Delete this section. Section 4.5, Follow-up, By Auditing Organization, will provide adequate coverage of the verification process without resorting to an audit, audit reports, etc. Verification will be accomplished during the performance of follow-up action by the auditing organization.
- 7) Section 4.3.3, Post Audit Conference. Delete the last sentence. The minutes of the post audit conference are recorded and distributed to the attendees and management. It is not considered necessary to have the auditing organization and the audited organization sign these minutes to signify understanding.

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APPENDIX B
DIVISION QUALITY POLICIES, SCOPE, AND
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LOS ANGELES POWER DIVISION		QUALITY PROGRAM MANUAL	
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