1-B QUALITY
ASSURANCE

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ARKANSAS POWER & LIGHT COMPANY
QUALITY ASSURANCE PROGRAM
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ARKANSAS POWER & LIGHT COMPANY

QUALITY PROGRAM
FOR
ARKANSAS NUCLEAR ONE

I. INTRODUCTION

A. Objective & Identification of Quality Program

1. The objective of the Quality Program is to insure that Arkansas Nuclear One nuclear power plant is designed, constructed and operated without undue risk to the health and safety of the public.

2. The Quality Program consists of all of the various activities herein described which provide three independent levels of assurance that the objective of the Program will be achieved. The Program is composed of three types of activities: Quality Control, Quality Assurance, and Quality Surveillance. As used in this document these terms may be defined as follows:

B. Quality Control

1. Quality Control comprises activities in the Quality Program related to the physical characteristics of a material, structure, component, or system which provide a means to control the quality of the material, structure, component or system to predetermined requirements.

2. Quality Control includes the setting of quality criteria, specification of codes, standards and written procedures for verifying that the quality criteria are met, as well as the performance and documentation of the inspections and tests specified.

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I. INTRODUCTION (Cont'd)

C. Quality Assurance

Quality Assurance comprises all those planned and systematic activities in the Quality Program directed toward verifying the adequacy and implementation of the Quality Control activity. Quality Assurance includes design review to insure that proper and adequate codes, standards and sound engineering practices are specified by the design engineer, as well as an Audit Program of systematic inspection and documentation review to verify that the quality control activities specified are in fact being performed by qualified personnel using proper and calibrated equipment.

D. Quality Surveillance

1. Quality Surveillance is periodic audit examination, evaluation and verification of the performance of an organization's efforts which affect quality and comprises those activities by the Owner designed to assure that the Quality Assurance and Quality Control activities are functioning effectively.

2. Specific Quality Surveillance activities by the Owner include the audit of Quality Assurance and Quality Control Programs, the audit of designs, drawings, specifications and procurement documents for items within the Quality Program, periodic inspections both at the construction site and in vendors' shops, and review of documentation from the Quality Assurance and Quality Control activities.

I. INTRODUCTION (Cont'd)

E. Scope

1. The Scope of the Quality Program includes all structures, systems and components of Arkansas Nuclear One nuclear power plant that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. (Appendix B is further broken down into a "Q List" which identifies all those specific items which will be considered as falling under the scope of this program.)

2. The Program covers all activities affecting the nuclear safety-related functions of those structures, systems, and components including designing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, and testing fall within the Scope of the Program.

II. ORGANIZATION

A. Scope

1. The primary organizations involved in the Quality Program are Arkansas Power & Light Company, Bechtel Corporation and Babcock & Wilcox Company.

2. The organization of the Quality Program is presented in Appendix A Figure 1, including lines of quality assurance and quality control. Stop work authority is indicated in Appendix A Figure 2 and 3. The following discussion describes the organization and responsibilities of the principle organizations.

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II. ORGANIZATION (Cont'd)

3. All suppliers and contractors for Arkansas Nuclear One responsible for the design, fabrication, or construction of any of the structures, system, and components witnin the Scope of the Program are required to have competent organizations to perform the specified quality activities.

B. Arkansas Power & Light Company (Owner)

1. The responsibility and authority of the Owner to assure the performance of the Quality Program is assigned to the Vice-President and Chief Engineer who reports directly to the Senior Vice-President.

2. As indicated in Appendix A Figure 1, the Arkansas Nuclear One QUALITY ASSURANCE COMMITTEE reports directly to the Vice President and Chief Engineer.

3. The Chairman of this Committee, the Chief Quality Assurance Coordinator, has the responsibility for devising and implementing the Quality Auditing functions on design, procurement, manufacture, and construction of all structures, components and systems falling under the Quality Program. Reporting to the Chief Quality Assurance Coordinator are inspectors and engineering specialists as needed. These inspectors and specialists perform audit functions both in the field and at vendor shops.

4. The SAFETY REVIEW COMMITTEE and the DESIGN REVIEW BOARD report to the Production Department Manager who, in turn, reports directly to the Vice-President and Chief Engineer.

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II. ORGANIZATION (Cont'd)

These committees review specifications, drawings procedures, etc. for Arkansas Nuclear One. These additional reviews reinforce the efforts of the QUALITY ASSURANCE COMMITTEE. (A complete description of the duties and responsibilities of the DESIGN REVIEW BOARD, the SAFETY REVIEW COMMITTEE and the QUALITY ASSURANCE COMMITTEE may be found in Supplement No. 9 to the Preliminary Safety Analysis Report dated 8-30-68, Pages 8.4-3 through 8.4-9).

DESIGN REVIEW BOARD

The DESIGN REVIEW BOARD has several responsibilities. It establishes criteria for the plant based principally on considerations of plant costs, convenience of operation and maintenance, plant safety and reliability, and schedules. Then it reviews the vendor designs and specifications on the basis of these criteria. It reviews and assists the architect-engineer in the preparation of specifications. It evaluates and recommends to management acceptance or rejection of vendor proposals including designs, equipment and testing specifications, codes and standards, installation and operating procedures, etc.

The general policy of Arkansas Power & Light Company is to request bids for materials and equipment only from reputable companies which can meet our rigid qualifications. Such vendors must have substantial design and manufacturing experience to meet our specifications requirements with appropriate demonstrations of present ability or agree to perform necessary demonstration tests to prove the abilities required by our design criteria.

In addition to these responsibilities during the design and construction of the plant, the DESIGN REVIEW BOARD continues to function after plant operation begins. It reviews plant records to evaluate the performance of the plant and makes recommendations concerning any proposed change in the plant facilities or procedures.

The Board actually functions by individual reviews and meetings as required. The frequency of its meetings naturally varies as the detailed plant design progresses. Presently, the Board meets about every four weeks.

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The DESIGN REVIEW BOARD has no direct authority over the Russellville Nuclear Unit, although some of its members do have line authority. It makes recommendations to management who rely heavily upon the judgment of the Board.

SAFETY REVIEW COMMITTEE

The SAFETY REVIEW COMMITTEE also has several responsibilities. It establishes criteria for the plant based on considerations of reliability and safety. It then reviews and approves all designs and procedures which affect safety. Although the DESIGN REVIEW BOARD considers safety in its review of plant design and specifications, it has the primary responsibility for plant cost and construction schedules. Therefore, the SAFETY REVIEW COMMITTEE was formed to review the plant design and specifications with plant safety and reliability as their only criteria. Their review is exempt from considerations of cost or schedule.

After the plant goes into operation this committee will maintain surveillance over plant operations to insure compliance with approved procedures. The SAFETY REVIEW COMMITTEE has the responsibility for investigating any accidents at the plant and taking remedial action to prevent their recurrence. It also reviews and approves any proposed changes in facilities or procedures that might be recommended by the plant staff or the DESIGN REVIEW BOARD to insure that plant safety is not compromised.

During the design and construction of the plant the SAFETY REVIEW COMMITTEE functions through individual review and committee meetings in a manner similar to that of the DESIGN REVIEW BOARD. After plant operations begin the SAFETY REVIEW COMMITTEE will make scheduled and unscheduled visits to the plant to observe operations. The Committee will insure that plant management carries out emergency drills, makes inspections of emergency equipment, and maintains liaison with local hospitals to insure that adequate emergency medical treatment can be provided in the unlikely event of overexposure of personnel to radiation.

The SAFETY REVIEW COMMITTEE has the authority to reject any design, specification, or procedure adversely affecting plant safety during construction and must approve any changes in facilities or procedures affecting safety after the plant goes into operation.

The SAFETY REVIEW COMMITTEE is composed of the Assistant Manager of the Production Department for New Construction, the Manager of Safety for Arkansas Power & Light Company, a representative of the top nuclear plant management, and the nuclear plant's Chemistry and Radiation Protection Engineer (not yet assigned). The Committee meets once a month,

or more frequently if necessary, to discuss their independent review of plant design, procedures, protective equipment, and personnel Safety Training Programs.

Through the functioning of the DESIGN REVIEW BOARD and the SAFETY REVIEW COMMITTEE the initial plant design has been established for the Russellville Nuclear Unit that represents the desired quality. In order to insure that the initial plant design criteria, codes and standards described in the PSAR are strictly adhered to as the detailed design of the plant progresses, the DESIGN REVIEW BOARD and the SAFETY REVIEW COMMITTEE will continue their review of all specifications and detailed designs of Class I systems and components. These committees have the responsibility and the authority to reject any design or specification failing to meet the applicable codes, criteria, etc.

QUALITY ASSURANCE COMMITTEE

Our QUALITY ASSURANCE COMMITTEE has the responsibility for devising and implementing a program that will insure that the plant is built to this quality level. Their duties fall into two general categories -- planning and quality control.

In the planning area this committee must review all plant designs and specifications for committee educational purposes to prepare them for carrying out their responsibility of establishing procedures for quality control. Also, based on this review the committee has the responsibility to inform Arkansas Power & Light Company management if any plant equipment or design deviates from accepted industry codes and standards. Another of their responsibilities is to review the architect-engineer and vendor quality assurance and quality control programs and schedules and provide sufficient surveillance to assure proper implementation of the programs.

This committee accomplishes the above by individual member review and committee meetings which are held monthly or more frequently as required. To assist the committee members in these reviews, various specialists covering areas of mechanical, concrete, structural, and electrical construction are available from the Arkansas Power & Light Company's Engineering Department as required.

In defining the quality control program the QUALITY ASSURANCE COMMITTEE will not attempt to entirely duplicate the quality control efforts of the A-E and vendors, since our efforts represent the second and many times the third redundant level of quality control. Our program will be designed as an "overseeing" effort to verify that the inspectors (Arkansas Power & Light, Architect-Engineer, or Vendors) are on-the-job in sufficient numbers, performing "spot check" witness tests at vendors' facilities and review the results of all quality control programs.

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The Chief Quality Control Coordinator, who is a member of the QUALITY ASSURANCE COMMITTEE, or his representative will be in residence full time at the construction site. He will work closely with Bechtel's Quality Assurance Engineer and insure that adequate Bechtel and Arkansas Power & Light Company inspectors are on-the-job at all times. The QUALITY ASSURANCE COMMITTEE (Arkansas Power & Light Company management people) will delegate to the Chief Quality Control Coordinator all the required authority to prevent work from being done where conditions exist that would prohibit effective quality control inspections or to stop work in progress upon detection of faulty materials or workmanship. He will have the authority to stop any phase of the work either at the construction site or in vendors' shops. He may exercise this authority at the job site by direct communication of a stop work order delivered orally or in writing to the Bechtel Project Superintendent on the site. To stop work in a vendor's shop he can issue such a directive, orally or in writing, to the Bechtel or Babcock & Wilcox Project Engineer, whichever more directly controls the work in question. In Appendix A this authority to stop work is indicated as an (xxxx) line. These lines (xxxx) denote stop work authority only and do not imply any other type of authority. A copy of all results of the Bechtel and Babcock & Wilcox quality control programs will be transmitted directly to the Chief Quality Control Coordinator and hence to the QUALITY ASSURANCE COMMITTEE in a timely fashion. A complete set of quality control records will be kept at the plant under the supervision of the Committee.

The Chief Quality Control Coordinator has available from the Arkansas Power & Light Company's Engineering Department experienced personnel in areas of substation design and construction, transmission line design and construction, fossil fired generation design and construction, electrical instrument and relays, concrete, mechanical equipment installation, and foundation installation, for inspection duties both at the site and in vendors' facilities. Most of these men have at least five years' experience with Arkansas Power & Light Company in the Engineering or Production Departments.

In areas where we do not have the necessary experienced inspectors in our own organization we will hire inspectors or employ services of a consulting firm doing work in these areas.

II. ORGANIZATION (Cont'd)

5. A TEST WORKING GROUP will be responsible for programing and implementing acceptance testing, operational testing, test specifications, test procedures and operating procedures. This TEST WORKING GROUP will tag or identify the items to be tested and marking of those items which have been found satisfactory. These items will be marked or tagged as required. Any non-conforming items will be properly marked and properly remedied. Documentation on the above procedures will be maintained. (See Section VII)

6. The Assistant Manager of the Production Department (Nuclear Plant Project Manager) has been assigned the responsibility for the Owner's Project Management. The Bechtel Project Engineer and the Bechtel Construction Superintendent report directly to him as indicated in Figure 1 and Figure 3. Similarly, Babcock & Wilcox's Project Manager reports indirectly to him as indicated in Figure 1.

II. ORGANIZATION (Cont'd)

7. Both the Arkansas Power & Light Nuclear Plant Project Manager (through the formal lines of authority for the project) and the Arkansas Power & Light Chief Quality Assurance Coordinator (through special authority lines) can reject materials and stop work which does not comply with specifications, drawings, codes, standards or good workmanship. This stop-work authority extends to the Bechtel Project Engineer, the Bechtel Construction Superintendent and the Babcock & Wilcox Project Manager (See Appendix A).

C. Bechtel Corporation (Architect-Engineer-Constructor)

1. Bechtel Corporation (San Francisco, California) has been retained by the Owner as architect-engineer and constructor for Arkansas Nuclear One. Bechtel acts as Owner's agent for the procurement of materials, equipment and services. Owner has also given Bechtel the authority to exercise a broad quality assurance function over all vendors, including Babcock & Wilcox Company.

2. Inspectors from Bechtel's Purchasing Department inspect and verify the fact that proper quality control inspection, test and documentation requirements are being met in vendors' shops, Babcock & Wilcox shops and Babcock & Wilcox vendors' shops. Bechtel's inspectors are not responsible for expediting. Bechtel maintains a separate staff of expediters for that purpose.

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II. ORGANIZATION (Cont'd)

3. For quality assurance at the construction site, Bechtel has assigned a Quality Assurance Engineer to the site. The Quality Assurance Engineer is independent of Bechtel's construction forces and reports directly to Bechtel's Project Engineer as shown in Figure 2. He is responsible for surveillance of engineering and Quality Control/Quality Assurance activities in the field. He also reviews inspection work, inspection reports and monitors the permanent field QC/QA documentation files.

4. Another Quality Assurance activity for which Bechtel is responsible is the design review conducted by Bechtel's Chief Engineers representing various engineering disciplines for design, drawings, and specifications involving items under the Quality Program. The Chief Engineers also review the specified sub-vendor QC Program.

5. Bechtel's overall Quality Assurance Programs are continually reviewed and updated for performance and content by Bechtel's Quality Assurance Coordinator who reports to Bechtel's Engineering Management through the Manager of Quality Assurance.

6. Bechtel is also responsible for Quality Control activities. Bechtel's design engineers set specification, code, inspection and test requirements. The Design Engineers also review sub-vendor Quality Control Programs (outside the B&W Scope) which is another Quality Assurance activity.

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II. ORGANIZATION (Cont'd)

7. Bechtel Field Engineers perform quality control and inspections on material received at the site and construction work at the site. Throughout such Quality Control activities Bechtel's philosophy is to hold the person responsible for the work in question directly responsible for the first level quality control. The Owner agrees with this practice since it results in placing the first level quality control responsibility in the hands of career persons familiar with both design requirements and construction conditions.

8. All such Quality Control activities are under at least two independent surveillance activities at all times -- Bechtel's Quality Assurance and Owner's Quality Auditing functions. These are completely separate and independent from Bechtel's construction organization.

D. The Babcock & Wilcox Company (Nuclear Steam Supply System)

1. The Babcock & Wilcox Company is responsible for supplying the Nuclear Steam Supply System for Arkansas Nuclear One. The Nuclear Steam Supply System will be erected by Bechtel Corporation with the assistance of Babcock & Wilcox erection consultants. The overall responsibility for the design, fabrication and shipment of the Nuclear Steam Supply System resides with the Nuclear Power Generation Department (NPGD) of Babcock & Wilcox Company.

2. Babcock & Wilcox Company's Nuclear Power Generation Department design engineers are responsible for the Nuclear Steam Supply

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System specifications including codes, tests, etc. Babcock & Wilcox Company's Manufacturing Department is responsible for development, implementation and documentation of quality control procedures for items fabricated in Babcock & Wilcox shops. Babcock & Wilcox subvendors provide B&W approved Quality Control Programs on their required items within the Scope of the Program.

3. Babcock & Wilcox Quality Assurance Organization which reports directly to the Vice President, Nuclear Power Generation Department, is independent of Babcock & Wilcox engineering and manufacturing organizations. Results of the Quality Assurance activities are reported to the Babcock & Wilcox Project Manager. The Quality Assurance Organization performs quality assurance activities over the engineering and manufacturing activities within Babcock & Wilcox and manufacturing performed in Babcock & Wilcox Vendors' shops.

E. Summary of Organization

1. All structures, components and systems of Arkansas Nuclear One nuclear plant which have a vital role in the protection against nuclear safety related accidents which could cause undue risk to the health and safety of the public are subjected to at least three independent quality functions -- Quality Control, Quality Assurance, Quality Auditing.

2. Babcock & Wilcox provides a redundant Quality Assurance activity through their internal Quality Assurance organization

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(including Babcock & Wilcox supplied items and Babcock & Wilcox subvendor supplied items).

3. Bechtel Corporation performs the Quality Assurance function through internal design review by chief engineers, field inspectors in vendors' shops (including Babcock & Wilcox and Babcock & Wilcox suppliers shops), and the resident Quality Assurance Engineer at the plant site.

4. Owner performs a surveillance over these levels of QA/QC functions performing both Assurance and Auditing functions over the Quality Program.

5. Quality Control is also performed throughout the Program by personnel responsible for the design, test, manufacture, or construction activity.

F. Records

The results of inspections, tests, and audits; logs; reviews; and material analyses will be accumulated in a systematic retrievable manner, so as to retain the capability of verifying source, constituents and processes associated with materials and equipment. Corrections of deficiencies will be likewise recorded. These records shall be maintained for the life of the plant.

G. Audits

Planned and periodic audits will be performed by Arkansas Power & Light Company at the nuclear plant and at suppliers shops (including sub-suppliers) as required to determine the effectiveness of the Quality Program. Babcock & Wilcox and Bechtel likewise will be

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II. ORGANIZATION (Cont'd)

required to make periodic audits. Audits will be performed in accordance with written procedures or check lists.

III. DESIGN

A. Quality Control

The Bechtel or Babcock & Wilcox engineer with the responsibility for developing a design, drawing or specification for a structure, system or component has the first level quality control responsibility for specifying accepted materials, codes, standards, special tests, and required documentation to assure that the structure, system or component in question will perform its required nuclear safety related function. Specific quality control requirements are developed at this stage.

B. Quality Assurance

1. Designs, drawings, and specifications for structures, systems and components as per Appendix B are subjected to the second level quality activity, namely Quality Assurance, by qualified personnel who are, at all levels except top management, administratively independent of those personnel performing the design Quality Control.

2. Those designs, drawings and specifications developed by design engineers within the Bechtel Project Organization will be reviewed and approved for quality control content by the cognizant Bechtel Chief Engineers who are independent of the Project Organization. This Quality Assurance approval must be obtained before the Bechtel Project Engineer is authorized

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to release the document in question for fabrication or construction. Similar AP&L review and approval of specifications must be obtained before the Bechtel Project Engineer is authorized to release them. Designs and prints are reviewed by AP&L on an audit basis. Similar reivew and approval must be obtained for any changes or modifications to approved designs, drawings and specifications.

3. Drawings and specifications for Appendix B items, developed by Babcock & Wilcox engineers, are subjected to Quality Assurance review by Bechtel project design engineers and/or Chief Engineers who may stop work through the Project Management lines of authority if deviations from quality requirements or accepted engineering practice are determined. Additionally, such designs, drawings and specifications are under the surveillance of Babcock & Wilcox Company's Nuclear Power Generation Department's internal Quality Assurance organization which can similarly reject or stop work through Babcock & Wilcox Project Management. Changes or modifications of such approved drawings and specifications are subjected to Bechtel Quality Assurance review.

C. Quality Auditing

1. Drawings and specifications are subjected to third-level surveillance audit by Owner's Quality Assurance Committee. The purpose of this audit is to verify that Bechtel and Babcock & Wilcox's Design Quality Assurance activities are functioning and to further review these documents for

III. DESIGN (Cont'd)

consideration of nuclear safety and proper application of codes and standards. (Audit reviews are also given to designs, drawings and specifications by the Owner's Design Review Board and Safety Review Committee for safety of operation and maintenance. These reviews further assure the desired quality of the plant.)

D. Documentation

1. Copies of drawings, specifications, design criteria and Quality Auditing review records are maintained at the construction site under supervision of Owner's Chief Quality Assurance Coordinator.

2. The Bechtel Project Engineer and the Babcock & Wilcox Project Manager have the responsibility for insuring that all correspondence related to designs, drawings or specifications contain reference to the up-to-date revisions of such documents. They have the responsibility for providing up-to-date versions of such designs, drawings and specifications including any revisions to all personnel required for review, procurement, fabrication, construction or erection, inspection and testing of the structure, system, or component in question.

IV. PROCUREMENT (Appendix B Items)

A. Quality Control

1. Suppliers must have available adequate personnel, facilities, and equipment to perform quality control tests, inspections

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IV. PROCUREMENT (Cont'd)

and analyses as specified in the drawings, specifications and design information comprising the bid request in question.

2. Suppliers must supply written procedures, drawings and description of his fabrication quality control program as required by the specification or procurement document.

B. Quality Assurance

1. As a part of the evaluation of bids Bechtel or Babcock & Wilcox has the responsibility for determining the competence of the supplier to furnish quality equipment and to perform the required quality control activities. They are also responsible for reviewing shop drawings, work procedures, etc. generated by the supplier to determine that the proposed fabrication methods will comply with the quality requirements for the item in question.

C. Quality Auditing

1. Owner's Quality Assurance Committee audits suppliers quality control procedures, facilities descriptions, and qualification reports to determine that Bechtel or Babcock & Wilcox have verified the competence of the successful vendor to perform the required quality control.

2. Owner's acceptance of suppliers proposals and subsequent issue of purchase orders by Bechtel Corporation (acting as Owner's agent) is contingent upon satisfactory results of these reviews and approvals by the Owner.

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IV. PROCUREMENT (Cont'd)

D. Documentation

1. A copy of quality related documents including specifications, drawings, quality requirements, inspection reports and Arkansas Power & Light's Quality Assurance reviews of these documents are maintained on file at the construction site by Arkansas Power & Light's Chief Quality Assurance Coordinator.

V. FABRICATION, SHIPPING AND HANDLING (Appendix B Items)

A. Quality Control

1. Suppliers Quality Control Program (including Babcock & Wilcox manufacturing) requires performance of tests, analysis, inspections and other quality control activities using suppliers qualified personnel or outside sub-contractor personnel retained specifically for Quality Control.

2. The specific level of inspection and control afforded items on the Q List is determined on a case by case basis or on predetermined standards. Factors considered in establishing the degree of control include nature of the item, importance of the item to plant safety and reliability, previous experience with this or comparable items, capabilities of potential suppliers or subcontractors and requirements of applicable codes or standards.

3. Suppliers program will provide identification and control of applicable materials, parts and components including partially fabricated assemblies and their status of inspections and tests. The identification procedure must assure that identification of each applicable item is possible at all times,

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V. FABRICATION, SHIPPING AND HANDLING (Cont'd)

either through tags or markings on the item or through documentation readily traceable to the item.

4. The suppliers procedures shall prevent the use of unauthorized or defective items.

5. Special processes such as welding, heat treating, cleaning, and non-destructive testing shall be performed by qualified personnel according to prescribed codes, standards and other requirements given in the specifications, procurement document, drawings and design documentation.

6. Qualified inspectors shall perform in-process and final inspections and tests as required in the specifications, drawings and design documentation. Equipment and facilities used in performance of such tests, analyses, and inspections shall be adjusted and calibrated as specified in applicable codes, standards, specifications, drawings and design information.

7. Specified cleaning, shipping and handling requirements must be met and verified by inspections.

B. Quality Assurance

1. Each supplier must agree to permit owners representatives and/or Owner's Contractors access to his shop(s) and their sub-supplier's shops (if any) for the purpose of verifying the effective functioning and documentation of suppliers Quality Control Program. Supplier must also agree to mandatory hold points for such verifications, if required.

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V. FABRICATION, SHIPPING AND HANDLING (Cont'd)

2. Bechtel Shop Inspectors (and Babcock & Wilcox Quality Assurance Representative, in the case of Babcock & Wilcox supplied item) will audit suppliers shops to verify that suppliers personnel are properly qualified and certified and that tests and inspections are being performed as required under proper conditions using proper equipment which has been properly calibrated and adjusted.

3. The Bechtel (and Babcock & Wilcox) QA Representative will also verify that proper and identified materials are being used and that approved fabrication and handling procedures are being followed. They will also determine that proper environmental conditions required for special processes prevail and that special environmental conditions for shipping and handling procedures, if any, are being maintained and followed.

4. If any deficiencies or violations are detected as a result of the Quality Assurance activities, the Quality Assurance representative will (1) report immediately through his management to the Bechtel (or Babcock & Wilcox) Project Management and (2) require that procedures be prepared and submitted for approval to Bechtel (or Babcock & Wilcox) to rectify and prevent recurrence of the situation. All such inspectors have the authority to stop work if warranted through the Project Management lines of authority.

5. Written procedures will be required for proper field storage control on applicable items (Appendix B - list) to assure that quality is maintained in this area.

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V. FABRICATION, SHIPPING AND HANDLING (Cont'd)

C. Quality Surveillance

1. Owner's Quality Assurance Committee and its representatives from within Owner's organization along with contractors retained specifically for quality auditing will perform periodic audit inspections of suppliers shops to verify that the Bechtel and Babcock & Wilcox Quality Assurance activities are functioning effectively. Written reports of all such audits will be submitted to the Quality Assurance Committee.

2. The Owner's Quality Assurance Committee will audit the Quality Control and Quality Assurance documentation to verify that proper and sufficient documentation is available to demonstrate that the Quality Program requirements have been met.

D. Documentation

1. Records documenting the results of the Quality Control, Quality Assurance and Quality Auditing inspections, deviations and remedial actions and personnel qualifications sufficient to demonstrate that the requirements of the Quality Program, as specified in the procurement document, have been met. These will be maintained at the construction site under supervision of Arkansas Power & Light's Chief Quality Assurance Coordinator.

2. Owner requires that all such documentation be delivered to the site within a reasonable time after shipment of the materials or components to the site. However, in no case will Owner finally accept such materials or components until the required documentation is received at the site.

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V. FABRICATION, SHIPPING AND HANDLING (Cont'd)

3. Such records where appropriate shall include but not be limited to inspection, test and audit reports, materials analysis reports, personnel qualifications, procedures and test equipment identification. Inspection and test records where appropriate shall, as a minimum, identify the inspector and/or data recorder, type of observation, the results, acceptability, and the action taken in connection with any deficiencies noted.

VI. CONSTRUCTION AND ERECTION

A. Quality Control

1. Bechtel Corporation Construction Department is the General Contractor for construction and erection of the Arkansas Nuclear One nuclear power plant.

2. The Construction Superintendent is responsible for construction and inspection activities in the field. The personnel directly responsible for quality control of construction include the Project Field Engineer, Quality Control Engineer and Field Engineers.

3. The Project Field Engineer is responsible for supervision of field engineers in their efforts to apply predetermined specifications and design engineering and in their efforts to make quality inspections at the job site. In carrying out his inspection responsibilities, he assigns qualified Field Engineers to perform inspection assignments. He is responsible for obtaining and preparing inspection check lists, verifying accuracy and completeness of inspection reports and ascertaining

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that defects are removed and that repairs are carried out in accordance with applicable specifications, instructions and procedures.

4. The Quality Control Engineer reports to and assists the Project Field Engineer in carrying out inspection responsibilities. He is assigned responsibility for review of inspection reports, coordination, training and advising Field Engineers performing quality control inspection assignments, coordination of testing laboratories and overall detailed execution of field inspection.

5. Field Engineers carry out the inspection assignments and are responsible for filling out appropriate inspections forms. Field Engineer Inspectors function on a disciplinary basis, e g., mechanical equipment, civil/structural, electrical/power, instrumentation/control, welding/metallurgy.

6. The number of inspectors assigned will depend upon the requirements of the variable inspection workload and construction schedule. Inspectors have access to all the design drawings, applicable codes and sampling and testing procedures pertaining to their inspection assignments and are thoroughly familiar with the requirements.

7. Where material or non-destructive testing is specified or required to be performed during construction, the Project Field Engineer may employ the services of a qualified independent inspection laboratory.

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VI. CONSTRUCTION AND ERECTION (Cont'd)

8. Detailed quality control procedures will be found in Bechtel Field Inspection Manuals for the appropriate disciplines. Field quality control includes the preparation, distribution and filing of field inspection reports. Applicable components and materials will have field inspection documentation prepared at three stages: (1) upon receipt, (2) after installation or physical completion of fabrication work and (3) at the end of the construction period when all necessary cleaning, lubricating, static tests and protection have been carried out. Applicable systems receive at least the last two formal inspection reports: (1) after completion of fabrication and (2) at the end of construction.

B. Quality Assurance

1. Quality Assurance is performed at the construction site by Bechtel's Quality Assurance Engineer (QAE). The QAE is a field representative of the Project Engineering team. He is responsible for surveillance of engineering and quality control activities at the site, audit and verification of inspection work, verification of adequate inspection reports and assisting Owner's Chief Quality Assurance Coordinator in maintaining permanent Quality Program records at the site. The QAE has the authority to stop work through the Construction Superintendent in the event of non-conformance with drawings, specifications and procedures established for the items under the Quality Program.

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VI. CONSTRUCTION AND ERECTION (Cont'd)

2. The QAE must verify and accept a minimum of three Quality Control Reports for most items under the Quality Program -- (1) the report of receipt and proper storage of materials and components at the site, (2) the report of installation of equipment or materials, and (3) the final inspection report. Work cannot proceed beyond these check points without the QAE's approval. Requirements for QAE approval of these reports include satisfactory completion and documentation of all quality control inspections, and personnel qualification records, as well as approved resolution of any variations in materials or workmanship.

C. Quality Auditing

1. Owner's Chief Quality Assurance Coordinator (CQAC) or his designated representative from Owner's staff is in residence full time at the construction site. The Owner's Quality Auditing activity is implemented through CQAC and his representatives with the assistance of the members of the Owner's Quality Assurance Committee.

2. These personnel do not repeat all Quality Control activities at the site but rather verify that qualified Bechtel inspectors are on-the-job when required and are performing the specified Quality Control activities in accordance with the Quality Program.

3. This verification is accomplished by review of personnel qualifications, inspection reports, Bechtel Quality Assurance documentation, and by spot check inspections of material in storage or work in process.

VI. CONSTRUCTION AND ERECTION (Cont'd)

4. Weekly Reports of the CQAC's activities, as well as special reports on any serious deviations are prepared by the CQAC and submitted to Owner's Management and to members of the Owner's Quality Assurance Committee.

5. The CQAC has direct stop work authority to the Bechtel Construction Superintendent should work or conditions prevail which would adversely affect quality of the plant.

D. Documentation

1. A complete set of Quality Program records is maintained at the construction site under supervision of the CQAC. Documentation on file includes but is not limited to personnel qualifications, nondestructive test reports, materials analysis reports, cleaning reports, inspector's reports, Quality Assurance reports and variation notices, final inspection tests, as well as the complete Quality Documentation package for all manufactured items shipped to the site (prior to their final acceptance).

VII. TEST PROGRAM

A. General

1. The AP&L Test Program will commence with a complete and clean system and end with the system operating satisfactorily.

2. The Test Program consists of two phases of activities.

a. PHASE I

This phase consists of the necesaary activities to initiate the Test Program. This includes the planning,

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VII. TEST PROGRAM (Cont'd)

scheduling and coordination for the development of test specifications, test procedures, and operating procedures. A Critical Path Method Program will be produced to insure that all functions have been covered.

The Plant Superintendent, reporting to the Manager of Production, is responsible for Phase I of the Test Program. The Chairman of the Test Working Group will be responsible for Phase I until the Plant Superintendent has been named.

The Test Working Group will coordinate the efforts between Arkansas Power & Light Company, Babcock & Wilcox Company and Bechtel Corporation in the development of the Test Program specification and procedures. The Test Working Group membership will consist of three Arkansas Power & Light Company members, one Babcock & Wilcox member and two Bechtel Corporation members, with the Chairman being an Arkansas Power & Light Company representative. Additional members may be added as requirements dictate.

All test specifications developed will be reviewed and approved by Arkansas Power & Light Company. Completed test specifications, test procedures and operating procedures will be reviewed by members of the Test Working Group. After their review and approval, they will be submitted to AP&L for final review and approval.

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VII. TEST PROGRAM (Cont'd)

The plant operating personnel will be given the responsibility of writing the operating procedures based on the final approved test specifications, test procedures and latest design information. By assigning this function to the operating personnel, it will serve as training and increase their knowledge of the plant which will better prepare them for the operator licensing examination.

b. PHASE II

Pre-operational, functional, and operational testing of components and systems are conducted during Phase II. This also includes proving that the systems and components are testable.

Phase II is the responsibility of the Plant Superintendent during all test activities before and after fuel loading. The Plant Technical Support Engineer or his representative will be a member of the Test Working Group.

This phase begins with the physical testing of components and systems and continues through satisfactory operation of the plant. All tests will be conducted in accordance with the approved test specifications and test procedures to assure the integrity and testability of all components and systems. Testing and measuring devices shall be calibrated and adjusted so as to maintain accuracy within necessary limits. The program will be performed by Arkansas Power & Light Company under the direction of the Plant Superintendent.

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VII. TEST PROGRAM (Cont'd)

B. Quality Control

The Test Program is a Quality Control function which will assure the plant has been designed and constructed of such a quality that its operation will cause no undue risk to the health and safety of the public.

C. Quality Assurance

1. Quality Assurance for the Test Program will be an independent function carried out by the Quality Assurance Coordinator or his designated representative. Test specifications, test procedures, and operating procedures will be audited to check on compliance with codes, standards, PSAR commitments and specifications.

2. The performance of the Test Program will also be audited and inspected by the Quality Assurance Coordinator or his designated representative.

D. Documentation

When the Test Program is completed, a document file shall include the following:

1. Approved test specifications, test procedures and operating procedures with addendums.

2. Documented and acknowledged audit of test specifications and procedures by the Quality Assurance Coordinator or his designated representative.

3. Documented results of each test performed.

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VII. TEST PROGRAM (Cont'd)

4. Documented modifications or revisions of design effecting test specifications or test procedures.

E. Equipment Testing Status

1. Suitable marking shall be used to identify the status of inspections and tests upon individual items and the status of plant operating equipment. These markings shall clearly identify conforming as well as non-conforming items.

2. Procedures shall be provided for tagging valves, switches and other devices as required to prevent inadvertent operation.

VIII. GENERAL

A. Corrective Action

1. Through the QA organizations of B&W, Bechtel, and AP&L, all conditions adverse to quality are promptly identified and reported to appropriate levels of management. Arkansas Power & Light will require the correction of the adverse condition and future elimination of circumstances leading to such adverse conditions. Corrective action taken will be documented.

2. Babcock & Wilcox and their sub-contractors will be required to establish QC procedures covering necessary corrective action for items not passing shop inspection. Variation from specifications are reported and resolved consistent with the nature of the variation. The possible causes of the difficulty are investigated and corrective action is instituted and documented by necessary changes in specifications and manufacturing processes. B&W suppliers are requested to have similar procedures consistent with their manufacturing processes.

VIII. GENERAL (Cont'd)

3. Bechtel Corporation, within their scope, will have procedures for identification and reporting of situations adverse to quality through preparation of "significant deviation reports". These include reports of significant failures, malfunctions, deficiencies, deviations, defective material, etc. Routine occurrences of rework is not normally included in the corrective action program. Field Deviation Reports are prepared by either Project Field Engineering or the Quality Assurance Engineer and reviewed by the Project Engineering Team and Engineering Specialists. Bechtel suppliers and sub-contractors are audited as described in other parts of this program.

4. Arkansas Power & Light will periodically audit the B&W and Bechtel Program of corrective action. During the course of Quality Surveillance, reports of inspections and audit reports will be prepared. These reports go to the Chief Quality Assurance Coordinator, Chief Engineer, Manager of Production and Assistant Manager of Production (Nuclear Project Manager). Through these reports, AP&L will audit variances and corrective action to insure that proper action is taken and procedures are properly documented.

B. Program Review

This Quality Assurance Program shall be regularly reviewed in regard to its status, performance and adequacy by AP&L. In addition, the program is also under continuous review by Bechtel and B&W for improvements.

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IX. BECHTEL QA PROGRAM

Bechtel Corporation is the architect-engineer-constructor for Arkansas Nuclear One. Bechtel has a broad quality function under AP&L and the following section is the Bechtel Quality Assurance Program.

1.0 Organization

The organization employed for implementation of the Bechtel Quality Assurance Program on the Arkansas Nuclear One project is shown in Figure A. Personnel having significant Quality Assurance-related functions include:

(a) Design Phase

Project Engineering Team
Chief Engineers and their Technical Staff
Cognizant Engineering Manager
Manager - Quality Assurance
Quality Assurance Coordinator
Metallurgical and Quality Control Services Dept.

(b) Procurement Phase

Shop Inspectors
Chief Inspectors
Project Engineering Team
Chief Engineers and their Technical Staff
Cognizant Engineering Manager
Manager - Quality Assurance
Quality Assurance Coordinator
Metallurgical and Quality Control Services Dept.

(c) Construction Phase

Field Engineers
Quality Control Engineer
Project Field Engineer
Material Supervisor
Quality Assurance Engineer
Project Superintendent
Project Engineering Team
Chief Engineers and their Technical Staff
Cognizant Engineering Manager
Manager - Quality Assurance
Quality Assurance Coordinator
Metallurgical and Quality Control Services Dept.

The Project Engineering Team prepares drawings, specifications, purchase requisitions, bid evaluation and all other tasks associated with the Bechtel engineering design

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portion for the Arkansas Nuclear One project. The Project Engineering Team also prepares the Quality Assurance Program that will be carried out in the balance-of-plant and construction phases of the project. The following basic principles are applied:

(a) The Project Engineering Team has primary responsibilities for quality in the design phase.

(b) Vendors and Subcontractors have primary responsibilities for quality of materials, equipment and services furnished by them.

(c) The Bechtel project field organization supervised by the Project Superintendent has primary responsibility for quality of construction performed directly by Bechtel.

(d) One or more levels of inspection are provided as required within the organization having primary quality responsibilities.

The Bechtel Quality Assurance Program also provides for at least one level of monitoring and verification by individuals not under the direct control of the group having primary responsibility for quality (e.g. the Quality Assurance Engineer monitors construction, Bechtel Shop Inspectors monitor Vendors, etc.). Beyond this, Quality Assurance Program audits of engineering and field operations are carried out under the direction of the Quality Assurance Coordinator.

2.0 Program

The Bechtel Quality Assurance Program for Nuclear Power Plants will be carried out in accordance with the Nuclear Quality Assurance Manual, Revision 3, modified to meet

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specific Arkansas Power & Light Co. requirements. This manual describes the overall Program and identifies management and administrative procedures and individual responsibilities.

The Manager - Quality Assurance is responsible for overall direction of the Quality Assurance Program including formulating and implementing policy, administration and coordination of the program and administrative and technical supervision of Quality Assurance Engineers and Coordinators. He is responsible for providing overall coordination of Engineering, Procurement and Construction Departments in Quality Assurance activities to effectively implement the program.

The design phase is implemented by identifying the Structures, systems and components to be covered by the Quality Assurance Program in a Q-List which is prepared by the Project Engineering Team and reviewed and approved by Chief Engineers. The specific level of inspection and control afforded items on the Q-List is determined on a case-by-case basis by the Project Engineering Team through consultation with the Chief Engineers and Bechtel's technical specialists. Factors considered in establishing the degree of control include: nature of the item, importance of the item to plant safety and reliability, previous experience with this or comparable items, capa-

bilities of potential Vendors or Subcontractors and requirements of applicable codes or standards. Where deemed necessary, Bechtel engineering documents include specific procedures or requisites for the production and Quality Assurance of the item or request their preparation by the organization responsible for manufacturing or erection. The Metallurgy and Quality Control Services Department prepares specifications and procedures for materials, fabrication and non-destructive testing. In addition this department provides technical consultation and guidance for Engineering, Procurement and Construction. They further provide welding and inspection training services at the jobsite.

In carrying out the procurement phase of the program the following personnel are involved:

(a) Shop Inspectors are responsible for carrying out, or participating in, shop qualification inspections, inspection of work in process in Suppliers' and sub-Suppliers' shops, and for final inspection and release of equipment for shipment. They carry out their activities in accordance with the Procurement Department Inspection Manual procedures as supplemented by the drawings and specifications and additional instructions provided by Engineering. They may be Bechtel

permanent staff personnel, or personnel of recognized laboratories and inspection agencies.

Shop Inspectors receive their assignments from the Chief Inspectors who are responsible for supervision and coordination of their activities. When the sub-Suppliers to a Supplier are located outside the operating area of a Shop Inspector, inspection sub-assignments may be given to Inspectors in the other area.

(b) The Material Supervisor is located at the job site. His activities are coordinated by the Project Superintendent, and he is responsible to the Purchasing Department for receipt, storage and handling of material and equipment. The Material Supervisor is responsible for receiving inspection, control and storage of material and equipment prior to installation. He performs his activities in accordance with Field Procurement Procedures supplemented by additional instructions provided by Engineering and the Nuclear Quality Assurance Manual.

In implementing the program in the construction phase, Quality Assurance-related responsibilities are assigned to the following personnel:

(a) The Project Field Engineer supervises Quality Control inspection at the job site. In carrying out this assignment, he assigns qualified Field Engineers to perform Quality Control inspections. He supervises the preparation of inspection check lists, verifies accuracy and completeness of inspection reports and ascertains that defects are removed and that repairs are carried out in accordance with applicable specifications, instructions and procedures.

(b) The Quality Control Engineer reports to and assists the Project Field Engineer in carrying out Quality Control inspection responsibilities. He is assigned responsibility for review of inspection reports, coordination, training and advising Field Engineers performing Quality Control inspection assignments, coordination of testing laboratories and overall detailed execution of field inspection and maintaining the field QA/QC files.

(c) Field Engineer/Inspectors carry out the inspection assignments and are responsible for filling out the appropriate inspection forms. Field Engineer/Inspectors function on a disciplinary basis, e.g., mechanical equipment, civil/structural, electrical/power, instrumentation/control, welding/metallurgy.

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The number of Inspectors assigned depends upon the requirements of the variable Quality Control inspection workload and construction schedule. Inspectors have access to all the design drawings, applicable codes and sampling and testing and are thoroughly familiar with the requirements.

(d) The Quality Assurance Engineer receives technical direction on a day-to-day basis from the Project Engineer but administratively reports to the Manager - Quality Assurance through the QA Coordinators. He is stationed at the job site after field work starts and is responsible for surveillance of engineering and quality control activities in the field. The QAE does not perform inspection but serves as a representative of the Project Engineer in the field, providing guidance on requirements related to the Quality Assurance Program and surveillance of field inspection activities. He has authority to stop work for which Bechtel Construction has prime responsibility and assure restitution of any significant deviation in quality of construction materials and workmanship. For work of Bechtel or Client subcontractors, the QAE has authority to recommend stoppage through the Project Superintendent.

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3.0 Design Control

Several levels of design review and approval are applied to significant design aspects of Bechtel work. These standard practices include:

(a) Checking and review by design and engineering level personnel within the Project Engineering Team having technical qualifications comparable to those of the engineer or designer who orginated the work.

(b) Review and approval by the originating engineer's Design Group Supervisor.

(c) Review and approval by the Project Engineer.

(d) Review and/or approval by the appropriate Chief Engineer of certain key designs and calculations such as electrical single-line drawings.

For structures, systems and components on the Q-List, additional Design Control measures are implemented. A Design Control check list is prepared which identified drawings, specifications and other data (including the Q-List) which shall be reviewed by Chief Engineers or Technical specialists under the Chief Engineer's direction. The Design Control Check List is agreed on by the Project Engineer and the cognizant Chief Engineers soon after initiation of the project. When periodic design reviews are deemed necessary, Chief Engineers and the Project Engineer agree on appropriate schedules and procedures. Normally, such design reviews are not formally documented.

When the items identified in the Design Control Check List have completed, the cognizant Chief Engineer will have a final review performed and execute a Design Control approval signifying that the item is satisfactory from the standpoint of Quality Assurance requirements.

In implementing Design Control, Quality Assurance functions performed by the Chief Engineers and Cognizant Engineering Manager are as follows:

(a) The Chief Engineers qualify for independent review of engineering, since the Project Engineering Team is under the sole direction of the Project Engineer.

The Chief Engineers provide such independent review for all items on the Design Control Check List. In so doing, they coordinate and assure necessary technical review by specialists and consultants. Chief Engineers may delegate their review responsibilities to qualified specialists on their staffs.

(b) The Cognizant Engineering Manager provides management guidance and surveillance of the Project Engineering activities. His QA-related functions involve verification through project reviews that Project Engineering is carrying out its QA responsibilities.

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Drawings and specifications which have a bearing on the Nuclear Steam System Supplier's equipment or result from criteria supplied by him are routinely submitted to or directly exchanged with the Supplier for review. In a similar manner, information developed by the Nuclear Steam System Supplier affecting the Bechtel--NSSS interface is submitted by the Supplier to Bechtel for review. Drawings, specifications and procurement packages are routinely submitted to Arkansas Power & Light Co. for appropriate review and approval.

The Project Engineering Team employs several documents to establish design requirements for the project. These documents include or incorporate applicable AEC regulatory requirements and design bases as proposed by the license application and accepted by the AEC; basic Arkansas Power & Light Co. furnished data defining plant requirements; basic engineering data amplifying the basic Arkansas Power & Light Co. directed project data; NSSS Supplier furnished criteria and data; project criteria sheets prepared for each discipline; and Bechtel design guides, standard specifications and data sheets.

4.0 Procurement Document Control

Technical aspects of Procurement Documents are prepared by the Project Engineering Team in accordance with the procedures described in the preceding section. Appropriate Vendor Quality Assurance Program requirements are

incorporated in the Procurement Documents. Provisions are made for periodic and final inspection in Vendor shops as appropriate. All procurement, whether carried out by Home Office Procurement Department or the Field Procurement Organization employs specifications and Quality Assurance Requirements established by the Project Engineering Team.

5.0 Instructions, Procedures and Drawings

General procedures for carrying out engineering, procurement and construction are contained in the following manuals and documents:

(a) Project Engineer's Manual containing requirements for carrying out engineering activities.

(b) Nuclear Quality Assurance Manual defining responsibilities and outlining Quality Assurance activities and procedures.

(c) Field Inspection Manual describing general guidelines and procedures for Field Inspection.

(d) Procurement Department Inspection Manual containing shop inspection instructions, guidelines and procedures.

(e) Field Procurement Procedures specifying field purchase instructions for field purchases and material receiving inspection.

(f) Bechtel general and technical engineering standards including nuclear power station design standards which establish selective criteria, guidelines and standards for station design.

These are supplemented by specific instructions and procedures which may be prepared by Engineering, obtained from Vendors, or prepared by Vendor, Sub-contractor or Bechtel Construction personnel as required. When appropriate, such instructions and procedures are reviewed and approved by the Project Engineering Team and/or Bechtel specialists.

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6.0 Document Control

The Bechtel Quality Assurance Program includes a comprehensive system of Document Control which assures that documents and changes thereto are reviewed for adequacy in accordance with Design Control procedures previously described. Approved drawings are promptly issued to individual organizations and individuals carrying out the work and to those responsible for inspection. Existing field procedures control the distribution of approved drawings and assure that obsolete drawings are appropriately voided or destroyed. Changes to approved drawings whether made by the Project Engineering Team or Field Engineering are reviewed and approved by the Project Engineering Team in accordance with procedures for review of the initial issue. Where significant changes are involved, review by cognizant Chief Engineers and/or technical specialists is performed. Drawing control logs indicating current status of drawings and specifications are prepared monthly and distributed to responsible Project Engineering and Field personnel. Shop Inspectors are advised of current status of approved Vendor shop drawings. The Bechtel Quality Assurance Engineer monitors field engineering activities to verify that quality assurance requirements established by the Project Engineering Team are included in the field specifications and drawings and that field engineering changes are reviewed and approved by the Project Engineering Team.

7.0 Control of Purchased Material, Equipment and Services

The Bechtel Quality Assurance Program includes a comprehensive system to assure that all purchased material, equipment and services conform to the procurement documents. It provides for evaluation of Vendor's Quality Assurance Program and preparation of Procurement Specifications incorporating Quality Assurance requirements. The Quality Assurance requirements include an appropriate Vendor Quality Assurance Program, purchaser surveillance as required, Vendor preparation and maintenance of appropriate test and inspection records, certificates and other Quality Assurance documentation, and Vendor submittal of Quality Control records considered necessary for purchaser retention to verify quality of completed work.

Bechtel Shop Inspectors review and verify Vendor Quality Assurance records and prepare reports documenting Vendor data not submitted to purchaser. Where Bechtel shop inspection is performed, a final inspection of the finished item is carried out in Vendor's shop prior to release for shipment; Bechtel Field Procurement Procedures provide for receipt inspection by Material Supervisor on all materials and equipment delivered to the job site. For significant items or critical materials which form parts of Q-List systems, Bechtel Field Engineers carry out an independent receipt inspection and prepare receiving reports which supplement receiving reports required by standard Field Procurement Procedures.

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Procurement procedures require that conditions adverse to quality be promptly identified and reported to Bechtel. These include reports of significant failures, malfunctions, deficiencies, deviations, defective material, etc. Procedures to correct these problems are approved by Project Engineering.

Bechtel Procurement Procedures also provide for periodic audits of Vendor Quality Assurance activities as appropriate.

8.0 Identification and Control of Materials, Parts and Components

As applied to Vendors, appropriate requirements for identification and control of materials, parts and components will be established through review of Vendor's Quality Assurance Program and procedures agreed to prior to bid award. Bechtel Field Procedures and practices incorporate measures for material control, including segregation of non-conforming items, and/or marking and identification as required. Traceability will be accomplished where required by code, standard or specification. In other cases, measures such as physical separation or appropriate marking procedures are used to identify and control materials or components of specific type, specification, class, etc. Positive control of non-conforming items will be maintained by suitable markings and/or segregation.

9.0 Control of Special Processes

Use of qualified procedures and application thereof as required by established codes and standards will be rigidly enforced on all Bechtel Vendors, Subcontractors and Bechtel personnel. For other special processes identified by equipment suppliers or Project Engineering, procedures will be prepared by equipment suppliers, Project Engineering, or Field Engineering and approved by appropriate personnel in the organization which identified the process. Personnel performing such operations will be trained and carefully supervised by personnel familiar with the specific special process.

10.0 Inspection

Bechtel performs periodic and final inspection of Vendor work as described previously. This is normally performed by Shop Inspectors; however, in special cases engineering personnel participate in such inspections. Inspection practices normally include witnessing of significant tests, as appropriate, and requirements for Vendors to accept mandatory hold-points where, in the opinion of Bechtel Inspectors, work should not proceed without prior examination by the Bechtel Inspector.

For field operations, in-process and final inspection of activities affecting quality are carried out by Bechtel Field Engineers with knowledge of the discipline involved, project requirements and the inspection process. Field

inspection is carried out in accordance with guidelines and procedures contained in the Bechtel Field Inspections Manual, supplemented by approved procedures for special processes and specific project requirements. Field inspection operations are supervised by the Quality Control Engineer and monitored by the Quality Assurance Engineer. Reports or records of inspection operations are prepared by the Field Engineers/Inspectors, approved by the Quality Control Engineer and accepted and distributed by the Quality Assurance Engineer.

11.0 Test Control

Supplier and Subcontractor test operations including procedures as appropriate are reviewed in accordance with procurement procedures previously described.

In the field, certain test operations are carried out by Construction organization in the course of plant construction. Subsequent to completion of construction, the Bechtel Startup organization may be involved in system checkout and startup operations. Tests by Construction are normally performed in accordance with standard construction practice or via specific test procedures as specified by the Project Engineering Team.

12.0 Calibration of Measurement and Test Equipment

Vendor procedures for control of measurement and test equipment are reviewed as appropriate in evaluating the

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Vendor Quality Assurance Program. In the field, a written procedure is followed to provide control and periodic calibration of special tools, measuring and test equipment.

13.0 Handling, Storage, Shipping and Preservation

Special handling, storage, shipping and preservation requirements are identified in procurement specifications for Vendor's work. In the field, materials and equipment are stored in accordance with standard procedures as well as specific requirements and any special procedures issued by the Project Engineering Team. These are prepared by the field organization, approved by the Project Superintendent and reviewed by the Project Engineering Team.

14.0 Inspection, Tests and Operating Status

Records of inspections and tests are provided in the form of written inspection reports or other appropriate records for QA specified items which show inspection performed and results and clearly identify the item. Specific details for marking, tagging or otherwise indicating inspection and acceptance status depend upon the nature of the work performed. Standard procedures are provided in the Field Inspection Manual. Additional special procedures are developed as required.

15.0 Non-conforming Material, Parts or Components

The Bechtel Quality Assurance Program provides measures which control materials, parts or components not conforming to prescribed requirements to prevent their inadvertent use or installation. Materials are physically controlled in accordance with procedures described under Section 8.0. For non-conforming items which may be made usable through rework, repair or modification of requirements, reports are prepared and submitted to the Project Engineering Team for appropriate guidance. Records of resolution for these cases are prepared and incorporated in Quality Assurance files. Where rework, repair or approval for use is not feasible, non-conforming materials are either removed from the construction site or utilized in systems or structures where their characteristics satisfy requirements for such systems.

16.0 Corrective Action

The Bechtel Quality Assurance Program incorporates procedures for identification and reporting of situations which are deemed adverse to quality through preparation of "Significant Deviation Reports". These include reports of significant failures, malfunctions, deficiencies, deviations, defective material, etc. Routine occurrances of rework generally anticipated for the activity involved are not normally included in the corrective action program. These reports are prepared by either Project Field Engineering or the Quality Assurance Engineer

and reviewed by the Project Engineering Team and Engineering Specialists. These reports provide for documentation of findings and corrective measures taken.

Significant Deviation Reports are classified as Bechtel Confidential Information and will not be incorporated in Project Quality Assurance files. This policy is followed in order to permit free, factual reporting of all situations, some of which may involve personnel evaluations, etc. However, summaries of these reports will be incorporated in Project Quality Assurance records.

17.0 Quality Assurance Records

Copies of all reports described in the preceding sections, as prepared or obtained by Bechtel from Vendors and Subcontractors are collected in project Quality Assurance files, however, as noted in the preceding section, only summaries of "Significant Deviation Reports" are included in the Quality Assurance files. These files are available for audit by Applicant during the design and construction period and are turned over to the Applicant at the completion of the Bechtel contract. Detailed Bechtel Quality Assurance audit reports are not included in such files; however, summary records and conclusions will be made available.

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18.0 Audits

The Bechtel Quality Assurance Program includes four specific audit activities:

(a) Periodic audits of Project Engineering Activities and records are carried out by, or under the direction of, the Quality Assurance Coordinator.

(b) Bechtel Shop Inspectors carry out periodic audits of Vendor's Quality Assurance Program and records

(c) Quality Assurance Engineer carries out frequent audits of field inspection activities, Quality Assurance reports and QA/QC files.

(d) Periodic audits of field Quality Assurance and inspection activities are carried out under the direction of the Quality Assurance Coordinator.

All of the above audits are carried out on a sampling basis, periodically during the design and construction period. At the completion of construction for systems and structures subject to the Quality Assurance Program, a final inspection is performed on the work and associated Quality Assurance records to assure necessary inspections and records have been prepared and are on file. A final inspection report is prepared confirming this final examination and audit.

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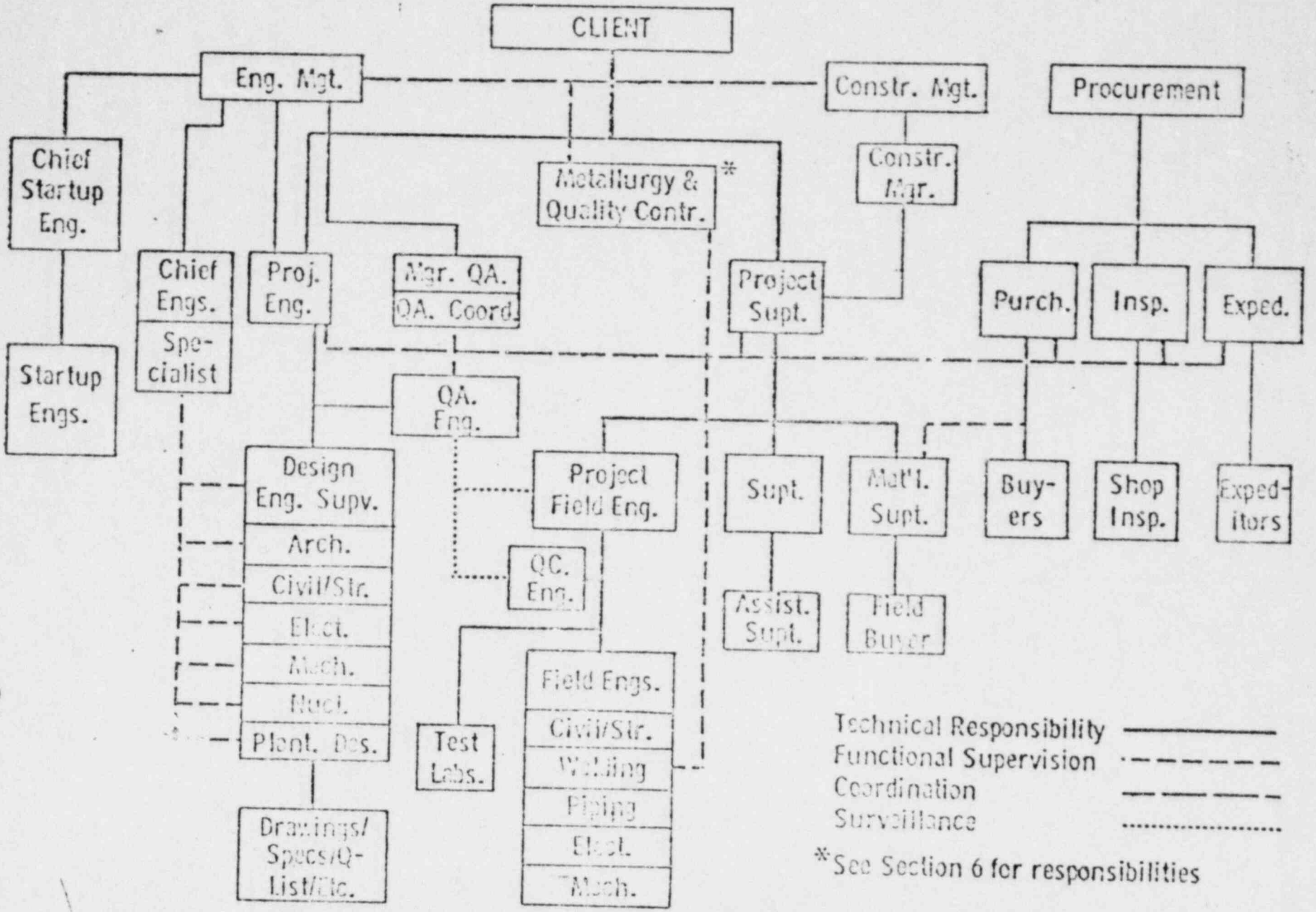

QUALITY ASSURANCE ORGANIZATION CHART

FIGURE A

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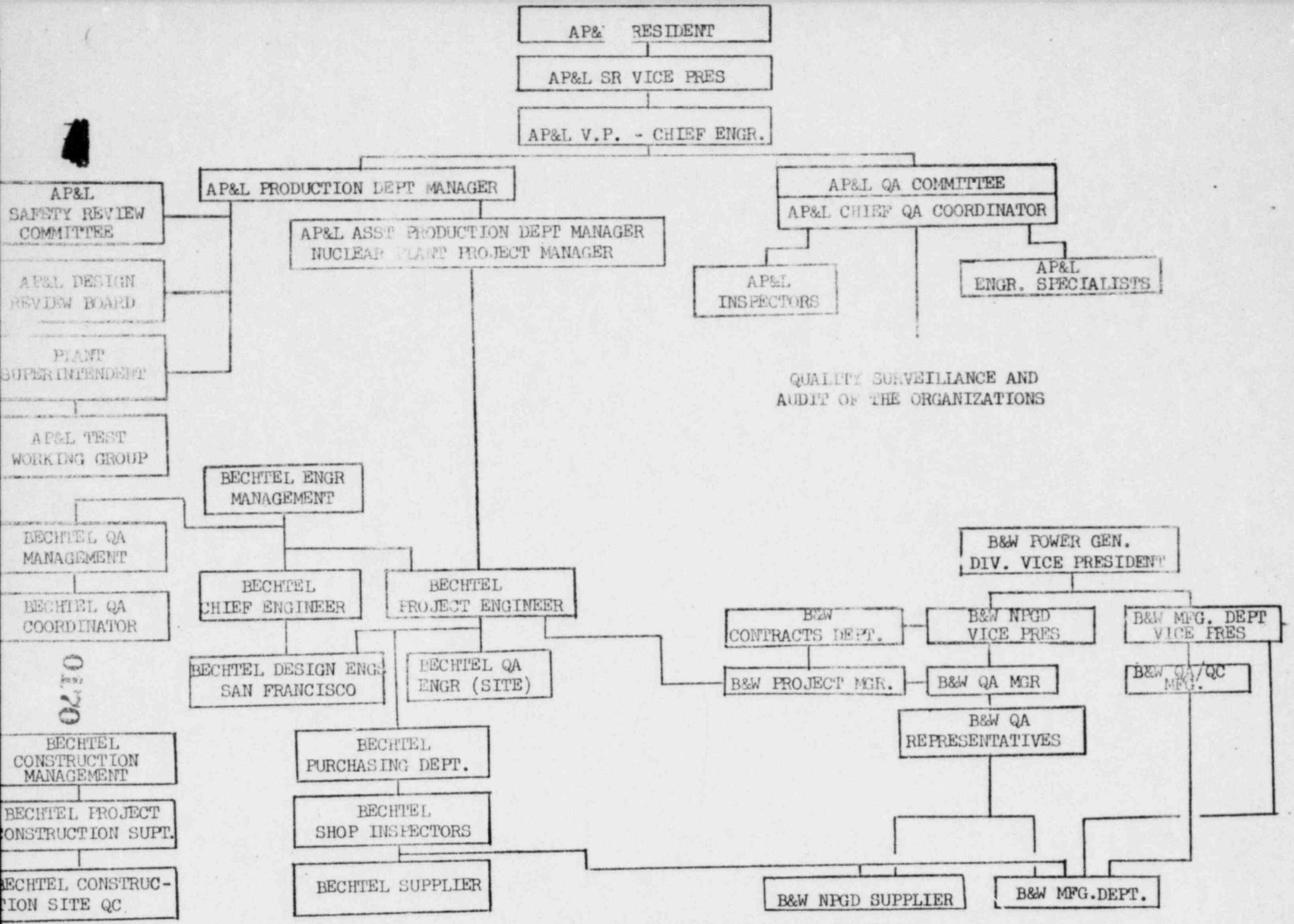

ARKANSAS NUCLEAR ONE QUALITY PROGRAM ORGANIZATION
FIG. 1

NCTIONAL ORGANIZATION CHART
WITH STOP WORK AUTHORITY
AND
QUALITY CONTROI IN VENDORS' SHOPS

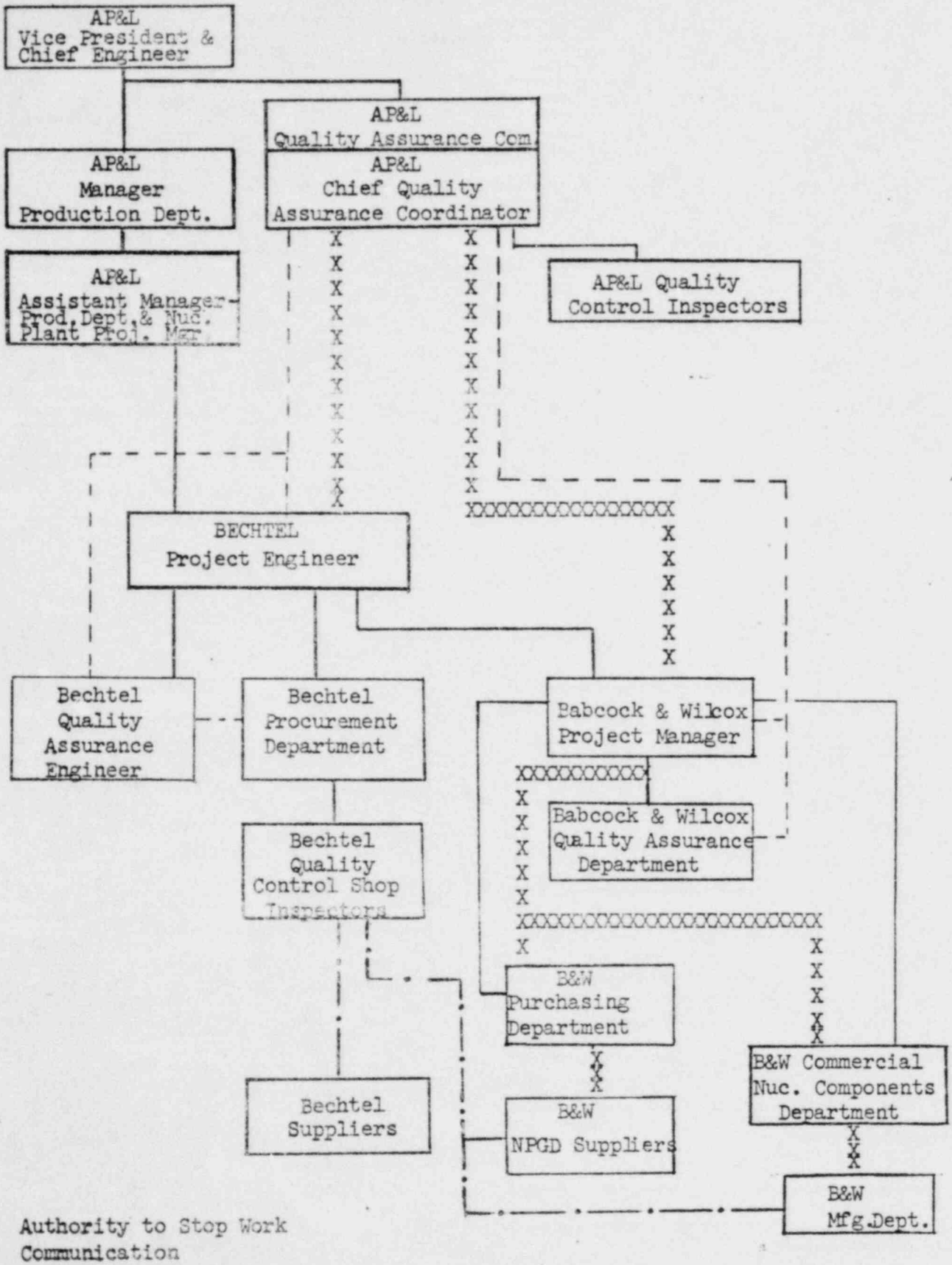

Figure 2

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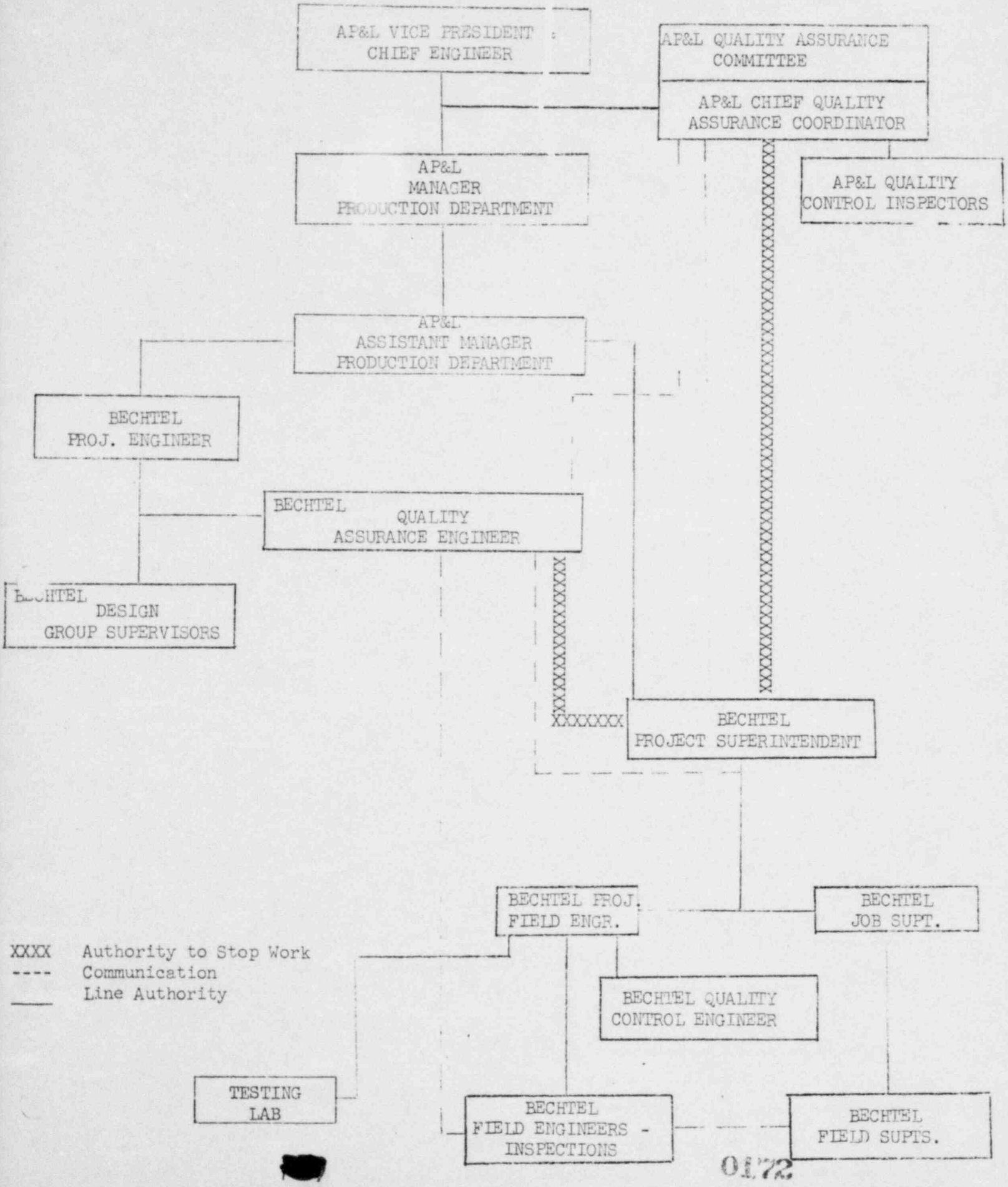
FUNCTIONAL ORGANIZATION CHART FOR QUALITY CONTROL AT THE PLANT SITE (INCLUDING STOP WORK AUTHORITY)



APPENDIX B

CLASS I STRUCTURES, SYSTEMS, AND COMPONENTS

(1) The following are Class I structures:

Reactor building.
Auxiliary building housing the engineered safeguards systems, control room and radioactive materials.
Diesel fuel storage facilities.
Enclosures for service water pumps and auxiliary cooling water pumps.
Supports for Class I system components.
Emergency reservoir and pipeline.

(2) The following are Class I systems and components:

Reactor vessel and internals including control rods and control rod drives.
Reactor coolant system components (steam generators, pressurizer, pumps, etc.) and piping.
Reactor building penetrations up to and including the first external isolation valve.
Main steam and main feedwater piping up to the first stop valves adjacent to steam generators.
Atmospheric dump and main steam safety valves and associated piping from main steam headers.
New and spent fuel storage racks and fuel handling equipment including the crane above fuel pool.
Motor-driven and steam-driven auxiliary feedwater pumps.
Emergency diesel generators including fuel supply.
Reactor building crane (unloaded condition).
Control boards, switchgear, load centers, batteries, transformers and cable runs serving Class I equipment.
Service water system.
Auxiliary cooling water pumps.
Intermediate cooling water system serving vital NSSS heat exchange equipment.
Reactor building spray system.
Reactor building air recirculation and cooling units.
Low pressure injection and decay heat removal system.
Core flooding tanks and piping.
High pressure injection pumps and piping.
Gaseous radioactive waste system.

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