
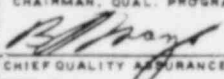


EBASCO SERVICES INCORPORATED		NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL	SECTION
APPROVAL	 CHAIRMAN, QUAL. PROGRAM COMM.  CHIEF QUALITY ASSURANCE ENGINEER		REVISION <u>10</u> R10 DATE <u>July 31, 1981</u> R10

## TABLE OF CONTENTS

Part I - General

<u>Section</u>	<u>Title</u>	<u>Rev. No.</u>	<u>Date</u>
QA-I-1	Quality Assurance Program	5	2/29/80
QA-I-2	Organization and Responsibilities	5	7/31/81 R10
QA-I-3	Personnel Indoctrination and Training Program in Quality Assurance	2	8/11/77
QA-I-4	Design Control	1	8/11/77
QA-I-5	Quality Assurance Evaluation of Suppliers/Contractors	2	7/31/81 R10
QA-I-6	Quality Assurance Records	0	3/14/75

Part II - Engineering Offices

<u>Section</u>	<u>Title</u>	<u>Rev. No.</u>	<u>Date</u>
QA-II-1	Instructions, Procedures & Drawings	2	3/4/81
QA-II-2	Document Control	2	3/4/81
QA-II-3	Procurement Document Control	0	3/14/75
QA-II-4	Purchasing	1	4/16/76
QA-II-5	Supplier Surveillance	2	3/4/81
QA-II-6	Nonconformances	1	8/11/77
QA-II-7	Corrective Action	1	2/29/80
QA-II-8	Control of Special Processes	2	3/4/81
QA-II-9	Quality Assurance Audits	3	7/31/81 R10

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  TABLE OF CONTENTS	SECTION
---------------------------------	-------------------------------------------------------------------	---------

Part III - Construction Site

<u>Section</u>	<u>Title</u>	<u>Rev. No.</u>	<u>Date</u>	
QA-III-1	Instructions, Procedures and Drawings	2	3/4/81	R9
QA-III-2	Document Control	2	3/4/81	R9
QA-III-3	Procurement Control	1	2/29/80	
QA-III-4	Construction Site Procurements	4	3/4/81	R9
QA-III-5	Supplier/Contractor Surveillance	3	3/4/81	R9
QA-III-6	Nonconformances	2	3/4/81	R9
QA-III-7	Corrective Action	2	3/4/81	R9
QA-III-8	Control of Special Processes	1	2/29/80	
QA-III-9	Quality Assurance Audits	1	2/29/80	
QA-III-10	Identification and Control of Items	1	2/29/80	
QA-III-11	Inspection	2	3/4/81	R9
QA-III-12	Test Control	1	2/29/80	
QA-III-13	Control of Measuring and Testing Equipment	2	10/20/78	
QA-III-14	Control of Receiving, Handling and Storage	2	3/4/81	R9
QA-III-15	Inspection, Test and Operating Status	1	2/29/80	
Appendix I	Terms and Definitions	1	9/30/76	
Appendix II	Ebasco Positions on U S Nuclear Regulatory Commission Regulatory Guides		10/20/78	

EBASCO SERVICES INCORPORATED		NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL	SECTION
			QA-I-2
APPROVAL	<i>B. E. Tey</i> CHAIRMAN, QUAL. PROGRAM COMM.	ORGANIZATION AND RESPONSIBILITIES	REVISION 5
	<i>[Signature]</i> CHIEF QUALITY ASSURANCE ENGINEER		DATE July 31, 1981

R5

R5

## 1.0 SCOPE

This section of the Manual describes the organizational structure, functional responsibilities, levels of authority and lines of internal and external communication for management, direction and execution of the Ebasco Quality Program. It is recognized that quality assurance is an interdisciplinary function and not the sole domain of a single quality assurance group; for that reason, this section of the Manual includes organizational and functional descriptions of several departments in addition to that department whose sole function is quality assurance.

## 2.0 GENERAL

2.1 The Ebasco Operations organization consists of four independent quality-related principal divisions headed respectively by the Senior Vice Presidents of Engineering and Construction, Consulting Engineering and Projects and Procurement, and the Vice President Materials Engineering and Quality Assurance. Each of these officers of the company report to Ebasco's President and Chief Executive Officer through the Executive Vice President Operations. Reporting to the Senior Vice President Engineering and Construction are the Vice President Engineering and Vice President Construction. Reporting to the Senior Vice President Consulting Engineering are the President of Envirosphere Company, the Vice President Plant Operations and Betterment and the Vice President Consulting Engineering. Reporting to the Senior Vice President Projects and Procurement is the Vice President Procurement.

A fifth quality-related principal division is headed by the Executive Vice President of Advanced Technology and Special Projects who reports directly to Ebasco's President. Reporting to the Executive Vice President Advanced Technology and Special Projects is the Vice President Advanced Technology.

2.2 Representatives of Senior Vice President Projects and Procurement; of the Vice Presidents Engineering, Construction, Procurement, Plant Operations and Betterment, Consulting Engineering, and Materials Engineering and Quality Assurance; and of the President of Envirosphere Company comprise the operations organization representatives of the Quality Program Committee, which is responsible for Ebasco Quality Assurance policy. Also included on this Committee is a representative of the Vice President Advanced Technology. This is shown diagrammatically by Figure I-2.1 at the end of this section.

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

2.3 The divisions or departments most directly involved in the implementation of the quality assurance program for design, engineering, fabrication, and installation are Materials Engineering and Quality Assurance, Engineering, Construction, and Procurement. The organizational structures of these are shown on Figure I-2.2, I-2.3, I-2.4 and I-2.5 at the end of this section. The Projects Department provides overall contractual administration of a project, coordinating the efforts of involved departments and serving as a line of communication between Ebasco and its Clients. The Consulting Engineering, Plant Operations and Betterment, and Advanced Technology Departments are involved in the implementation of Quality Program requirements through the supplemental services they provide.

The responsibilities of each department of the Ebasco Organization for quality assurance requirements applied to Nuclear Power Stations are described herein.

### 3.0 MATERIALS ENGINEERING AND QUALITY ASSURANCE

3.1 Primary responsibility for Quality Assurance rests with the Vice President Materials Engineering and Quality Assurance who reports directly to the Executive Vice President Operations. Qualification requirements for the position of Vice President Materials Engineering and Quality Assurance are: Bachelor of Science Degree in Engineering; 10 to 15 years of experience in quality related work or equivalent experience in the engineering or construction of a nuclear power plant, including at least 10 years experience in responsible managerial project positions; thorough knowledge of the Ebasco Quality Assurance Program. The Materials Engineering and Quality Assurance Unit is comprised of the following organizations, each of which contributes directly to the implementation of the Quality Program (see Figure I-2.2): R5

- a) Quality Assurance Engineering
- b) Materials Application
- c) Vendor Quality Assurance
- d) Consulting Quality Assurance Engineer
- e) Materials Engineering Laboratory

3.1.1 Quality Assurance Engineering is administered by the Chief Quality Assurance Engineer who reports to the Vice President Materials Engineering and Quality Assurance. Qualification requirements for the position of Chief Quality Assurance Engineer are: Bachelor of Science Degree in Engineering; 10-15 years of experience in quality-related work or equivalent experience in the engineering or construction of a Nuclear Power Plant, including at least 5 years experience in responsible managerial project positions; thorough knowledge of the Ebasco Quality Assurance Program. The Quality Assurance Engineering Department is responsible to plan implementation of, evaluate, monitor and



EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

enforce the Ebasco Quality Program. This responsibility is carried out by five functional subdivisions:

- (a) Project Quality Assurance Engineering
- (b) Site Quality Assurance/Quality Control
- (c) Site Quality Program
- (d) Quality Assurance Specialists which provide various other quality-related services and functions
- (e) Nondestructive Examination (NDE) Quality Assurance

R4

Managers, Supervisors and Specialists in charge of the subdivisions report directly or through other supervisors to the Chief Quality Assurance Engineer. Engineers and Specialists are then assigned to specific projects from these subdivisions. The Quality Assurance Engineering Organization is shown in Figures I-2.6 and I-2.7.

3.1.1.1 Project Quality Assurance Engineering - A Project Quality Assurance Engineer (PQAE) is assigned to each Nuclear Project to plan, coordinate and oversee the implementation of the Quality Assurance Program for that particular project. This PQAE, who reports to a Project Quality Assurance Engineering Supervisor, coordinates the Quality Assurance implementation efforts of Materials Engineering and Quality Assurance personnel (quality assurance engineers, materials engineers, welding engineers, nondestructive examination specialists, vendor quality assurance representatives and site quality assurance personnel assigned to his project).

R4

The PQAE has the authority and responsibility to identify quality related problems, to initiate or recommend solutions, to control existing nonconformances until properly dispositioned, and to verify implementation of approved dispositions. Principal tasks performed by the PQAE and those assisting include:

- (a) Review Ebasco specifications and drawings for inclusion of quality assurance requirements
- (b) Evaluate quality assurance programs of suppliers
- (c) Prepare quality assurance plans for the surveillance of activities in suppliers' shops
- (d) Review or coordinate the review of suppliers' nondestructive examination and test procedures
- (e) Conduct audits of Site Quality Assurance and Vendor Quality Assurance personnel, as applicable.

R4

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

- (f) Direct efforts to obtain ASME Certificates of Authorization for Ebasco as may be required for the particular project
- (g) Represent Ebasco Quality Assurance Engineering with regard to all project-related activities, such as Owner, Ebasco and/or Vendor Meetings, Owner audits and management audits
- (h) Distribute and control quality assurance manuals, as well as changes thereto, for the assigned project

3.1.1.2 Site Quality Assurance - The Manager Site Quality Assurance, who reports to the Chief Quality Assurance Engineer in New York, is responsible for the direction, supervision, and administration of site quality assurance/quality control operations at those nuclear construction sites where a Quality Program Site Manager is not assigned. The Manager Site Quality Assurance is responsible for the development, maintenance and current status of Site Quality Assurance Engineering Procedures, and for providing technical assistance and guidance to subordinate Quality Assurance Engineering Site Supervisors and staff. (See Fig. I-2.2 and Fig. I-2.6). In addition, he is responsible for the review and acceptance of Quality Control procedures.

R4

R4

3.1.1.3 Site Quality Program - A Quality Program Site Manager is assigned to each nuclear project construction site on a resident basis for the purpose of overall planning, direction and implementation of the Ebasco Nuclear Quality Program Manual. The Quality Program Site Manager who reports to the Chief Quality Assurance Engineer in New York, is subordinate to no individual on site and has the independent authority to identify site quality related problems, to initiate or recommend solutions, to control existing nonconformances, to verify implementation of approved dispositions, and when necessary, to stop work. He is responsible to assure that all personnel working for him are qualified for their respective positions and properly trained. The Site Quality Program function is divided into three groups: Quality Assurance Engineering, Quality Control and Quality Records, each reporting through a respective supervisor to the Quality Program Site Manager. (See Fig. I-2.6)

R4

3.1.1.3.1 Site Quality Assurance Engineering: A Quality Assurance Site Supervisor and staff of engineers and representatives are assigned the following functions:

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

- (a) Review and audit quality related site construction and engineering activities and records on a continuing basis
- (b) Audit construction forces for adherence to prescribed approved procedures
- (c) Review and/or coordinate review of site suppliers' fabrication and test procedures
- (d) Review site-generated purchase orders for inclusion of quality assurance requirements
- (e) Review and advise on Quality Control Procedures for compliance with this Manual and code and regulatory requirements. When necessary, the Quality Assurance Site Supervisor may request the PQAE to assist in the review of these procedures
- (f) Maintain records of all reviews and audits performed
- (g) Review all radiographic film for site-related nondestructive examination
- (h) Audit final records and documentation prior to turn over to the Client

3.1.1.3.2 Site Quality Control - A Quality Control Site Supervisor and staff of engineers and inspectors are assigned the following functions consistent with the scope of work assigned to Ebasco:

- (a) Planning and performance of inspection activities during the construction phase.
- (b) Identifying and initiating correction of nonconforming conditions to requirements indicated by drawings, specifications, codes or procedures and performance of reinspection to verify corrective action taken

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

- (c) Establishing and enforcing quality control documentation and inspection requirements based upon specifications, codes, standards, and drawings as established by Engineering
- (d) Performance or monitoring of site NDE, soils and concrete testing activities
- (e) Assisting in organizing and administering training seminars as required to assure proper level of training and engaging in the certification of Quality Control personnel to the required level of qualification
- (f) Identification and control of the quality status of items
- (g) Development and implementation of applicable Quality Control Plans, and generation of inspection reports covering mandatory inspection activities at the construction site

The Site Quality Control Group will only be responsible for first-level Quality Control activities for safety-related items and services being performed by Ebasco's forces. For work being performed by Contractors, the Contractors will be responsible for first-level Quality Control activities.

3.1.1.3.3 Site Quality Records - A Quality Records Supervisor and staff of specialists are assigned the following functions:

- (a) Develop, establish and implement a system for the collection, storage and maintenance of Quality Assurance Records at the project construction site
- (b) Responsible for review for completeness, control, storage, preservation and safekeeping of vendor, contractor and site generated quality assurance records

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

- (c) Establishment and implementation of a records indexing system to permit proper traceability and retrieval
- (d) Establishment of a procedure for access to the records storage area, and removal and retrieval of quality records

3.1.1.4 Quality Assurance Specialists - Quality Assurance Engineering has several specialty groups responsible for the following activities which are performed in accordance with QA procedures:

- (a) Performance of Inservice Inspection R4
- (b) Qualification and certification of personnel as required by applicable codes or standards
- (c) Development of Quality Assurance standards and procedures
- (d) Review, evaluation and summarization of Code and Regulatory Quality Assurance Requirements
- (e) Evaluation of suppliers' Quality Assurance Program
- (f) Conducting Quality Assurance education, both internal and external to Quality Assurance Engineering R4
- (g) Interdepartmental auditing of all individuals or groups responsible for activities covered by the Quality Program R4
- (h) Development of Quality Assurance Records Programs ,  
,  
R4
- (i) Development of Quality Assurance Programs for Power Plant Operations ,  
,  
R4

3.1.1.5 Nondestructive Examination Quality Assurance:  
This group, under the Assistant Chief Quality Assurance Engineer in charge of Inservice Inspection and Nondestructive Examination provides expertise with regard to conducting various forms of NDE and includes the following functions: R4

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

- (a) Establish and/or interpret NDE requirements and acceptance criteria for fabricated and erected equipment as required
- (b) Review and comment on NDE procedures and radiographic films submitted by manufacturers, site construction forces and/or clients
- (c) Advise manufacturer and site construction forces as to proper NDE procedures, applications, techniques, equipment and qualifications

3.1.1.6 Radiation Safety - Ebasco's Corporate Radiation Safety Officer reports to the Chief Quality Assurance Engineer. He is responsible for auditing and enforcing the Ebasco procedures for radiation safety.

3.1.2 Materials Applications, under the supervision of the Chief Materials Engineer, includes two subdivisions: Materials Engineering and Welding Engineering. A Project Materials Engineer and Project Welding Engineer are assigned to each project. These positions may be assigned to the same individual if properly qualified. Quality-related activities of Materials Applications personnel include the following:

- (a) Develop material and welding specifications
- (b) Develop and qualify welding procedures and fabrication techniques for use by Ebasco site construction forces, engineered equipment suppliers and erectors.
- (c) Advise Ebasco Construction Management as to the development and application of advanced welding techniques which would enhance quality.
- (d) Review Ebasco specifications and drawings for compliance with applicable codes and regulatory requirements for proper selection of materials, weld procedures and joint details
- (e) Review suppliers' material specification and fabrication procedures for compliance with project specifications and codes
- (f) Assist in welder performance testing to assure that all code and regulatory requirements have been met.
- (g) Participate in quality assurance evaluations of suppliers in the area of welding, materials and fabrication

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL ORGANIZATION AND RESPONSIBILITIES	SECTION QA-I-2
---------------------------------	-------------------------------------------------------------------------------	-------------------

- (h) Provide technical assistance as required to resolve problems in suppliers' shops and at the construction site in the areas of welding, materials, heat treatment and other related areas.
- (i) Provide technical assistance concerning material properties under service conditions involving stress, radiation, temperature, corrosive media, etc., to determine capability of specific materials to perform in such environments.

3.1.3 Vendor Quality Assurance is administered by the Chief Vendor Quality Assurance Representative who reports to the Vice President Materials Engineering and Quality Assurance. The primary function of this department is to establish and maintain confidence that purchase order and documented Quality Assurance Program requirements are complied with during fabrication in Suppliers' shops and in those of their subsuppliers, and to document results of shop surveillance visits made to carry out this function. Specific details of this department's responsibilities are included in Section QA-II-5 of this Manual.

3.1.4 The Consulting Quality Assurance Engineer reports to the Vice President Materials Engineering and Quality Assurance. He is responsible for conducting audits of the Ebasco Quality Assurance function to determine and report its compliance with the Ebasco Quality Program requirements.

3.1.5 The Materials Engineering Laboratory performs field non-destructive examination, and soils, concrete and reinforcing steel testing services at construction sites, as applicable. The Laboratory is administered by a Manager who reports to the Vice President Materials Engineering and Quality Assurance.

#### 4.0 ENGINEERING

Primary responsibility for design and engineering rests with the Vice-President of Engineering (see Figure I-2.3).

4.1 Chief Engineers of the various engineering disciplines report directly to the Vice-President of Engineering, and are responsible for technical and administrative aspects of the engineering and design phases of their disciplines.

R5  
R5

4.2 A Project Engineer is assigned to each Nuclear Project. Project Engineers lead and coordinate the various technical functions performed in connection with their projects and assure that the requirements of Section QA-I-4 of this Manual relating to engineering are implemented.



EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

4.3 A Lead Discipline Engineer from each engineering discipline is responsible for project commitments to the Project Engineer and is technically responsible to a Supervising Engineer, who reports to an Assistant Chief Engineer or to a Director, who in turn reports to a discipline Chief Engineer. One Lead Discipline Engineer from each engineering discipline is continuously assigned to each nuclear project. Additional engineers are assigned to assist the Lead Discipline Engineer, as needed. R5

4.4 Design Supervisors report to a Group Supervisor or Supervising Design Engineer who reports to a Division Chief, who reports to the Chief Engineer. Design Supervisors supervise the work of draftsmen and designers in the preparations of drawings. R5

4.5 The Engineering Department is responsible for performance of the following activities in accordance with approved written instructions and/or procedures:

- (a) Preparing equipment specifications and drawings as well as revisions thereto in accordance with the requirements of Section QA-I-4 of this Manual
- (b) Providing stress analyses of piping systems
- (c) Reviewing bids to determine whether specifications are met technically
- (d) Evaluating Bidders' and Suppliers' deviations and/or proposed alternatives
- (e) Reviewing Suppliers' drawings or other Suppliers' design criteria in accordance with specification requirements.

4.6 Primary responsibility for stress analysis of piping systems rests with the Vice-president of Engineering as administered by the Chief Engineer Mechanical

4.6.1 Engineers in the Stress Analysis Department report to the Assistant Chief Engineer, Applied Mechanics, who in turn reports to the Chief Mechanical Engineer. R5

4.6.2 The Stress Analysis Department is responsible for the calculation of stresses in piping systems to assure full compliance with applicable codes and to assure full compliance with regulatory requirements as contained in licensing documentation and applicable NRC Rules and Regulations. R5

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL ORGANIZATION AND RESPONSIBILITIES	SECTION QA-I-2
---------------------------------	-------------------------------------------------------------------------------	-------------------

4.7 Primary responsibility for engineering standards and procedures rests with the Vice-President of Engineering. The Standards and Procedures Department is responsible for administrative control of Ebasco's Standard Specifications (i.e., materials specifications, engineering specifications), Design Guides, and Engineering Department Guides.

4.7.1 Engineers in the Standards and Procedures Department report to the Manager - Standards and Procedures who in turn reports to the Vice-President of Engineering.

4.7.2 Engineers performing the specific functions in this department are responsible for coordinating the technical input from the responsible engineering disciplines.

4.7.3 The Standards and Procedures Department is responsible for obtaining and documenting approvals for the initial issues and all subsequent revised issues of the Ebasco Standard Specifications. Administrative control of the specifications is maintained by this department with an up-to-date index (reissued once every three months) listing the latest issue of each specification.

4.7.4 Administrative control of Ebasco Engineering and Design Guides is performed in the Standards and Procedures Department. Technical input is performed by the responsible engineering disciplines, while the issuance and control of distribution of the Design Guides and Engineering department Guides are performed in the Standards and Procedures Department. Administrative control is maintained by means of an up-to-date index for each numbered Manual which dates each guide on the index as revisions are issued. Records are maintained to substantiate internal review and approval required for each document.

R4

4.7.5 The Standards and Procedures Department is responsible for the coordination of preparation and control of departmental implementing procedures.

## 5.0 CONSTRUCTION

Primary responsibility for construction rests with the Vice-President of Construction (see Figure I-2.4). The Construction Department has the prime responsibility for the performance of quality construction.

5.1 Construction Managers report to the Vice-President of Construction and are responsible for overall supervision and coordination of all construction activities and services.

5.2 The Manager of Construction Services reports to the Vice-President of Construction and is responsible for general supervision of Construction Department Quality Program activities and of the Construction Engineering Group.

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

5.2.1 The Manager of Quality Control, reporting to the Manager of Construction Services, is responsible for development of Quality Control Standard Procedures and Construction Department Standard Procedures, coordination and direction of training and qualification of personnel, keeping abreast of NRC and all Code requirements and periodic reporting to Construction Department Management of current Quality Program status and any required corrective actions.

5.2.2 The Manager of Construction Engineering reports to the Manager of Construction Services and is responsible for the inclusion of quality requirements in Construction Contracts and review of Engineered Documents as required by the Quality Assurance Program Manual. (All construction contracts involving safety-related equipment are subject to review by the Quality Assurance Engineering Department for compliance with the applicable code and regulatory agency requirements and Quality Assurance Program requirements).

5.3 For individual projects, the Site Manager reports to a Construction Manager and has the responsibility for direction and coordination of all on-site activities associated with the construction of the plant.

5.4 The Project Superintendent reports to the Site Manager and is responsible for performing general site supervision of construction in accordance with drawings, specifications and contractual obligations.

5.5 The Construction Superintendent reports to the Project Superintendent and has the responsibility of assuring that jobsite fabrication and installation is in accordance with drawings, specifications and other prevailing documents.

5.6 Area Superintendents report to the Project Superintendent and are responsible for area planning and scheduling, area construction control and is responsible for all phases of field office and field engineering.

5.7 The Senior Resident Engineer reports to the Project Superintendent and is responsible for all phases of field office and field engineering.

5.8 The Administration Manager reports to the Site Manager, and is responsible for management of site office services, including purchasing, materials administration, data processing and accounting.

5.9 The Purchasing Administrator reports to the Administration Manager and is responsible for the issuance and control of purchasing documents between vendors and personnel at the jobsite.

5.10 The Material Administrator reports to the Administration Manager and is responsible for commercial receiving inspection, storage and issue of materials at the site.

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

## 6.0 ENVIROSPHERE COMPANY

Primary responsibility for nuclear licensing and environmental matters rests with the President and Chief Executive Officer of Envirosphere Company.

6.1 Nuclear Licensing - Nuclear Licensing is administered by the Manager Nuclear Licensing who reports to the Vice President Envirosphere, who in turn reports to the President of Envirosphere. Each nuclear project is assigned a Project Licensing Engineer who reports to the Manager Nuclear Licensing through a Nuclear Licensing Supervisor. Nuclear Licensing is responsible for performing the following in accordance with approved written instructions and/or procedures:

- a) Establishing the guidelines for the identification and classification of structures, systems and equipment important to safety
- b) Preparation of safety design bases and criteria for structures, systems and equipment important to safety
- c) Overall coordination and review of preparation of safety analysis reports, amendments and other licensing documents as well as control of distribution thereof
- d) Advising engineering as to the acceptability of implementation of design bases and criteria as contained in drawings and specifications
- e) Review and interpretation of regulatory agency requirements and advising Engineering of same
- f) Establish and maintain records of the generation and approval of licensing documents including revisions thereto

6.2 Nuclear Safety Review - Nuclear safety review is administered by the Manager Nuclear Licensing, who reports to the Vice President Envirosphere, who in turn reports to the President of Envirosphere. Each nuclear project is assigned a Project Licensing Engineer who is responsible for implementation of safety review activities. He directs the activities of the licensing engineers assigned to the project in performing safety review. Nuclear licensing is responsible for performing the following safety review activities in accordance with approved written instructions and or procedures.

- a) Safety review of selected drawings and specifications (see Section QA-I-4) to assure compliance with NRC Regulations, SAR and the intent of applicable Regulatory Guides.
- b) Interpreting safety design bases and criteria for structures, systems and components important to nuclear safety
- c) Establishing and maintaining records substantiating (a) and (b) above.

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

6.3 For environmental matters, the responsible Envirosphere Vice Presidents report to the President of Envirosphere Company, who in turn reports to the Senior Vice President Consulting Engineering. They are responsible for providing Environmental Consultation services of their respective departments as the need arises.

R4

## 7.0 CONSULTING ENGINEERING

Primary responsibility for consulting engineering rests with the Vice-President Consulting Engineering. For environmental matters, primary responsibility rests with the President of Envirosphere Company.

R4  
R4  
R4

7.1 Chief Consulting Engineers of the various engineering disciplines report directly to the Vice-President Consulting Engineering and are responsible for consultation provided by their respective disciplines

R4

7.2 Consulting Engineers, who report to the Chief Consulting Engineers of their respective disciplines are assigned to nuclear projects to provide consulting services as the need arises.

R4

7.3 The Consulting Engineering Department works with the Engineering Department in the development of new concepts relating to engineering and design criteria, equipment specifications, plant cycles and equipment arrangements and assists the Engineering Department in the resolution of special problems. Such activities are to be performed in accordance with Section QA-I-4 of the Manual.

R4

## 8.0 PROJECTS

R4

Primary responsibility for project administration rests with the Senior Vice-President Projects and Procurement:

8.1 Managers of Projects report to the Senior Vice President Projects and Procurement and are responsible for overall supervision of the various projects.

R4

8.2 Each nuclear project is assigned a Project Manager who reports to a Manager of Projects. A "project team" consisting of a Project Engineer, Project Superintendent and other assigned engineers and representatives from each discipline as appropriate is assembled for each project. The overall coordination of the activities of this team is the responsibility of the Project Manager.

R4

8.3 The Project Manager maintains close liaison with the Project QA Engineering in order to assure that contractual quality assurance requirements are satisfied.

R4



EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL ORGANIZATION AND RESPONSIBILITIES	SECTION QA-I-2
---------------------------------	-------------------------------------------------------------------------------	-------------------

8.4 The Project Manager is the prime point of contact between Ebasco and the Client. However, the project Quality Assurance Engineer has the right of establishing independent lines of communication regarding quality assurance with the client and suppliers, while keeping the Project Manager ( and Purchasing, in the case of suppliers) apprised of any such contacts.

R5

8.5 The Project Manager is responsible for establishing, at the earliest possible point, the Project Distribution Schedule. This is a complete listing of the various forms of communication such as letters, purchase orders and reports, as well as all of the various organizations, both internal and external to Ebasco. The Project Distribution Schedule is a matrix which provides a uniform distribution system for the overall project in order to assure an orderly, consistent flow of communication. A sample of the Project Distribution Schedule is provided at the end of this section as Figure I-2.8.

#### 9.0 PLANT OPERATIONS AND BETTERMENT

Primary responsibility for operational engineering for equipment systems and total plant rests with the Vice-President Plant Operations and Betterment.

9.1 The Chief Engineer of Operations Engineering, the Manager of Reliability Engineering, and the Director of Engineering and Construction Retrofit Services report directly to the Vice-President Plant Operations and Betterment and are responsible for technical and administrative aspects of the respective groups.

9.2 Lead Engineers from each group, who report to their Director or an intermediate Supervisor, are assigned to nuclear projects as required.

9.3 Operations Engineering Group provides engineers for consulting and advising on starting and testing of nuclear power plants, writing pre-operational test procedures, review of plant design and resolving equipment and system operating problems.

#### 10.0 PURCHASING AND TRAFFIC

Primary responsibility for purchasing and traffic by the Ebasco Engineering Office rests with the Vice-President of Procurement.

10.1 Project Procurement Supervisors report to the Director of Purchasing through the Purchasing Agents and the Manager of Project Purchasing. The Director of Purchasing is responsible to the Vice President of Procurement. Contract Administrators and Buyers, who report to the Project Procurement Supervisors, are responsible for the phases of purchasing to which they are assigned.

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL ORGANIZATION AND RESPONSIBILITIES	SECTION QA-I-2
---------------------------------	-------------------------------------------------------------------------------	-------------------

10.2 The Purchasing Department is responsible for the following: R4

10.2.1 Obtaining prequalification quality assurance information from prospective Bidders. R4

10.2.2 Transmitting technical and quality assurance requirements to qualified prospective Bidders by inquiry. R4

10.3 The Manager of Traffic and Freight Forwarding reports to the Vice-President of Procurement and is responsible for the overall transportation activities, project related, and purchased equipment from vendors' plants to jobsite as required under contract provisions. R4

#### 11.0 ADVANCED TECHNOLOGY

Primary responsibility for Advanced Technology rests with the Vice President Advanced Technology. R4

11.1 Chemical Engineering Group - The Chemical Engineering Group is administered by the Chief Engineer - Chemical Engineering who reports to the Vice-President Advanced Technology. The Chemical Engineering Group has the prime responsibility for Radwaste design engineering on all nuclear and fossil plants.

- (a) Engineers performing Radwaste services are technically responsible to Radwaste Supervisors. These Supervisors report to the Chief Engineer-Chemical Engineering.
- (b) Lead Discipline Radwaste Engineers are assigned to each nuclear project. Additional Engineers are assigned to assist the Lead Discipline Engineer as required
- (c) The Chemical Engineering Group is responsible for performance of the following in accordance with approved instructions and/or procedures:
  - (1) Preparing Radwaste process system designs, piping and instrumentation flow diagrams, applicable safety analysis reports and environmental reports sections, general arrangements, equipment and systems specifications in accordance with the requirements of Section QA-I-4 of this Manual R4
  - (2) Reviewing vendor proposals to determine whether they meet technical requirements of the specifications
  - (3) Evaluating bidder's deviations and/or proposed alternatives
  - (4) Reviewing supplier's drawings or other design criteria in accordance with specification requirements



EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

- (5) Establishing and maintaining records substantiating (1), (2), (3), and (4) above

11.2 Applied Physics - Applied Physics is administered by the Chief Engineer-Applied Physics who reports to the Vice-President Advanced Technology. The Applied Physics Section has the prime responsibility for containment analysis, shielding physics and radiation criteria for design.

- (a) Engineers in the Applied Physics Section report to the Supervising Engineers, who in turn report to the Chief Engineer-Applied Physics.
- (b) Applied Physics is responsible for performance of the following in accordance with written approved instructions and/or procedures:
- (1) Developing design criteria for reactor containment pressure and temperature transient analysis
  - (2) Developing shielding design criteria
  - (3) Developing radiation effects analysis and radiation monitoring criteria; preparing purchase specifications and evaluating bids for radiation monitoring equipment
  - (4) Providing support services to other departments by analyzing and developing modes for special problems, such as jet forces and pipe whip
  - (5) Establishing and maintaining records substantiating (1), (2), (3), and (4) above.

11.3 Nuclear Engineering - Nuclear Engineering is administered by the Chief Engineer - Nuclear Engineering who reports to the Vice President Advanced Technology. The Nuclear Engineering Department has the prime responsibility for engineering and management services for the nuclear fuel cycle, and for nuclear plant engineering analyses associated with fuel handling, storage, and reactor in-core operation.

- (a) Engineers in the Nuclear Engineering Section report to the Supervising Engineer, who reports to the Assistant Chief Engineer Nuclear Engineering, who in turn reports to the Chief Engineer-Nuclear Engineering.
- (b) The Nuclear Engineering Section is responsible for performance of the following:
- (1) Determining spent fuel fission product decay heat release rates for spent fuel pool cooling system sizing, spent fuel storage rack design, and pool heat-up calculations
  - (2) Developing spent fuel storage rack design criteria; preparing purchase specifications and evaluating bids for spent fuel racks

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  ORGANIZATION AND RESPONSIBILITIES	SECTION  QA-I-2
---------------------------------	-----------------------------------------------------------------------------------	-----------------------

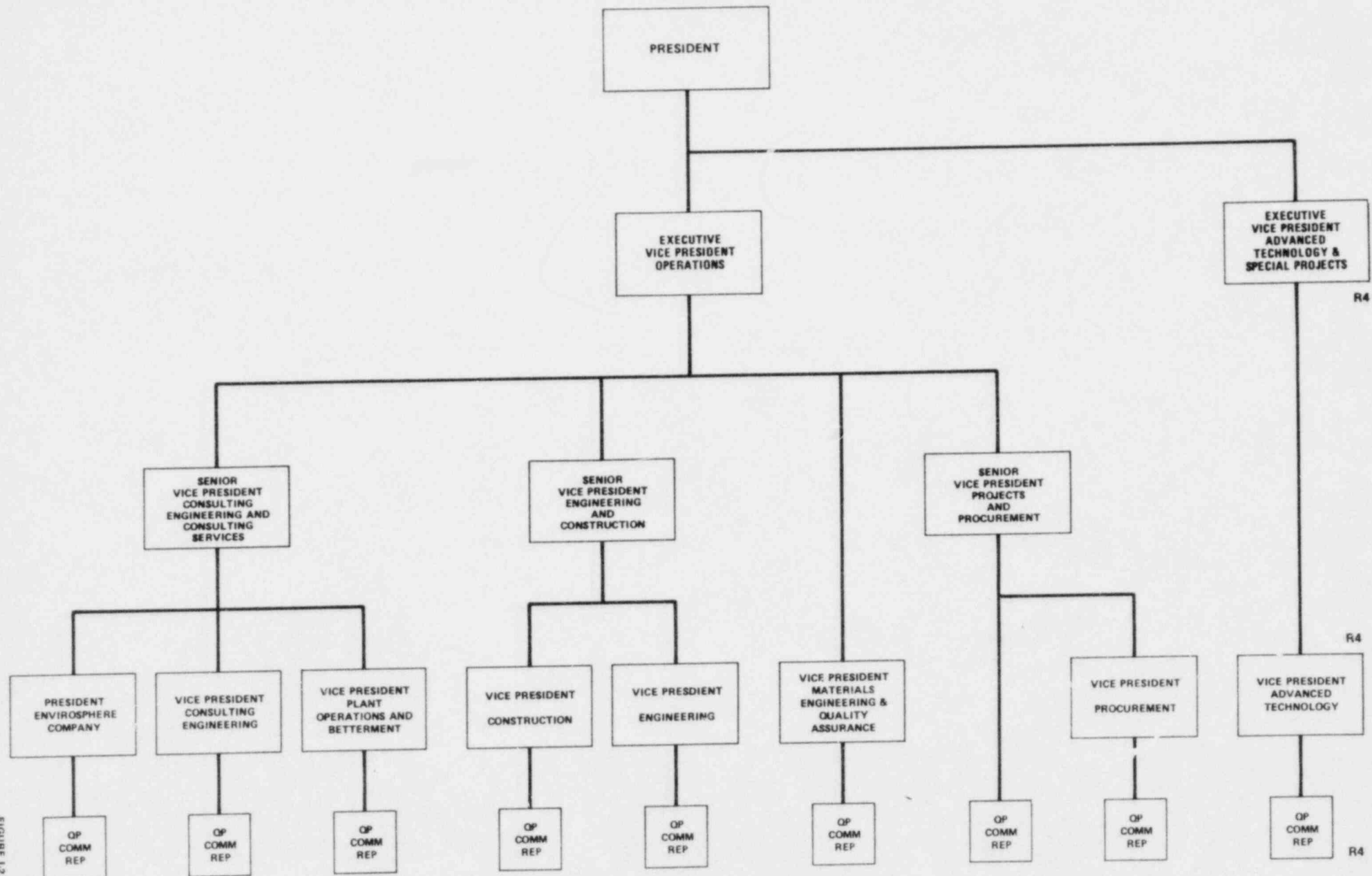
- (3) Providing support services to other departments on spent fuel rack interfacing systems, such as spent fuel handling machine requirements
- (4) Preparing and reviewing sections of Safety Analysis Reports pertaining to spent fuel storage racks and interfacing systems
- (5) Developing nuclear criticality analyses
- (6) Obtaining nuclear fuel meeting specified operational and performance requirements for clients
- (7) Establishing and maintaining records substantiating 1 through 6 above

11.4 Plant Security - Plant Security is administered by the Chief Engineer Nuclear Engineering, who reports to the Vice President Advanced Technology. Plant Security has the prime responsibility for engineering design considerations and criteria associated with the design and installation of a plant security system. R4

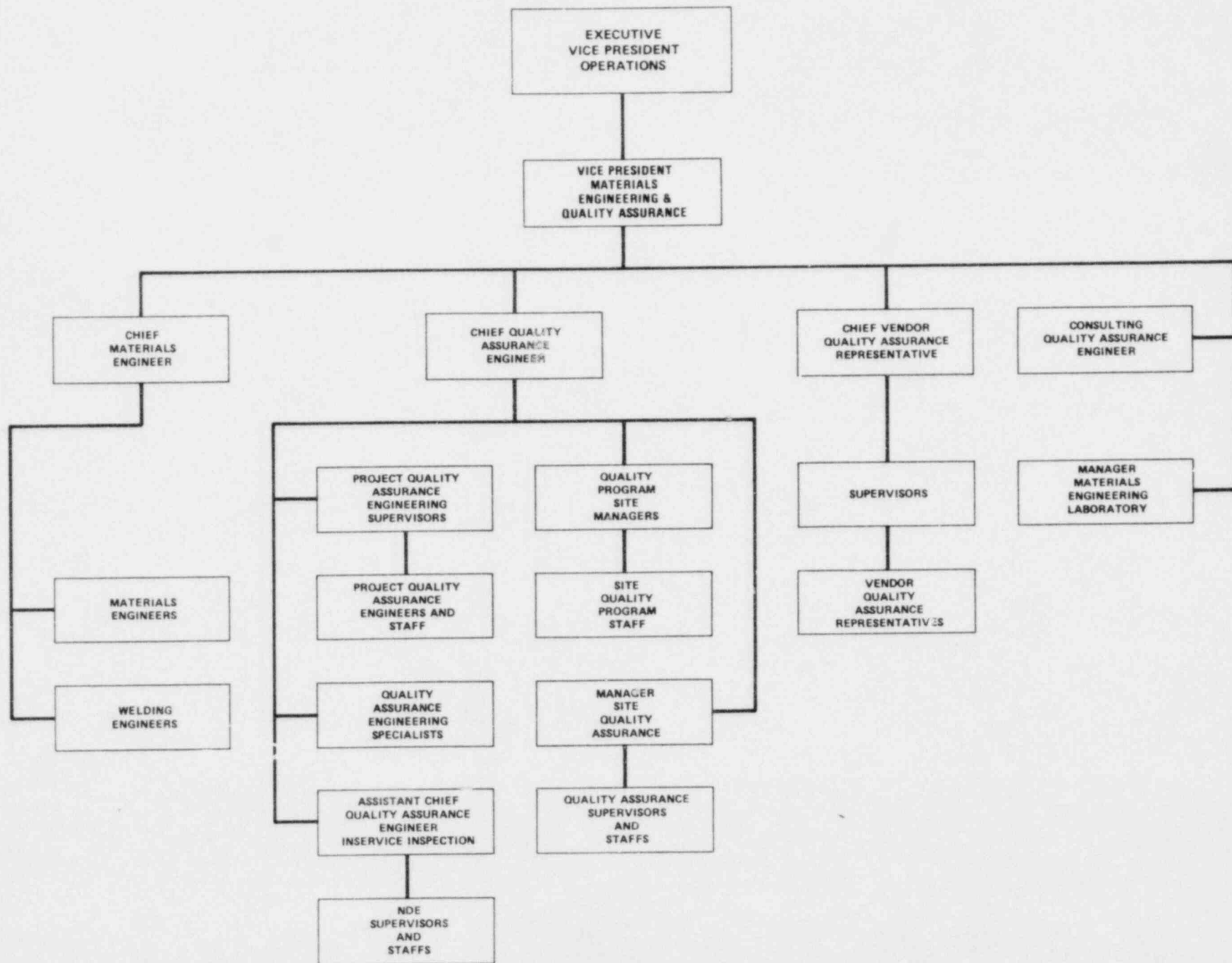
- (a) Engineers in Plant Security report to the Manager of Plant Security who in turn reports to the Chief Nuclear Engineer. R4
- (b) Plant Security is responsible for performance of the following:
  - (1) Minimizing the vulnerability of the plant to radiological sabotage that may result in a hazard to the public. (The Code of Federal Regulations postulates that the act of sabotage may be initiated by an insider or a group of outsiders or a combination of both.)
  - (2) Developing plant arrangements and layouts such that access to redundant safety related components are precluded during normal operation, such as the use of structural walls and doors.
  - (3) Providing access during emergency conditions, such as fire
  - (4) Providing and complying with criteria for all security vital equipment that is required to isolate the public from a radiological release, or that is required to mitigate the results of radiological sabotage

11.5 Dynamics and Systems - Dynamics and Systems Engineering is administered by the Director - Dynamics and Systems who reports to the Vice President Advanced Technology. Dynamics and Systems Engineering provides continuing analysis of any aspect of operational engineering and deemed economically valid and attainable. R4

**Ebasco Services Incorporated**  
**OPERATIONS AND ADVANCED TECHNOLOGY ORGANIZATION**  
**SHOWING QUALITY PROGRAM COMMITTEE REPRESENTATION**



Ebasco Services Incorporated  
MATERIALS ENGINEERING & QUALITY ASSURANCE ORGANIZATION



# Ebasco Services Incorporated

## ENGINEERING DEPARTMENT ORGANIZATION

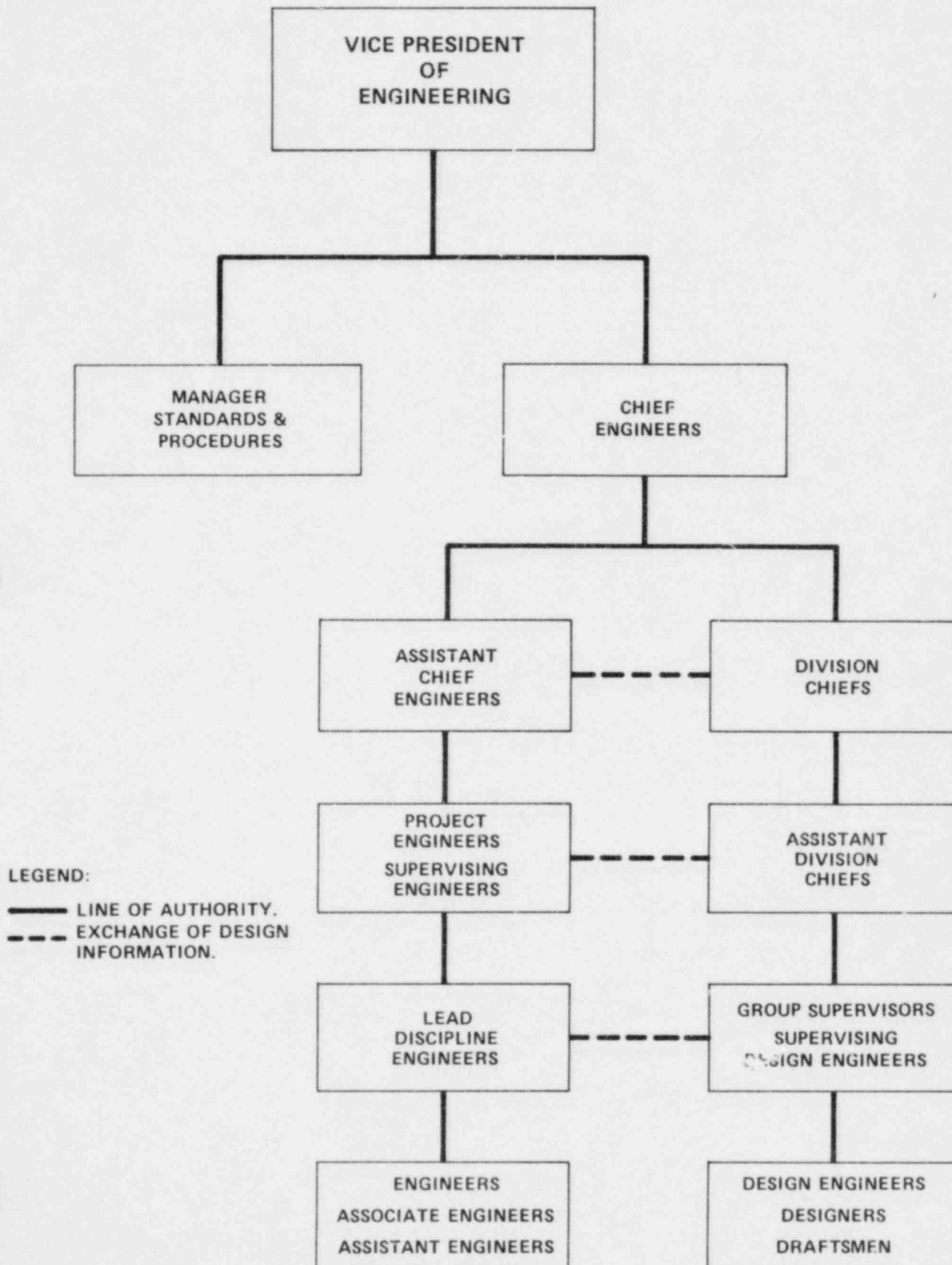


FIGURE I-2.3  
REV. 4

# Ebasco Services Incorporated ORGANIZATION FOR CONSTRUCTION

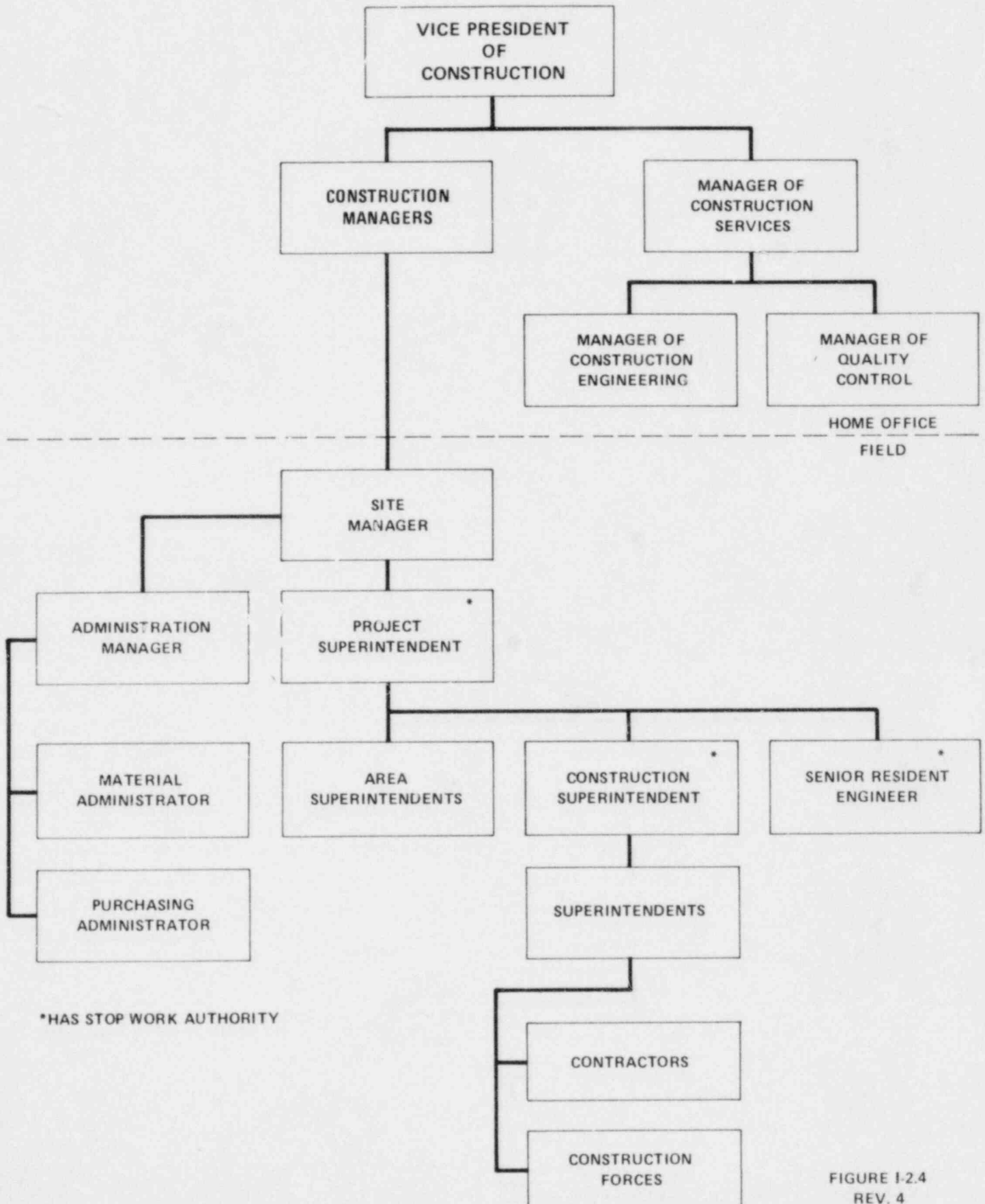
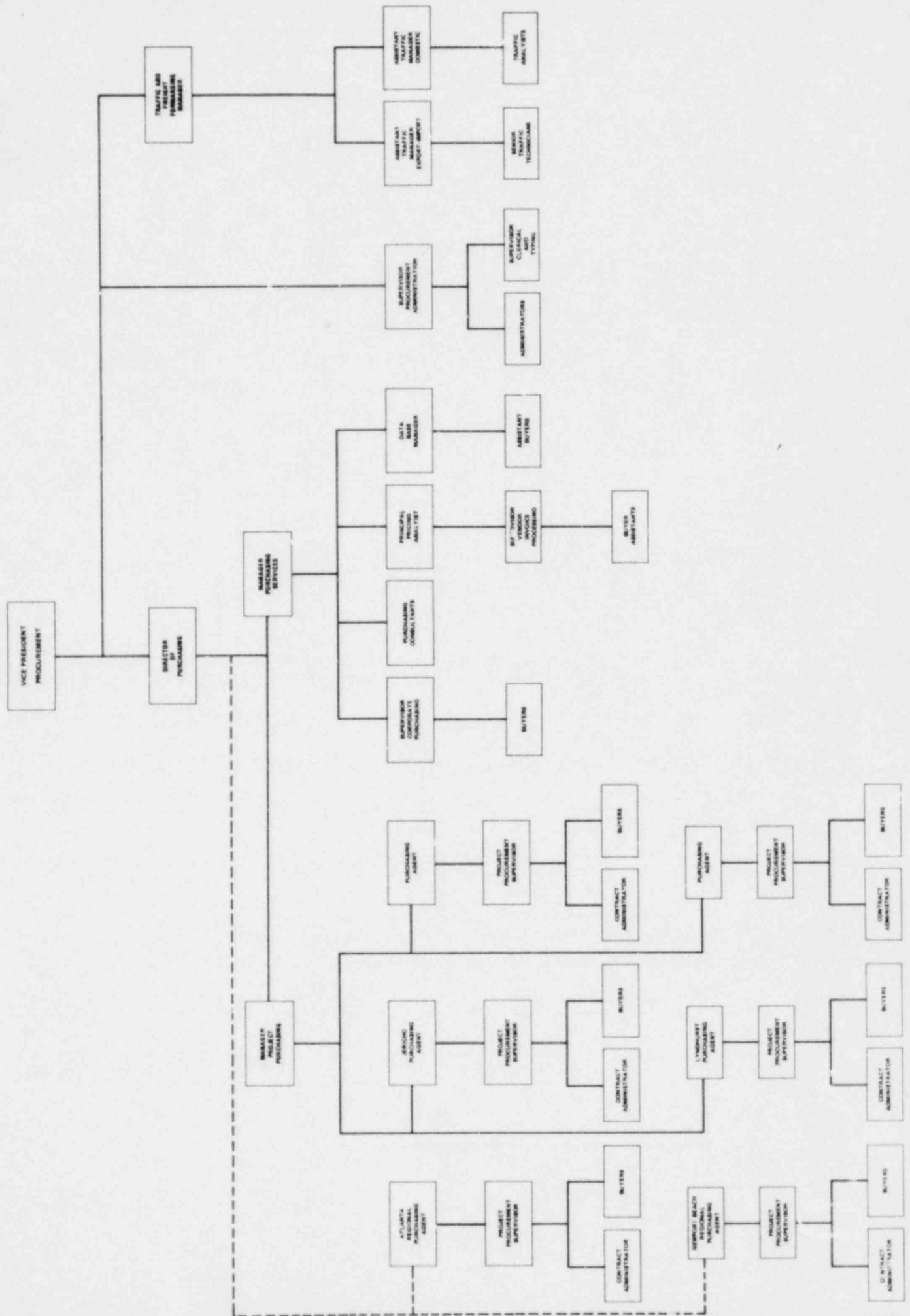


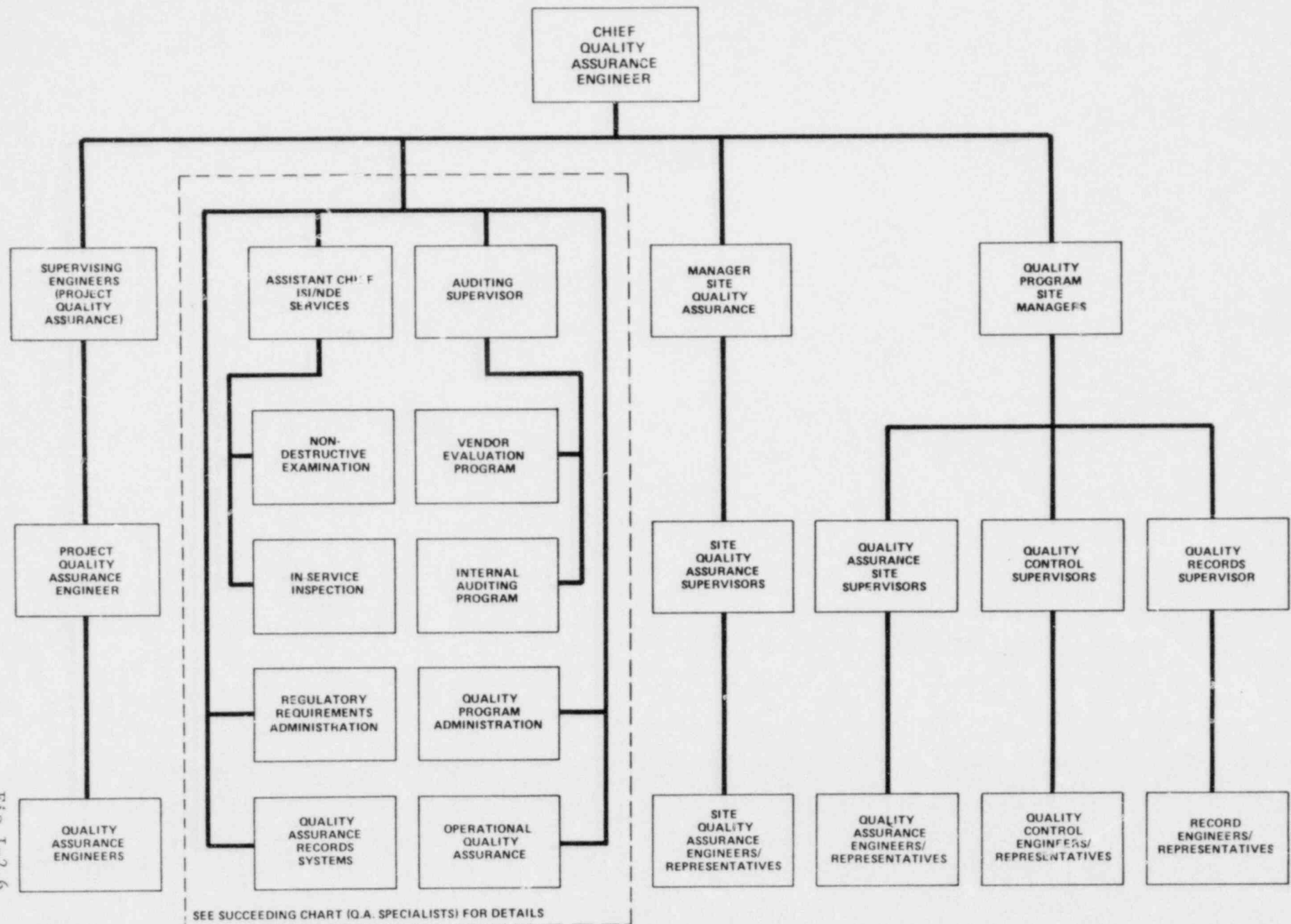
FIGURE I-2.4  
REV. 4

Ebasco Services Incorporated  
PURCHASING & TRAFFIC DEPARTMENTS  
ORGANIZATION CHART

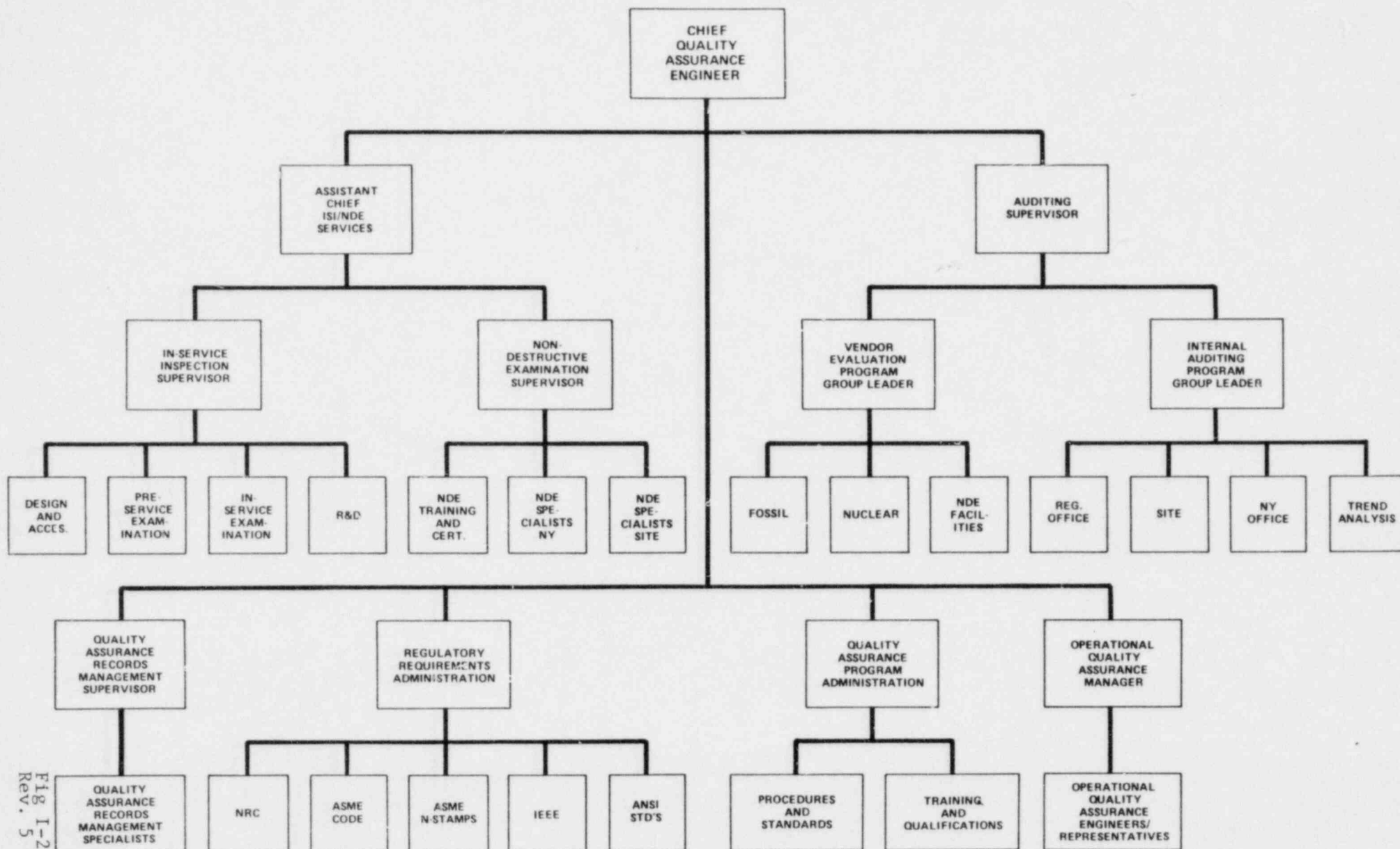




# EBASCO SERVICES INCORPORATED QUALITY ASSURANCE ENGINEERING



# EBASCO SERVICES INCORPORATED QUALITY ASSURANCE ENGINEERING QUALITY ASSURANCE SPECIALISTS



CLINT SYMONE

FUEL LOADING OR TRIAL OPERATION DATE


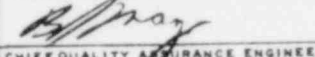
**PAGE 0000**

[illegible]

(\*) Includes Status of Engineering, Drawing Schedules, Status of Equipment and EIR Analysis.

LEGEND: 0 - Indicates original to person designated, 1, 2, 3, etc., indicates number of copies.  
A - Indicates selected items of interest as determined by Client or originating engineer.  
? - 1/8 size prints (15 x 21).  
C - Direct reading reproducible.

FIGURE I-2.8  
(FORMERLY I-2.7)

<b>EBASCO SERVICES INCORPORATED</b>	<b>NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL</b>	<b>SECTION</b> QA-I-5
APPROVAL  CHAIRMAN, QUAL. PROGRAM COMM.  CHIEF QUALITY ASSURANCE ENGINEER	QUALITY ASSURANCE EVALUATION OF SUPPLIERS/CONTRACTORS	REVISION 2 DATE July 31, 1981

R2

R2

## 1.0 SCOPE

The purpose of this section is to establish the criteria for evaluating suppliers/contractors of safety-related items and services procured, either by means of purchase orders issued through the Engineering and Site Offices or by means of Construction Contracts issued at the various construction sites. Such suppliers/contractors shall be evaluated for their adherence to the portions of 10CFR50 Appendix B, ANSI N45.2 and applicable daughter standards, and other Ebasco requirements that are applicable to the items or services supplied.

R2

R2

R2

## 2.0 RESPONSIBILITIES

Quality Assurance Engineering shall be responsible to assure, through implementation of departmental procedures, that safety-related items and services procured by Ebasco at Engineering Offices and Construction Sites are procured only from vendors and contractors who meet the applicable requirements of this section.

For site procurements involving purchase orders and construction contracts, the Senior Quality Control Supervisor or his designee may attend and participate in the evaluation of suppliers as described in Ebasco Site Quality Control procedures.

## 3.0 QUALIFICATION REQUIREMENTS

3.1 Qualification of a supplier/contractor shall be determined from results of the following:

R2

3.1.1 A review of the supplier's/contractor's Quality Assurance Manual.

3.1.2 A facility or site audit of the supplier's/contractor's Quality Assurance program to assure satisfactory implementation of that program. (Facility audits of Contractors' Quality Assurance programs shall be performed at the site after contract award but prior to start of installation of safety related items or performance of safety related work).

3.1.3 Evidence of manufacturer's Certificate of Authorization (i.e., ASME N-type stamp), if applicable.

R2

3.1.4 For Contractors who have provided unique or special services (i.e., laboratories, consultants, research facilities, etc.) evidence based upon historical data substantiating their capability on other Ebasco projects or industry demonstrated and/or recognized technical expertise.

R2

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  QUALITY ASSURANCE EVALUATION OF SUPPLIERS/CONTRACTORS	SECTION  QA-I-5
---------------------------------	----------------------------------------------------------------------------------------------------------	-----------------------

### 3.0 RESPONSIBILITIES (cont'd)

3.2 For purchase orders issued by the Engineering and Site Offices, a supplier, to be considered qualified to be awarded a purchase order, must have satisfactorily met the requirements of Paragraph 3.1 above. For Construction Contracts issued by the Construction Department, a contractor may be awarded a construction contract before meeting the requirements of Paragraph 3.1 above, but this is contingent upon his satisfactorily meeting the requirements before starting any safety-related work.

3.3 For Engineering and Site Offices purchase orders, Quality Assurance Engineering shall maintain and issue, to appropriate department heads, a list of Vendors considered qualified with regard to Quality Assurance capability in accordance with Quality Assurance Engineering procedures. Only Vendors who have satisfactorily met requirements of Paragraph 3.1 above shall be included on this list. Safety-related items and services shall be purchased only from Vendors included on this list. A Vendor may be removed from this list if it is found that unresolved conditions adverse to quality may have developed and remain unresolved.

For Construction Department Construction Contracts, the Manager of Construction Engineering will maintain a file of Contractors who have satisfactorily met the requirements of Paragraph 3.1.

3.4 A supplier may be issued a purchase order without being required to have a Quality Assurance program or being subject to a facility audit for "off-the-shelf" items. Off-the-shelf items are those that do not have unique design or specification requirements, and do not require the manufacturer to perform a separate or special operation or test to qualify the item for use in a specific nuclear power plant facility. Documentation of qualification for "off-the-shelf" items, when applicable, shall be requested and obtained prior to purchase order award for evaluation so as to provide auditable evidence of review and acceptance thereof. Receiving inspection in accordance with Section QA-III-11 shall be documented to include evidence that these items are in conformance with the purchase order requirements.

### 4.0 SUPPLIER QUALITY ASSURANCE MANUALS

4.1 For Engineering and Site Offices purchase orders, vendor Quality Assurance manuals shall be submitted to Ebasco for review at the time the vendors submit their bid, provided a previous submittal of the manual has not been made. For Construction Department Construction Contracts, the Quality Assurance manuals shall be submitted either before or after award of a contract, but prior to performance of any safety-related work.

4.2 All Quality Assurance manuals shall be reviewed by Quality Assurance Engineering in accordance with departmental procedures and check lists, which includes the requirement for independence of supplier inspection personnel.

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  QUALITY ASSURANCE EVALUATION OF SUPPLIERS/CONTRACTORS	SECTION  QA-I-5
---------------------------------	----------------------------------------------------------------------------------------------------------	-----------------------

## 5.0 SUPPLIER/CONTRACTOR FACILITY AUDITS

5.1 For purchase orders issued at the Engineering and Site Offices, the Quality Assurance Engineering Department, prior to award of a purchase order, shall conduct a Quality Assurance audit of the prospective supplier's facility in accordance with departmental procedures and checklists.

For Construction Contracts issued by the Construction Department, the Quality Assurance Engineering Department shall conduct a Quality Assurance audit of the prospective contractor's site facility either before or after award of contract but prior to start of any safety-related work. The Senior Quality Control Supervisor or his designee may participate in this audit.

5.2 Section QA-II-9 establishes the requirements for the performance of supplier/contractor facility or site audits. These requirements are satisfied by the implementation of departmental procedures which include provisions for the following:

- (a) Training and Qualification of Auditors
- (b) Proficiency of Audits
- (c) Audit Planning
- (d) Audit Notification
- (e) Audit Performance
- (f) Reporting of Audit Results
- (g) Audit Follow-Up
- (h) Audit Records
- (i) Trend Analysis of Audit Records

## 6.0 PERIODIC RE-AUDITS

6.1 All qualified suppliers/contractors shall have their Quality Assurance manual re-evaluated and their facility re-audited in accordance with an established schedule to determine continued compliance to applicable NRC, ANSI and Ebasco requirements. All re-audits shall be performed and documented as specified in this section for initial audits.

6.2 The periodic re-audit schedule shall be determined by the Chief Quality Assurance Engineer or his designee. The frequency shall be established utilizing pre-award audit findings, supplier/contractor history and supplier trend analysis. Maximum time for re-evaluation shall not exceed three years.



EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  QUALITY ASSURANCE EVALUATION OF SUPPLIERS/CONTRACTORS	SECTION  QA-I-5
---------------------------------	----------------------------------------------------------------------------------------------------------	-----------------------

## 7.0 TREND ANALYSIS OF SUPPLIER/CONTRACTOR AUDIT REPORTS

Copies of all supplier/contractor audit reports or other appropriate documentation shall be submitted to the Quality Assurance Engineering Internal Audit Supervisor or the Ebasco Quality Program Coordinator. The Quality Assurance Engineering Internal Audit Supervisor subsequently receives all reports and makes an analysis of the available Quality Assurance data with respect to quality trends and formally reports his findings to the Chief Quality Assurance Engineer and to the Chairman of the Quality Program Committee. The trend analyses and distribution of subsequent reports shall be made in accordance with the requirements of Quality Assurance Engineering procedure QA-D.3.

R2

## 8.0 RECORDS

All documents and records relating to a supplier's/contractor's quality program and audit status shall be secured and maintained by the Quality Assurance Engineering Department at the Engineering Office for Engineering Offices purchase orders and by the Quality Assurance Site Supervisor at the site for site purchase orders, all in accordance with departmental procedures and the applicable requirements of Section QA-I-6 of this manual.

Documents and records relating to Construction Contracts shall be secured through the Contracts Administrator and distributed to the Quality Records Supervisor for filing, all in accordance with departmental procedures and Section QA-I-6 of this manual. A copy of the contractors audit reports and any trend analyses should be sent to the Manager of Construction Engineering for future reference.

R2



EBASCO SERVICES INCORPORATED		NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL	SECTION QA-II-2	
APPROVAL BET CHAIRMAN, QUAL. PROGRAM COMM. B. May CHIEF QUALITY ASSURANCE ENGINEER	QUALITY ASSURANCE AUDITS		REVISION 3	R3
		DATE July 31, 1981	R3	

## 1.0 SCOPE

1.1 This section establishes the requirements and guidelines for preparation, performance, reporting and follow-up of Quality Assurance audits, both internal and external, as performed by Ebasco Quality Assurance Engineering, and internal audits of the Quality Assurance Engineering and Materials Applications functions as performed by the Management Audit Committee. These requirements apply to audits performed on activities affecting safety-related items and services.

## 2.0 GENERAL REQUIREMENTS FOR ALL INTERNAL AND EXTERNAL AUDITS

### 2.1 Audit Personnel

2.1.1 Shall be independent of direct responsibility for performance of the activity being audited.

2.1.2 Shall be qualified to perform Quality Assurance Audits based on experience and training.

### 2.2 Training and Orientation

2.2.1 Audit personnel shall have experience or be given training or orientation to assure their competence for performing audits. The competence of personnel to perform audits shall be developed by one or more of the following methods:

- (a) Providing personnel with working knowledge of appropriate regulatory documents, practices, codes and standards.
- (b) Training or orientation in general and specialized methods of planning and performing audits.
- (c) On-The-Job training under direct supervision of an experienced qualified auditor.

2.2.2 The requirements for training and orientation of auditors shall be developed by Quality Assurance Engineering for their audit functions.

### 2.3 Proficiency of Auditors

2.3.1 Auditors performing audits shall maintain their proficiency through one or more of the following methods:

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  QUALITY ASSURANCE AUDITS	SECTION  QA-II-9
---------------------------------	--------------------------------------------------------------------------	------------------------

- (a) Regular, active participation in the audit process
- (b) Review and study of codes, standards and procedures, related to Quality Assurance Programs and program auditing
- (c) Participation in training or orientation programs

## 2.4 Audit Planning

2.4.1 Audits shall be planned in advance to assure adequate coverage of the program being audited.

2.4.2 Preparation for both internal and external audits shall include the development of a written audit plan of standard format which include:

- (a) Audit scope
- (b) Approved written procedures and/or checklists which assure that the organization will be audited to the extent necessary. These procedures and/or checklists shall provide for verifying corrective action of non-conformance identified in previous audits. Audit procedures and/or checklists may be developed as part of a general audit program and need not be unique for each audit.
- (c) Activities to be audited
- (d) Audit schedule
- (e) Distribution list for audit report

## 2.5 The Audit Team

2.5.1 The audit shall be performed by one or more individuals at least one of whom shall be qualified. A qualified auditor shall be established as the team leader for audits conducted by all teams comprised of two or more auditors. The team leader shall be responsible for:

- (a) Orientation of the team
- (b) Assure communication between the team and the Ebasco Department organization or Supplier being audited.
- (c) Coordinating preparation and issuance of audit reports

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  QUALITY ASSURANCE AUDITS	SECTION  QA-II-9
---------------------------------	--------------------------------------------------------------------------	------------------------

2.5.2 The team leader shall assure that the team is prepared prior to performing the audit. Information such as appropriate procedures, manuals and prior audit reports shall be made available to the team members. Each auditor shall be provided with any appropriate audit plans, procedures or checklists necessary to performing the audit.

## 2.6 Audit Notification

2.6.1 The appropriate Ebasco departmental personnel or Supplier to be audited shall be notified of a scheduled audit and the scope of the audit. Such notification shall be given a reasonable time before the audit is to be performed.

R2

## 2.7 Audit Performance

2.7.1 Checklists and/or written procedures prepared during audit planning shall be used to conduct the audit.

2.7.2 An informal pre-audit conference may be arranged at the audit site in order to confirm audit scope and discuss the audit plan.

2.7.3 A post-audit conference shall be conducted to:

- (a) Inform those audited of the audit results, which shall include all nonconformances
- (b) Assure understanding of audit results.
- (c) Establish the course of corrective action if necessary.
- (d) Draw special management attention to any nonconformances identified that need immediate corrective action.

## 2.8 Reporting of Audit Results

2.8.1 An audit report shall be compiled by one or more members of the audit team and shall be signed by all the audit team members. The audit report shall provide:

- (a) Description of the audit scope
- (b) Identification of the auditors
- (c) Persons contacted
- (d) A Summary of audit results including an evaluation statement regarding the effectiveness of the Quality Assurance Program elements which were audited.

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  QUALITY ASSURANCE AUDITS	SECTION  QA-II-9
---------------------------------	--------------------------------------------------------------------------	------------------------

- (e) Detailed description of nonconformances and courses thereof where possible.
- (f) Recommendations for correcting nonconformance or improving the Quality Assurance Program, if possible. Such recommendations may be those of the audited party, provided they meet with the approval of all audit team members.

R3

2.8.2 The audit group shall prepare an audit report for each audit performed. Reports shall be distributed in accordance with Quality Assurance Engineering Procedures QA-D.5 and QA-P.9, and Company Procedure N-24, for Internal, Vendor Evaluation and Management Audits, respectively. Recipients shall include at least the individual audited and his supervisor or Lead Discipline Engineer, and the Project Quality Assurance Engineer for internal audits; and the vendor audited and the Project Quality Assurance Engineer for Vendor Evaluation Audits.

2.8.3 The audit report shall be issued in a timely manner as defined in the Quality Assurance implementing procedures.

R3

## 2.9 Audit Follow-Up

2.9.1 Similarly, a response to the audit report shall be prepared and submitted in a timely manner as defined in the Quality Assurance implementing procedures. The response shall clearly state the corrective action taken and the date of completion

R3

2.9.2 Follow-up action shall be performed by one or more members of the audit team to:

- (a) Assure that the written reply to the audit report is received.
- (b) Assure that corrective action is identified and scheduled for each nonconformance.
- (c) Confirm that nonconformances are resolved and corrective action when necessary, is accomplished.

2.9.3 Follow-up action may be accomplished through written communication, reaudit, or other appropriate means.

2.9.4 The Quality Assurance Engineering Audit Group shall perform a quarterly review of their audits to assure that corrective action has been taken in a timely manner. A quarterly Review Report on the resolution of deficiencies and corrective action will be prepared by the Quality Assurance Engineering Audit Group and forwarded to the Chief Quality Assurance Engineer and Vice President Materials Engineering and Quality Assurance.

R3

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  QUALITY ASSURANCE AUDITS	SECTION  QA-II-9
---------------------------------	--------------------------------------------------------------------------	------------------------

## 2.10 Audit Records

2.10.1 Records generated during audit preparation, performance or follow-up shall be retained for all audits in accordance with the applicable requirements of Section QA-I-6 of this Manual and written implementing procedures. Such records shall include:

- (a) Audit plans and checklists
- (b) Audit reports
- (c) Written replies to audit reports
- (d) Status of required corrective action
- (e) Other document which support audit findings and corrective actions as appropriate

2.10.2 Records of Training and experience of auditors shall be maintained for all personnel who are performing audits or who have previously performed audits. These shall be retained for the same period of time as required for the audit reports with which the auditors are associated.

## 2.11 Semi-Annual Reports to Management

2.11.1 As individual internal audit reporting is accomplished and internal audit information accumulates over a six months period, the Chief Quality Assurance Engineer will issue a summary report of Quality Assurance Engineerin audit results of that period, including the resolution of deficiencies and corrective action where known and applicable, to the following:

- (a) Vice President Materials Engineering and Quality Assurance
- (b) Heads of departments audited

2.11.2 The Vice President Materials Engineering and Quality Assurance shall be responsible for analyzing the results of the audits performed as provided for by this section and the Ebasco Quality Assurance program except as indicated in QA-II-9 paragraph 3.4. The Vice President Materials Engineering and Quality Assurance shall also directly inform applicable line Vice Presidents in their areas of individual responsibility and the concerned Ebasco Senior Officers of the audit results. The Chief Quality Assurance Engineer shall be responsible for initiating the implementation of any changes or corrective action deemed necessary by the Officers to improve the effectiveness of the Ebasco Nuclear Quality Assurance Program.

R3

R3

R3

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL QUALITY ASSURANCE AUDITS	SECTION QA-II-9
---------------------------------	----------------------------------------------------------------------	--------------------

## 2.12 Trend Analysis of Audit Reports

Copies of all audit reports shall be submitted to the Quality Assurance Engineering Internal Audit Supervisor or the Ebasco Quality Program Coordinator. The Quality Assurance Engineering Internal Audit Supervisor subsequently receives all reports and makes an analysis of the available Quality Assurance data with respect to quality trends and formally reports his findings to the Chief Quality Assurance Engineer and the Chairman of the Quality Program Committee. The trend analysis and distribution of subsequent reports shall be made in accordance with the requirements of Quality Assurance Engineering Procedure QA-D.3.

R2

## 3.0 SPECIFIC AUDIT REQUIREMENTS

### 3.1 Internal Quality Assurance Engineering Audits

3.1.1 Ebasco Quality Assurance Engineering performs internal audits of the various activities within Ebasco that affect safety-related structures, systems, components and services. These audits are generally performed on a project basis by the Internal Audit Group of the Quality Assurance Engineering Department in conjunction with the Project Quality Assurance Engineer in accordance with departmental implementing procedures.

### 3.2 Scheduling of Internal Audits

3.2.1 Internal audits shall be initiated as early in the life of the project or activity as practicable in order to assure timely implementation of the applicable Quality Assurance requirements, and to assure effective Quality Assurance during design, procurement and contracting activities.

3.2.2 Internal audits shall be regularly scheduled on the basis of the status and safety importance of the activities to assure conformance to the Ebasco Nuclear Quality Assurance Program. Applicable elements of the Quality Assurance Program shall be audited at least semi-annually or once within the life of the activity, whichever is shorter.

3.2.3 Supplemental internal audits should be conducted when:

- (a) Significant changes in the Quality Assurance Program are made
- (b) There is a suspicion or evidence of deficiencies or nonconformance in the Quality Assurance Program
- (c) An assessment of the effectiveness of the Quality Assurance Program is necessary
- (d) It is necessary to verify implementation of corrective action



EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  QUALITY ASSURANCE AUDITS	SECTION  QA-II-9
---------------------------------	--------------------------------------------------------------------------	------------------------

### 3.3 External Quality Assurance Engineering Audits

3.3.1 Audits of prospective suppliers of safety-related structures, systems components and services shall be performed in accordance with the applicable requirements of this section when such audits are required by Section QA-I-5 of this Manual. Such audits shall be scheduled as early as practicable to assure timely implementation of the applicable Quality Assurance requirements.

3.3.2 Supplemental audits of Suppliers or prospective Suppliers may be performed when:

- (a) Significant changes are made in the Supplier's Quality Assurance Program, or when warranted by new requirements of Ebasco or the client.
- (b) There is suspicion or evidence of deficiencies or nonconformances in the Quality Assurance Program.
- (c) An assessment of the effectiveness of the Suppliers' Quality Assurance Program is necessary.
- (d) It is necessary to verify implementation of corrective action.
- (e) It is necessary to verify proper implementation of the suppliers' Quality Assurance Program.

3.3.3 Personnel performing external Audits shall be selected by the Chief Quality Assurance Engineer or his designee.

3.3.4 These audits may be performed on a supplier's overall Quality Assurance Program or selected areas thereof.

### 3.4 Management Audits

3.4.1 A committee chaired by the Consulting Quality Assurance Engineer is responsible for conducting audits of the Ebasco Materials Applications and Quality Assurance Engineering functions to determine compliance with the Ebasco Quality Assurance Program requirements. These audits will also include evaluating Quality Assurance policies and assuring that appropriate implementing procedures are available and are being complied with.

R2

R2  
R2

EBASCO SERVICES INCORPORATED	NUCLEAR QUALITY ASSURANCE PROGRAM MANUAL  QUALITY ASSURANCE AUDITS	SECTION  QA-II-9
---------------------------------	--------------------------------------------------------------------------	------------------------

3.4.2 This auditing shall be accomplished on an annual basis in accordance with Ebasco Procedure A-45. The auditing shall be conducted by a committee with the Consulting Quality Assurance Engineer designated as the committee chairman. The committee shall be comprised of at least two qualified representative from either the Construction or Engineering Departments and the Consulting QA Engineer. Each committee Representative shall be appointed by his respective Vice President; however, no committee member can be directly engaged in any policy-making or administrative phase of the Ebasco Quality Assurance Program, but shall be knowledgeable in the general area of quality assurance. The committee shall be directly responsible to the Vice President Materials Engineering and Quality Assurance

R3  
R3

3.4.3 The committee shall prepare an audit report for each audit performed. This report shall be submitted directly to the Vice President Material Engineering and Quality Assurance with copies to other appropriate parties.

R3

3.4.4 The Vice President Materials Engineering and Quality Assurance shall be responsible for informing the concerned Ebasco management of the results of the audits performed by the committee. He shall also be responsible for initiating the implementation of any changes or corrective action deemed necessary to improve the effectiveness of the Ebasco Nuclear Quality Assurance Program.

R3  
R3

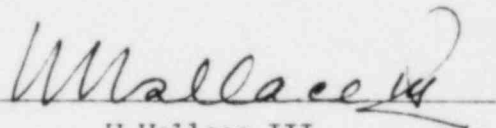
3.4.5 The Corporate Radiation Safety Office is responsible for auditing the company for conformance to radiation safety procedures as mandated by the United States Nuclear Regulatory Commission and State Regulatory Agencies.

R3

## STATEMENT OF AUTHORITY

The management of Ebasco Services Incorporated recognizes the necessity for a comprehensive Quality Program for Nuclear Power Plants. Ebasco Company Procedure No. N-21 establishes the basic organization, assigns authorities and responsibility for implementing the Quality Program, and establishes the requirement for a corporate Quality Assurance Manual. Accordingly, this Manual represents Ebasco Quality Program policy. In this respect, it is to be used as a standard by personnel in all Ebasco Organizational Units.

The primary responsibility for overall implementation and administration of the Ebasco Quality Assurance Program rests with the Vice President Materials Engineering and Quality Assurance as delegated to him by the Executive Vice President - Operations. The Quality Program Committee has been established under the auspices of the Executive Vice President - Operations, consisting of representatives of designated Vice Presidents. The committee is permanent and its Chairman shall be the Vice President Materials Engineering and Quality Assurance.



W Wallace III  
President

April 24, 1981

FOREWORD

This manual represents Ebasco Quality Program policy and requirements for the design and construction of nuclear power stations under the jurisdiction or in accordance with the requirements of the United States Nuclear Regulatory Commission. In this respect, it is to be used as a standard by all Ebasco personnel.

The manual has been prepared by the Quality Assurance Engineering Department and approved by the Ebasco Quality Program Committee. The manual reflects official Ebasco policy and has been designed to meet the requirements of the United States Nuclear Regulatory Commission document 10 CFR 50, Appendix B (18 Quality Assurance Criteria), and American National Standards Institute document N45.2, entitled Quality Assurance Program Requirements for Nuclear Power Plants.

The Ebasco Nuclear Quality Assurance Program Manual has been designed to meet the requirements of 10 CFR 50.34(7) for a quality assurance program description. It will be incorporated into applicable portions of safety analysis reports by reference as provided by 10 CFR 50.32.

The primary responsibility for overall implementation and administration of the Ebasco Quality Program rests with the Vice President Materials Engineering and Quality Assurance as delegated to him by the Executive Vice President - Operations. The Chief Quality Assurance Engineer is assigned the responsibility and authority to enforce Ebasco Quality Program requirements and has the unqualified support of Corporate Management. His decisions may not be overridden by personnel in any division or department, except with the written consent of the Vice President Materials Engineering and Quality Assurance or the Executive Vice President - Operations.

The Chief Quality Assurance Engineer shall staff each project to the extent necessary to perform Quality Assurance tasks directly and audit departments other than his own in their performance of tasks related to Quality Assurance. The Chief Quality Assurance Engineer has the authority to require immediate correction of any non-conforming activity or condition to comply with Ebasco Quality Program requirements, or if necessary, to stop work until suitable corrective action has been taken or a satisfactory resolution reached.

Recommendations or questions regarding the Quality Program or the manual shall be referred to the Chief Quality Assurance Engineer, who shall be responsible for resolution. The Ebasco Quality Program Committee is responsible for and has the authority to make and approve procedures for any changes to this manual.

The Quality Program Coordinator, designated by the Chairman of the Ebasco Quality Program Committee, functions as the Committee's secretary and publishes to all manual holders an Updating Status Memorandum for the manual at least every six months. The Memorandum summarizes changes made to the manual during the preceding period. The Quality Program Coordinator also maintains a listing of individual pages in the manual which indicates the current issue or revision date of each page. Information from this list can be obtained by addressing inquiries to the Quality Program Coordinator at the Ebasco New York Office.

The manual is assigned by the Quality Program Coordinator to individuals as required for their exclusive use. However, it remains the property of Ebasco Services Incorporated and shall be returned upon request. It is loaned in confidence and upon the condition that neither it nor the information contained in it will be reproduced, copied or disclosed in whole or in part. The material herein is copyrighted and protected by the copyright laws.

Should any circumstance arise under which a holder no longer requires the manual for the specific purpose for which it was assigned, it shall be returned promptly to the Quality Program Coordinator. Nuclear Quality Assurance manuals shall not be transferred or loaned to any other individual, position, firm or corporation without the written authorization of the Chairman of the Ebasco Quality Program Committee. The Quality Program Coordinator shall be informed promptly of any change in the mailing address of a manual holder.

Manual holders are responsible to maintain their copies in updated condition, including the proper insertion of new or revised sections as furnished and the destruction of all cancelled or superseded sections. Sections shall not be removed from manuals except as directed for revision or cancellation.

*B. E. Tenzer*

B E Tenzer  
Vice President Materials Engineering  
and Quality Assurance

April 27, 1981