UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

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June 26, 1973

242-5611

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Washington, D. C. 20545

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Dr. Emmeth A. Luebke
Atomic Safety and Licensing Board
Panel
U. S. Atomic Energy Commission
Washington, D. C. 20545

In the Matter of DUKE POWER COMPANY
(William B. McGuire Nuclear Station, Units 1 and 2)
Docket Nos. 50-369, 50-370

Gentlemen:

In response to the question in your order of June 18, 1973, directed to the Regulatory Staff, enclosed is the testimony of Domenic B. Vassallo and Bruce J. Cochran. These witnesses will be present at the Evidentiary hearing to be convened at 10 a.m., Tuesday, July 10, 1973 in the U. S. Court of Claims, Room 309, 717 Madison Place, N. W., Washington, D. C. 20005.

Sincerely,

A. Gr[illegible] Staples
Counsel for AEC Regulatory Staff

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# TESTIMONY OF DOMENIC B. VASSALLO

My name is Domenic B. Vassallo. I am presently employed as Chief, Pressurized Water Reactors Branch No. 1, Directorate of Licensing, U. S. Atomic Energy Commission. Prior to my promotion to Branch Chief in February 1972, I held the position of Project Manager since joining the Directorate of Licensing in September 1966.

In my present position, I am responsible for supervising and coordinating the safety analyses of the design, construction, and operation of nuclear power reactors as assigned. Prior to my assignment as Branch Chief, I served as the Project Manager who had the principal responsibility for the safety review of the McGuire Nuclear Station Units 1 and 2.

## I INTRODUCTION

Paragraph 50.34(a)(7) of 10 CFR Part 50 of the Commission's Regulations requires that each application for a construction permit of a nuclear power plant include in its preliminary safety analysis report (PSAR):

> A description of the quality assurance program to be applied to the design, fabrication, construction, and testing of the structures, systems, and components of the facility. Appendix B, "Quality Assurance Criteria for Nuclear Power Plants," sets forth the requirements for quality assurance programs for nuclear power plants. The description of the quality assurance program for a nuclear power plant shall include a discussion of how the applicable requirements of Appendix B will be satisfied.

Appendix B, "Quality Assurance Criteria for Nuclear Power Plants," following publication in the Federal Register (35 FR 10498), became effective July 27, 1970.

In its June 13, 1973 decision in the matter of the McGuire Nuclear Station Units 1 and 2, the Atomic Safety and Licensing Appeal Board (Appeal Board) directs that the record be clarified in the area of quality assurance. In particular the Appeal Board requests the Regulatory staff to furnish:[1]

> An unequivocal response as to whether the applicant's quality assurance organization conforms to Appendix B to 10 CFR Part 50, "Quality Assurance Criteria for Nuclear Power Plants."

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[1] Atomic Safety and Licensing Appeal Board Decision, pp. 35 and 36. This same questions was posed in the June 18, 1973 order of the ASLB.

Thus we must focus on whether the applicant's quality assurance (QA) organizational structure conforms to Criterion I (Organization) of Appendix B. Criterion I states:

> The applicant shall be responsible for the establishment and execution of the quality assurance program. The applicant may delegate to other organizations the work of establishing and executing the quality assurance program, or any part thereof, but shall retain responsibility therefore. The authority and duties of persons and organizations performing quality assurance functions shall be clearly established and delineated in writing. Such persons and organizations shall have sufficient authority and organizational freedom to identify quality problems; to initiate, to recommend, or provide solutions; and to verify implementation of solutions. In general, assurance of quality requires management measures which provide that the individual or group assigned the responsibility for checking, auditing, inspecting, or otherwise verifying that an activity has been correctly performed is independent of the individual or group directly responsible for performing the specific activity.

This criterion requires that the QA program must contain the following elements, which the Regulatory staff must determine (that when properly implemented) conform with Criterion I.

a. A clear delineation of authority and duties, persons and organizations responsible for QA functions.

b. Sufficient authority of QA personnel to identify, recommend solutions, and verify solutions to QA problems.

c. Management policy and procedures to provide QA personnel responsible for verifying that an activity has been correctly performed, with sufficient independence from organizational units directly responsible for performing a specific activity.

## II QA PROGRAM (ORGANIZATION) AS EVALUATED FOR ISSUANCE OF CONSTRUCTION PERMITS FOR MCGUIRE UNITS 1 AND 2

Duke Power Company submitted an application for construction permits for the McGuire Nuclear Station Units 1 and 2, on September 19, 1970. In accordance with Paragraph 50.34(a) of 10 CFR Part 50, the applicant presented in Appendix 1.C of the McGuire PSAR a description of the QA

program as applied to the design, fabrication, construction, and testing of the structures, systems, and components of the proposed facility. This section also provided an assessment of the conformance to all 18 criteria of Appendix B.

As described in the PSAR, engineering design was to be performed in the Civil, Electrical and Mechanical Engineering Divisions of Duke Power, under the direction of an anpropriate Principal Engineer in each of the respective divisions. For all safety related items, the design calculations, specifications, procedures and drawings were to be prepared by qualified individuals. The work of these individuals was, in turn, to be checked by another qualified individual, separate from the originator, but who might be in the same organizational unit. Surveillance was to be provided by a Senior Engineer and/or Principal Engineer. (As I read the Appeal Board's opinion, there was no question in this area.)

Briefly, with respect to the QA program for construction, the functions of quality assurance and technical support are the responsibility of the Principal Field Engineer. The Principal Field Engineer is not responsible for the assignment of crafts, the productivity of craft personnel or for meeting job schedules. Figure 1.C-3 of the PSAR illustrates the separation of QA functions from the construction functions which are the responsibility of the Job Superintendent and the various Craft Superintendents. Both the Principal Field Engineer and the Job Superintendent report to the Project Engineer. As shown in Figure 1.C-1 of the PSAR the Project Engineer reports directly to the Construction Manager, who in turn reports to the Vice President of Construction. Although it was our understanding that the Construction Manager and Vice President of Construction had other duties beside Quality Assurance matters, it was also the responsibility of these officials to resolve QA differences within the Construction Departments. Further, on page 1.C-8a of the PSAR it states that "In addition an audit team will periodically interview inspectors and craft people at all levels, thus giving those interviewed an opportunity to express concerns, in confidence, to persons at the management level. All of these safeguards are in addition to the regular management functions of the Project Engineer and other management levels within the Construction Department."

The Duke Power Steam Production Department has the responsibility for all plant operating functions and the preoperational testing of plant systems and components. Quality assurance measures were to be required to be developed to assure safe operation of the plant in conformance with Appendix B. However, in accordance with Paragraph 50.34(b)(6)(ii), the applicant's description of the plan and the regulatory staff's evaluation of the acceptability of the plan is deferred to the operating license stage of the review (FSAR).

2/ PSAR, Figure 1.C-2.

During the course of the safety review of the McGuire plant, the Regulatory staff held numerous meetings with the applicant in an effort to better understand the applicant's QA program and to further crystalize its own views concerning the acceptability of the program and the conformance to Appendix B. Our principal area of concern focussed on the QA organizational structure and whether it conformed to the intent of Criterion I of Appendix B. Further clarification of this matter was requested of the applicant in question 1.3.3/ In an attempt to clarify its views, the applicant responded in revised page 1.C-2 of Revision 1 of the PSAR, in part:

> The adopted criteria sometimes suggests that quality assurance functions be performed by an organizational component separate and distinct from the organizational component having responsibility for an activity. Duke conforms to this suggestion with respect to activities performed by craftsmen; i.e., quality assurance organizational components are separate and distinct from the organizational components responsible for accomplishing work by craftsmen and their supervision. In the area of professional engineering as applied in design, construction, testing, and operation, Duke has intentionally assigned quality assurance responsibilities to the same organizational components responsible for professional engineering activity. This has been done in the firm conviction that responsibility for quality is an integral and inseparable part of the engineering function.

As part of its review of the McGuire application for construction permits, the Regulatory staff reviewed and approved the applicant's QA program, as delineated in Appendix 1.C and revisions thereto,4/ although not clearly stated in the staff Safety Evaluation. At the time the Safety Evaluation for the McGuire Nuclear Station was written, it was the judgement of the staff that the quality assurance program for the McGuire Nuclear Station satisfies Criterion I (and the other 17 criteria) of Appendix B to 10 CFR Part 50. That is still the staff's opinion. The following points explain the basis upon which this conclusion was derived.

As we understood the intent of the regulation then, we did not require that the professional engineering staff's activities be reviewed by non-professionals, but that the review would be done by other professional engineers (who could be within the same organization) other than the originator. The applicant chose to interpret its views with respect to design engineering as an exception to the conformance of Appendix B.

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3/ Question 1.3, Letter from Dr. Peter A. Morris to Mr. William Lee, February 19, 1971

4/ Regulatory staff Safety Evaluation pages 99 and 100.

However, in its evaluation of this matter, the staff did not concur that the applicant's approach was an exception to Appendix B (Tr. 1935). Our basis for this conclusion was that, in accordance with Criterion 3 of Appendix B (Design Control), individuals or groups other than those who performed the original design but from the same organization may verify the design adequacy.

With respect to the QA organization for construction, we based our approval and evaluation on the program as described in the PSAR; and, the implementation of the program to be subsequently verified by inspectors of the Directorate of Regulatory Operations. A representative of that Directorate will submit testimony in a separate document.

The inspectors subsequently verified that the applicant's Quality Assurance Manual contained written procedures specifying that the QA Principal Field Engineer can direct communication directly to the Vice President for Construction on Quality Assurance matters and that QA Inspectors have the authority to stop work where non-conformance is observed. We therefore concluded that the QA organizational structure as described by the applicant and overseen by our field inspectors, met the requirements of Appendix B, even though the applicant appeared to express otherwise.

III QA PROGRAM (ORGANIZATION) AS REVISED FOLLOWING ISSUANCE OF CONSTRUCTION PERMITS

On or about January 1973, Duke Power modified its QA program, primarily with respect to the organization responsible for QA functions. It is our understanding that this modification was a corporate change and now applies to all of Duke Power's plants under construction (including McGuire), and even proposed plants such as Catawba now under review by the Regulatory staff. This is borne out by review of our files on Catawba and inspection reports made by our field inspectors.

The revised Duke Power quality assurance program is documented in the Catawba Nuclear Station PSAR (Docket Nos. 50-413 and -414, Amendment No. 9). As will be attested to by a staff witness from the Directorate of Regulatory Operations, this same program has been implemented for the McGuire plant. The corporate quality assurance program, with respect to organization can be summarized in the following paragraphs.

The Duke Power corporate organization is composed of the Design Engineering, Purchasing, Construction, and Steam Production departments. Within the Design Engineering and Construction departments there is a Quality Assurance Manager reporting administratively

to the respective department vice-president, and reporting functionally to the Corporate Quality Assurance Manager, a position currently filled by the Senior Vice President of Design and Construction (Figure 1).

The Design Engineering Department consists of three divisions; Civil, Mechanical and Nuclear, and Electrical. A Quality Assuance Manager is assigned to each division who reports administratively to the division chief engineer and functionally to the department quality assurance manager. Each division quality assurance manager is provided with a staff for implementation of the division's QA program. The QA manager in the Mechanical division has the additional responsibility of vendor surveillance and audit.

The Purchasing Department is the Mill-Power Supply Company, a wholly owned subsidiary of Duke Power. The QA manager for purchasing reports administratively to the Manager of Purchases - Plant Construction and functionally to Duke Power Corporate QA Manager. The Purchasing Department originates purchase orders based on purchase requisitions provided by the other departments and places these orders with previously approved vendors. The principal function of QA manager in this department is assuring that the requirements of the purchase requisitions have been properly translated into the purchase orders.

The Construction Department is organized by projects (Figure 2). Each project has a QA Engineer responsible for QA activities at the site reporting administratively to the site project manager and functionally to the Department QA Manager (Figure 3). As in the previous plan, the Principal Field Engineer and his staff, responsible for quality control, is not responsible for the assignment of crafts, the productivity of craft personnel or for meeting job schedules.

The Steam Production Department is responsible for all operating station functions. A QA Engineer is assigned to each operating station and reports administratively to the Assistant Station Superintendent and functionally to the Department QA Manager. In turn the Department QA Manager reports administratively to the Manager, Operation and Maintenance and functionally to the Corporate QA Manager (Figure 4).

Since the area of quality assurance is a dynamic and on-going program, it is expected that following issuance of a construction permit or operating license, periodic revisions to and updating of the applicant's Quality Assurance Manual will be required to assure continued Regulatory staff acceptability of compliance to the intent of Appendix B.

Since inception of the modified Duke Power Corporate QA program on or about January 1973, the staff, through the Directorate of Regulatory Operations has been monitoring the implementation of the program at the McGuire plant and other plants of Duke Power.

On the basis of staff review of the Corporate QA program (Organization) and inspection by the Directorate of Regulatory Operations. we believe this new plan is an improvement in and is superior to the former plan for the following reasons:

1. There is a clear commitment by Duke Power's top management to establish, within each Department, QA Managers whose responsibility is to verify that the implementation and direction of the overall QA Program is, in fact, being followed.

2. There is a clear commitment that the QA Managers will report functionally to the Corporate QA Manager and in so doing, will receive their QA policy direction and instructions from the Corporate QA Manager.

3. There is a clear commitment in writing by the Senior Vice President of Engineering and Construction, that the QA Managers have the authority as well as the responsibility to identify quality problems, to initiate, recommend, provide or review solutions; and to verify implementation of solutions.

4. There is a clear delegation of stop work authority to the various QA Managers.

5. Duke Power's commitment to controls, that require the QA Managers to document and report the results of their effort not only to those in charge of the various line departments but also to the Corporate QA Manager.

6. Duke Power's commitment that in the event of disputes between a line manager and the Corporate QA Manager over the adequacy of performance of QA personnel, the Corporate QA Manager's vote shall take precedence, i.e., he shall have veto power over the line manager's performance evaluation.

Based on the information above and verification of implementation of the QA program, as now constituted, we conclude that the QA organizational structure of Duke Power meets the intent of Criterion I of Appendix B and is acceptable.

FIGURE 4

# DUKE POWER COMPANY
## CONSTRUCTION DEPARTMENT
## ORGANIZATION CHART FOR QUALITY ASSURANCE

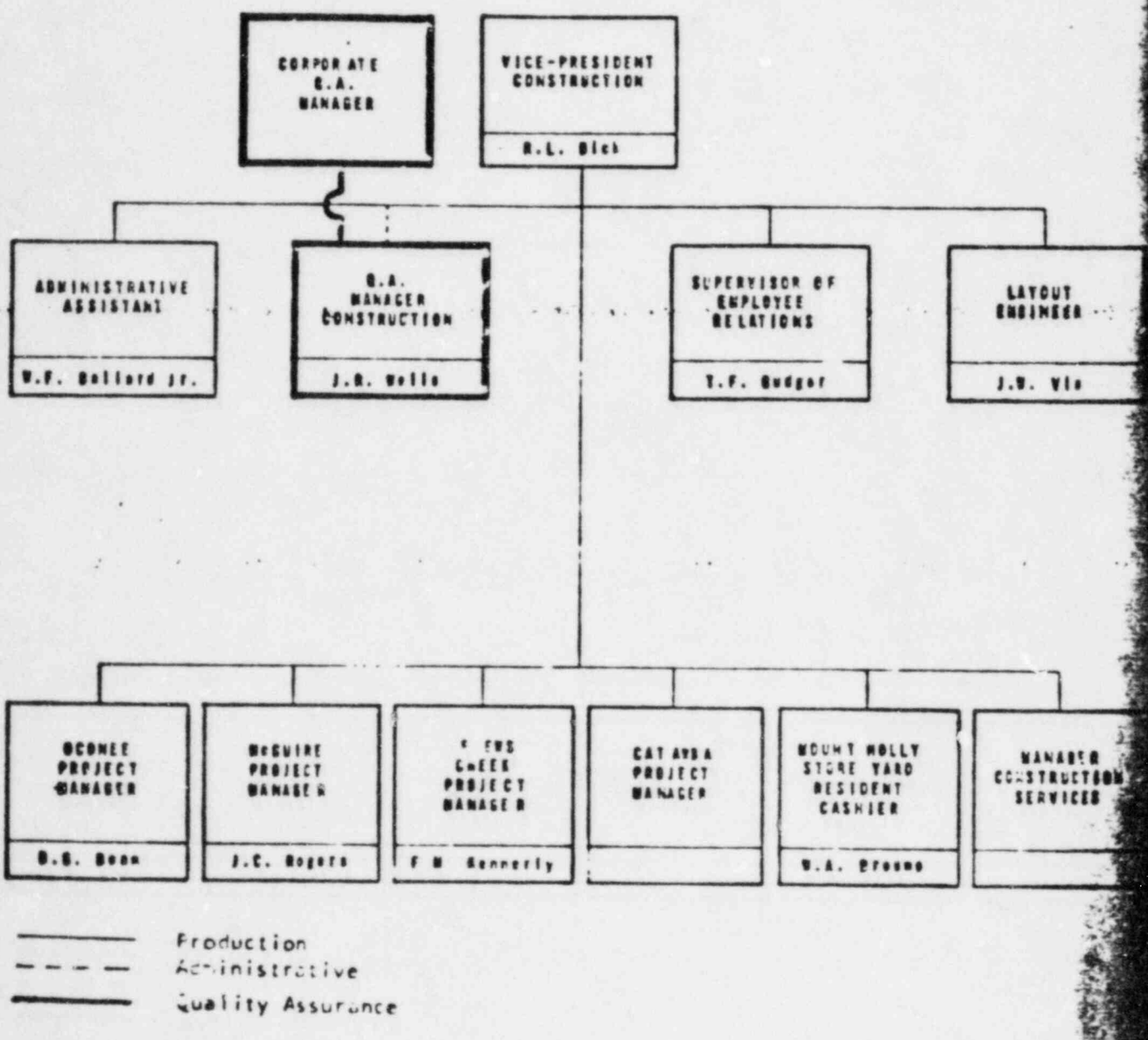

FIGURE 1

# DUKE POWER COMPANY
## DESIGN ENGINEERING DEPARTMENT
## ORGANIZATION CHART FOR QUALITY ASSURANCE

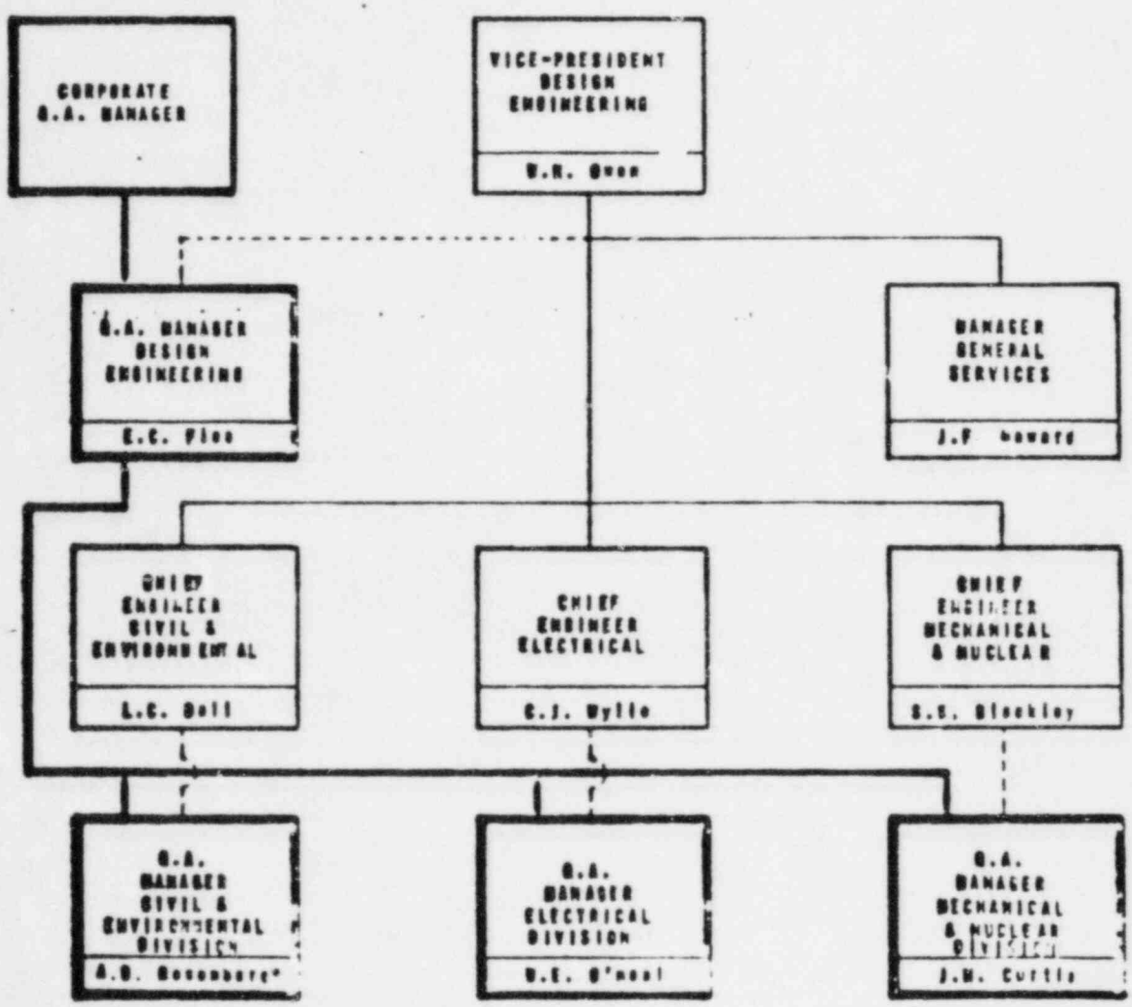


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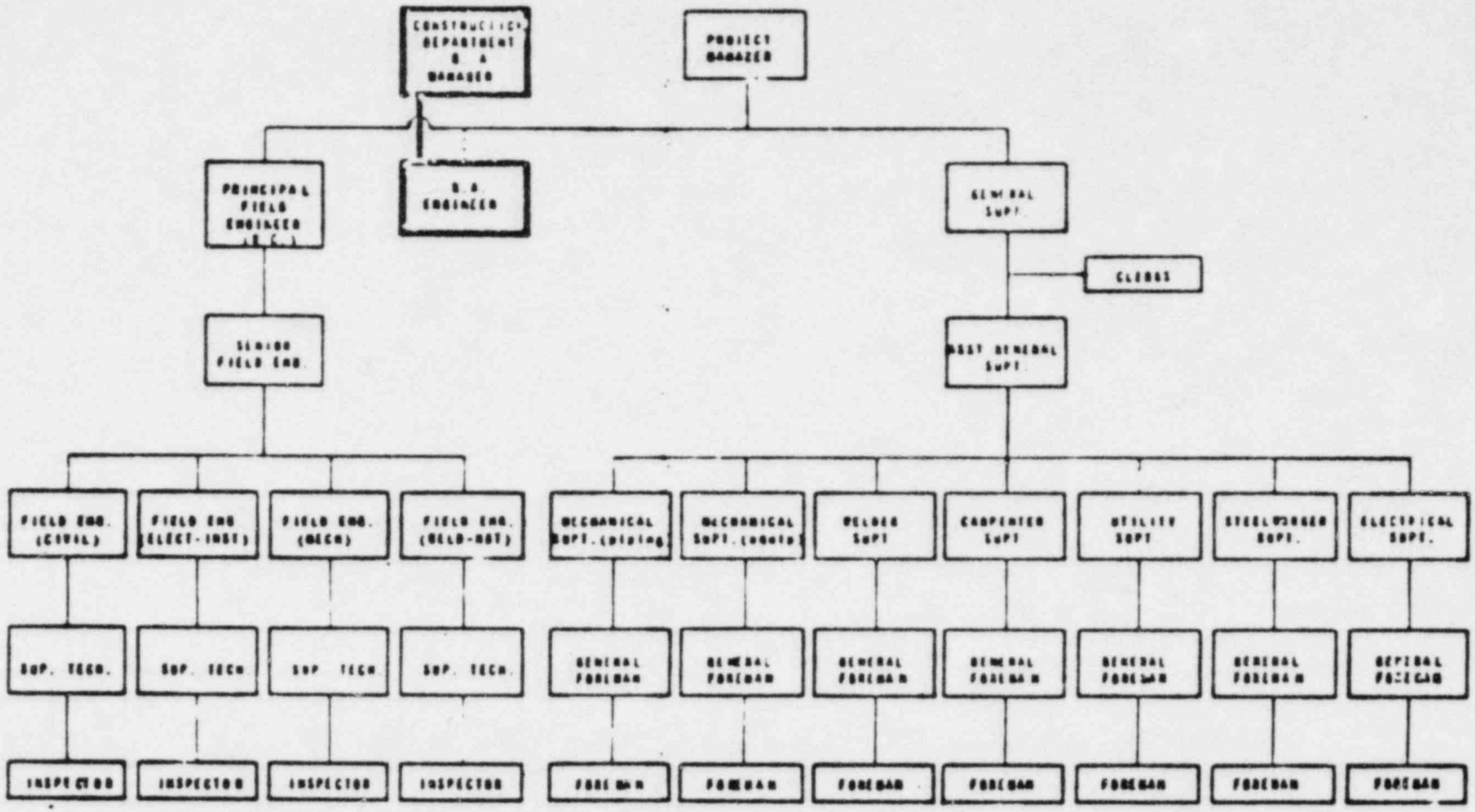
FIGURE 3

DUKE POWER COMPANY

CONSTRUCTION DEPARTMENT

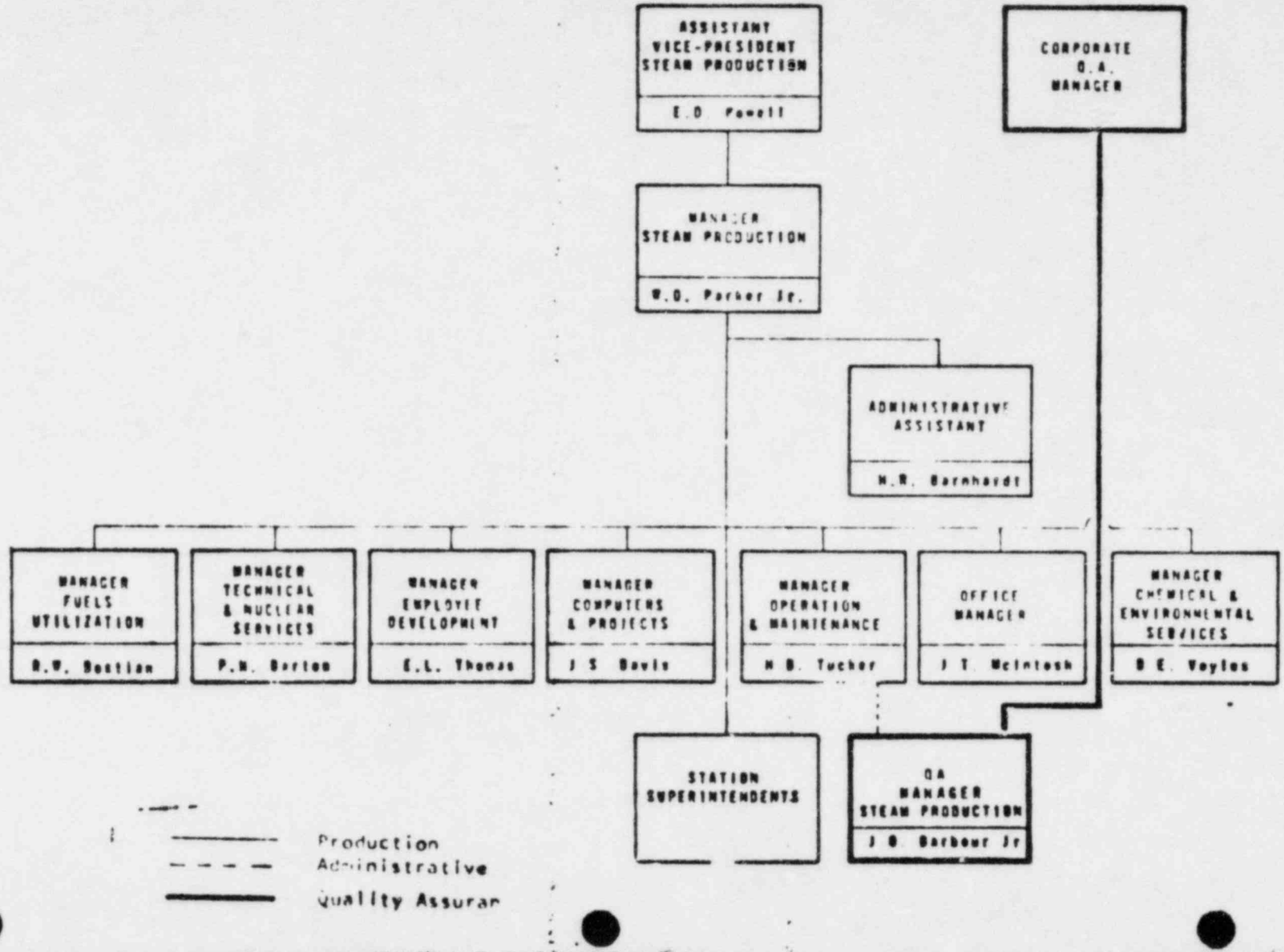
CATAWBA NUCLEAR STATION - ORGANIZATION CHART



# STEAM PRODUCTION DEPARTMENT

## ORGANIZATION CHART FOR QUALITY ASSURANCE

FIGURE 4



TESTIMONY OF BRUCE J. COCHRAN

1. My name is Bruce J. Cochran. I am presently employed by the Directorate of Regulatory Operations (RO) in Region II, Atlanta, Georgia. I am the Principal Reactor Inspector for the Duke Power Company, McGuire Nuclear Station. I graduated from the University of Miami in 1958 with a B.S. in Electrical Engineering.

2. As the Regulatory Operations Inspector I regularly inspect the construction, design and procurement activities for compliance with AEC regulatory requirements and PSAR commitments. My inspection effort includes the continuous evaluation of the development and implementation of the quality assurance (QA) program.

3. The Nuclear Steam Supply System for the McGuire Station is supplied by Westinghouse Electric Corporation with the design, procurement, and construction for all structures and the balance of plant systems by Duke Power Company. Duke is also responsible for the development and implementation of the QA program.

4. The initial audit of the QA program was performed in the Duke Power Company offices in Charlotte, North Carolina by a team of inspectors from the Region II office in March, 1971.

5. Subsequently, inspections were performed of construction activities granted under the exemption to the construction permit, in accordance with 10 CFR 50.12, until the issuance of construction permits CPPR-83 and CPPR-84 for McGuire Nuclear Station Units 1 and 2 in February, 1973. The inspection consisted of detailed examinations of QA records,

observation of construction activities, and interviews with personnel at the construction site and in the design engineering offices.

6. In January, 1973, Duke Power Company reorganized the Corporate QA organization with the appointment of a Corporate QA manager and Department QA managers for the Construction Department, Design Engineering Department, Purchasing Department, and Power Production Department with the Department QA managers reporting to the Corporate QA manager on all matters relating to Quality Assurance.

7. The Construction QA manager has a staff of QA engineers and technicians to provide technical support to the QA engineers at the construction site, and to develop QA procedures. The site QA engineer performs audits of construction activities and QA records, evaluates the performance of QC inspectors, and monitors construction procedures for conformance to code and regulatory requirements.

8. The Engineering Design Department consists of the Civil-Environmental Division, Electrical Division, and Mechanical-Nuclear Division with QA manager from each Division reporting to the Department QA manager. The Divisional QA managers have staffs of technicans and specialists to perform surveillance over engineering activities and perform vendor inspections to qualify vendors to (a) supply nuclear grade products and to (b) inspect the fabrication of purchased equipment and material.

9. All QA matters relating to procurement activities are handled by the Purchasing Department QA manager.

10. The Department and Divisional QA managers schedule the Corporate audits, select the auditors from representatives from each Department, except the Department of construction site to be audited. The auditors prepare the audit procedure and submit it to the Department QA managers for approval. The audit report is submitted to the Corporate QA manager who initiates action on identified deficiencies.

11. RO has performed two unannounced inspections at the McGuire Construction site to evaluate the operation of the new QA organization. During the second inspection three apparent violations of the requirements of 10 CFR 50 Appendix B were identified. Although cited against other criteria, two of the violations were indirectly attributed to inadequate deficiencies in the present implementation of the new QA organization. One violation (Criterion VI - Document Control) resulted from insufficient review of design drawings by the engineering department. The other violation (Criterion X - Inspection) identified the lack of independence between inspection and construction activities. (see appended notice of violation).