TABLE 2

OTHER SENIOR NUCLEAR MANAGERS

PROMOTED OR HIRED SINCE JANUARY 1986

(All TVA Employees)

Title/Function	Name of Senior Manager
Special Projects Manager, NQA	W. E. Andrews
Materials and Procurement Quality Manager, NQA, NAS	D. R. Armentrout
Quality Control Manager, SQN, NQA, NAS	T. J. Arney
Radiological Control Manager, NAS	J. H. Barker
Chemistry and Environmental Protection Manger, NAS	J. L. Bates
Maintenance Superintendent, SQN, NPP	R. J. Beecken
Construction Manager, WBN	R. W. Bradford
Information Systems Manager, NAS	D. J. Bunch
Nuclear Quality Audit and Evaluation Manager, NQA, NAS	T. E. Burdette
Project Controls and Financial Services Manager, SQN, NPP	W. L. Byrd III
Nuclear Fuels Manager, NTD	R. R. Calabro
Plant Manager, BFN, NPP	G. G. Campbell
Browns Ferry Site Licensing Manager, NLRA	P. P. Carier
Coordinating Engineer, NE	R. L. Carle
Operations Review Manager, NMRG, NAS	T. D. Cosby
Site Quality Manager, SQN, NQA, NAS	S. W. Crowe
Coordinating Engineer, NE	G. W. Curtis
Methods Manager, NE	W. D. Deford
Special Programs Manager, NQA, MAS	R. W. Dibeler
Coordinating Engineer, NE	W. L. Elliott
Mechanical Methods and Equipment Maintenance Manager, NPP	C. R. Favreau
Field Engineer, Modifications, SQN, NPP	H. J. Fischer
Quality Assurance Manager, SQN, NQA	T. A. Flippo
Technical Support Superintendent, SQN, NPP	R. W. Fortenberry
Coordinating Engineer, NE	H. R. Gavankar
Coordinating Engineer, NE	J. E. Gibbs
Steam Generator Maintenance & Technical Manager, NTD	D. F. Goetcheus
Watts Bar Program Team Member, NE	A. K. Gwal
Finance and Planning Manager, NBO	W. R. Hamm
Manager-in-Training, (SRO), NPP	M. R. Harding
Coordinating Engineer, NE	R. R. Hoesly
Watts Bar Program Team Member	W. V. Horn
Electrical Engineering Manager, NE	J. D. Hutson
Operations Superintendent, BFN, NPP	J. W. Hutton
Manager-in-Training, (SRO), NPP	L. L. Jackson
Coordinating Engineer, NE	K. S. Jadeja

TABLE 2

OTHER SENIOR NUCLEAR MANAGERS

PROMOTED OR HIRED SINCE JANUARY 1986

(All TVA Employees)

Title/Function	Name of Senior Manager
Site Quality Manager (WBN/BLN), NQA, NAS	H. C. Johnson
Nuclear Training Manager, NAS	R. J. Johnson
Lead Engineer (Power), BFEP, NE	H. L. Jones
Chief, Project Services Engineer, NE	C. W. Kilgore
Protective Services Manager, NAS	W. R. Lagergren
Sequoyah Site Director, NPP	J. T. LaPoint
Reliability and Performance Manager, NE	L. W. Lau
NDE Engineering Manager, NQA, NAS	R. L. Lumpkin, Jr.
Coordinating Engineer, NE	J. R. Lyons, II
Work Control/Outage Superintendent, BFN, NPP	S. R. Maehr
Watts Bar Project Engineer, NE	P. R. Mandava
Manager, Nuclear Quality Assurance, NAS	L. E. Martin
Chief Civil Engineer, NE	J. K. McCall
Project Management Manager, Watts Bar	J. A. McDonald
Management Systems and Nuclear Procedures Manager, NAS	R. C. McKay, Jr.
Modifications Manager, SQN, NPP	R. C. Miles
Technical Support Superintendent, BFN, NPP	D. C. Mims
Quality Assurance Manager, WBN, NQA, NAS	J. P. Mulkey
Nuclear Managers Review Group Manager, NAS	G. R. Mullee
Chief Materials Technology Engineer, NE	J. F. Murdock
Task Project Engineer, NE	R. J. Ogle
Manager-in-Training, (SRO), NPP	R. W. Olson
Nuclear Experience Review Manager, NLRA, NTD	T. W. Overlid
Bellefonte Site Manager, WBN/BLN	B. F. Painter
Quality Programs Manager, NQA, NAS	R. C. Parker
Configuration Management Manager, NAS	J. T. Parlier
Operations Superintendent, SQN, NPP	J. D. Patrick
TVA Licensing (Rockville Office) Manager, NLRA	P. J. Polk
Work Control/Outage Superintendent, SQN, NPP	G. G. Putt (Acting)
Engineering Manager, NE	W. S. Raughley
Licensing Project Management Manager, NLRA	M. J. Ray
Senior Materials Engineer, NE	J. A. Roach
Senior Program Manager, NAS	C. G. Robertson
Special Projects Manager, NTD	R. F. Rogers, III
Manager-in-Training, (SRO), NPP	L. H. Sain
Coordinating Engineer, NE	R. A. Sessoms
Planning and Analysis Manager, NMRG, NAS	R. D. Smith

TABLE 2

OTHER SENIOR NUCLEAR MANAGERS

PROMOTED OR HIRED SINCE JANUARY 1986

(All TVA Employees)

Title/Function	Name of Senior Manager
Project Engineer, BFN, NE	R. J. Smith
Plant Manager, SQN, NPP	S. J. Smith
Electrical and Instrument Methods and Equipment Maintenance Manager, NPP	J. A. Teague
Site Quality Manager, (BLN), NQA, NAS	B. J. Thomas
Project Engineer SQN, NE	P. G. Trudel
Site Quality Manager, BFN, NQA, NAS	G. G. Turner
Engineering and Modifications Restart Manager, BFN	H. H. Weber
Chief Nuclear Technology Engineer, NE	D. W. Wilson
Modifications Manager, BFN, NPP	R. E. Young
Browns Ferry Site Director, NPP	O. J. Zeringue
Industry and Technical Programs Manager, NTD	J. D. Ziegler

assistance from the contract manager to evaluate the performance of the permanent TVA manager against the performance requirements established by the Senior Vice President, Nuclear Power. Specifically, in the case of the replacement for the Senior Vice President, Nuclear Power, this concept of overlap was assured.

B. TVA's Long-Term Actions to Provide for a Sufficient Number of Experienced Nuclear Managers

In the initial short-term staffing, several members of TVA's new management workforce were not permanent TVA employees. TVA made arrangements to replace the loaned managers with experienced nuclear managers who are permanent TVA employees and to upgrade the management skills and experience of the TVA managers. TVA has taken two actions to accomplish this.

1. Recruiting Program

TVA has a significant ongoing recruiting effort. TVA is stressing the recruitment of experienced managers as well as other experienced professionals to serve as permanent TVA employees. Some of the elements of this program are: the use of search firms to identify candidates, a targeted recruitment effort for selected management positions, and a selection process that includes thorough background investigations, and certification of employment, selections, promotions, and management assignments for managers.

While efforts have been initiated to mitigate its impact, the statutory limit on salaries of TVA employees remains a long-term problem to be solved and TVA does not expect that it will be able to recruit all of the necessary experienced nuclear managers from outside of TVA over the long-term, nor does it expect to retain all of its senior nuclear managers.

Accordingly, as is discussed below, Nuclear Power plans a long-term program to develop a number of experienced nuclear managers from within its own organization.

2. Management Development and Training

TVA has a large staff of technically competent individuals, many of whom possess the potential for developing into excellent nuclear managers. TVA intends to develop the managerial potential of the best of these individuals by placing them in responsible positions under the direction and guidance of TVA's senior nuclear management and by implementing a Management Development and Training program that includes the following elements:

- Identification of managerial skill and staffing needs for effective management of Nuclear Power.

- Training and development activities to provide managers at all levels with the skills needed to provide leadership and meet the challenges of managing in Nuclear Power.

- Implementation of Management Development Planning as needed to meet job performance and competency requirements.

- Programmatic changes in the personnel management and performance appraisal processes that support the effective selection, retention and promotion of competent supervisors and managers.

The program will support the Senior Vice President's philosophy of excellence and emphasize the responsibility and accountability of management for maintaining standards of excellence, not only in quality and safety, but also in how people and functions are managed.

A management training plan has been developed using in-house resources with input and guidance from management training experts from a utility which has successfully undertaken a similar effort to improve management effectiveness on a major scale. The plan includes training courses covering basic skills and management philosophy for each level of management.

In addition, a management development plan will be developed to include such activities as:

- Implementation of individual and organizational training and development plans as needed to support the Senior Vice President's commitment to stable and effective management of Nuclear Power activities.

- Implementation of or improvements to supporting systems for Management Development such as succession planning and performance appraisal.

The long-term goal of the Nuclear Power management development system is to prepare managers in sufficient numbers and with sufficient skills to assume responsibility at all levels in Nuclear Power, including senior management.

It will address development of the individual manager and development of the management system as a whole in order to address problems with and future needs for managerial effectiveness in Nuclear Power.

To assure that these goals are accomplished, TVA has reorganized the management development and training functions. Management development and management training are the responsibility of the Manager of Nuclear Human Resources.

C. Conclusions

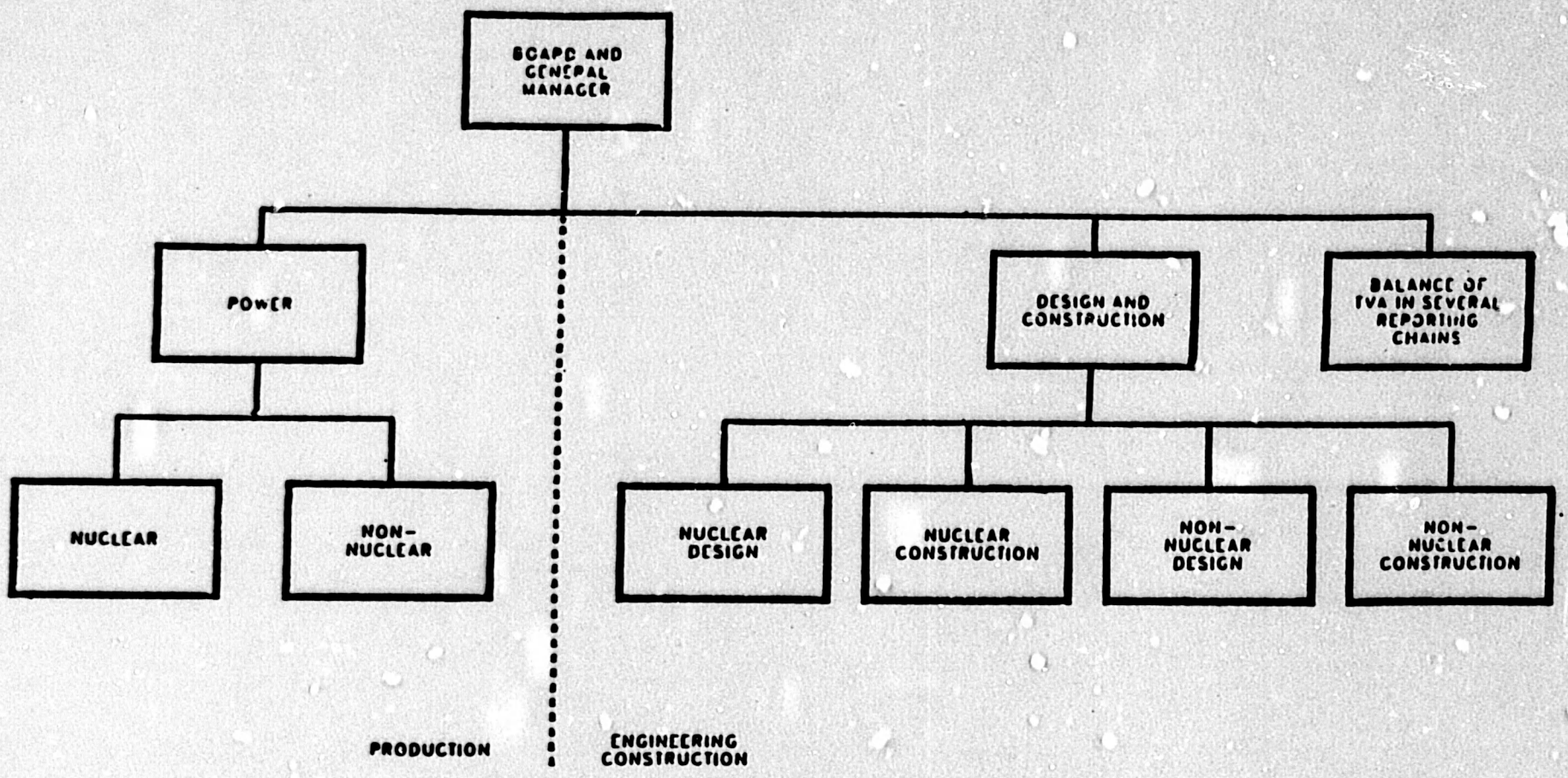
TVA has taken and will be taking additional short-term and long-term actions to increase the number of experienced managers for its nuclear program. Supplementing these actions with the management development courses will provide Nuclear Power with the necessary qualified managers to accomplish actions described in this revised Corporate NPP.

IV. RESTRUCTURING OF TVA'S ORGANIZATION

A. Introduction

Some of the problems in TVA's nuclear program have involved a lack of communication and coordination among TVA's nuclear organizations and an uncertainty regarding lines of authority and responsibility. Other problems involved a lack of centralized direction and control by TVA's nuclear management. Both of these problems are at least partly attributable to the manner in which TVA's organization was structured. As is explained below, TVA has taken and is taking action to remedy this situation by restructuring its organization.

Until 1985, TVA's organization did not provide for effective centralized management of its nuclear activities. Instead, as is shown in figure 1, TVA's organization had been divided among power operations, design and construction, and the balance of TVA's activities, each of which was responsible for both nuclear and non-nuclear activities. Consequently, TVA had no upper level management personnel who were devoted exclusively to managing nuclear activities, and the responsibility for the nuclear activities was divided among several departments which did not report to a single senior nuclear manager. Furthermore, each of TVA's nuclear plants acted autonomously, for the most part developing its own programs and systems to control plant activities.



TVA's Organizational Structure Prior to July 1983 (Functional Organization Chart)
Figure 1

As a result of this organizational structure, TVA did not have experienced senior nuclear managers who were in charge of all TVA nuclear activities. Furthermore, TVA's organizational structure made communication and coordination between organizations difficult, and lines of authority and responsibility for specific nuclear activities were not always clear. To complicate this situation further, engineering and design personnel were not located at the operating nuclear plants.

Beginning in 1985, TVA started to consolidate responsibility for its nuclear activities within one central organization and to divest that organization of virtually all responsibility for non-nuclear activities. That process was significantly advanced through the approval by the Manager of Nuclear Power of the organizational structure through the fourth reporting level within the Office of Nuclear Power on May 23, 1986. Additional refinements were made in the organizational structure which went into effect on July 1, 1988.

The restructuring of TVA's nuclear organization has been implemented in three stages, each in a more extensive form. First, responsibility for all of TVA's nuclear activities was consolidated within a single organization, Nuclear Power. Second, primary responsibility for each functional area within Nuclear Power was assigned to the appropriate Vice President or staff manager. Finally, the nuclear headquarters organizations were given responsibility for the technical direction and adequacy of those site support activities within their respective functional areas.

B. Consolidation of TVA's Nuclear Organization

1. Nuclear Power (NP)

Figure 2 depicts TVA's new organizational structure, as of April 1989, for its nuclear activities. As is evident from figure 2, all of TVA's nuclear activities are under the direction and control of the Senior Vice President, Nuclear Power, who reports to the Executive Vice President and Chief Operating Officer and the Board of Directors of TVA. The Senior Vice President, Nuclear Power, may be removed only by the Board of Directors.

The TVA Board of Directors has given the Senior Vice President, Nuclear Power full authority over the nuclear program. Mr. Kingsley's authority includes the power to hire, remove, assign, reassign, or direct any personnel supplied by outside contractors; and subject to the approval of the Board of Directors with respect to senior level TVA managers in accordance with existing reservation of authorities by the TVA Board, the Senior Vice President has the authority to hire, remove, assign, rearrange, or direct any TVA personnel engaged in nuclear power program activities as he may deem necessary or desirable to implement such policies or procedures.

NUCLEAR POWER

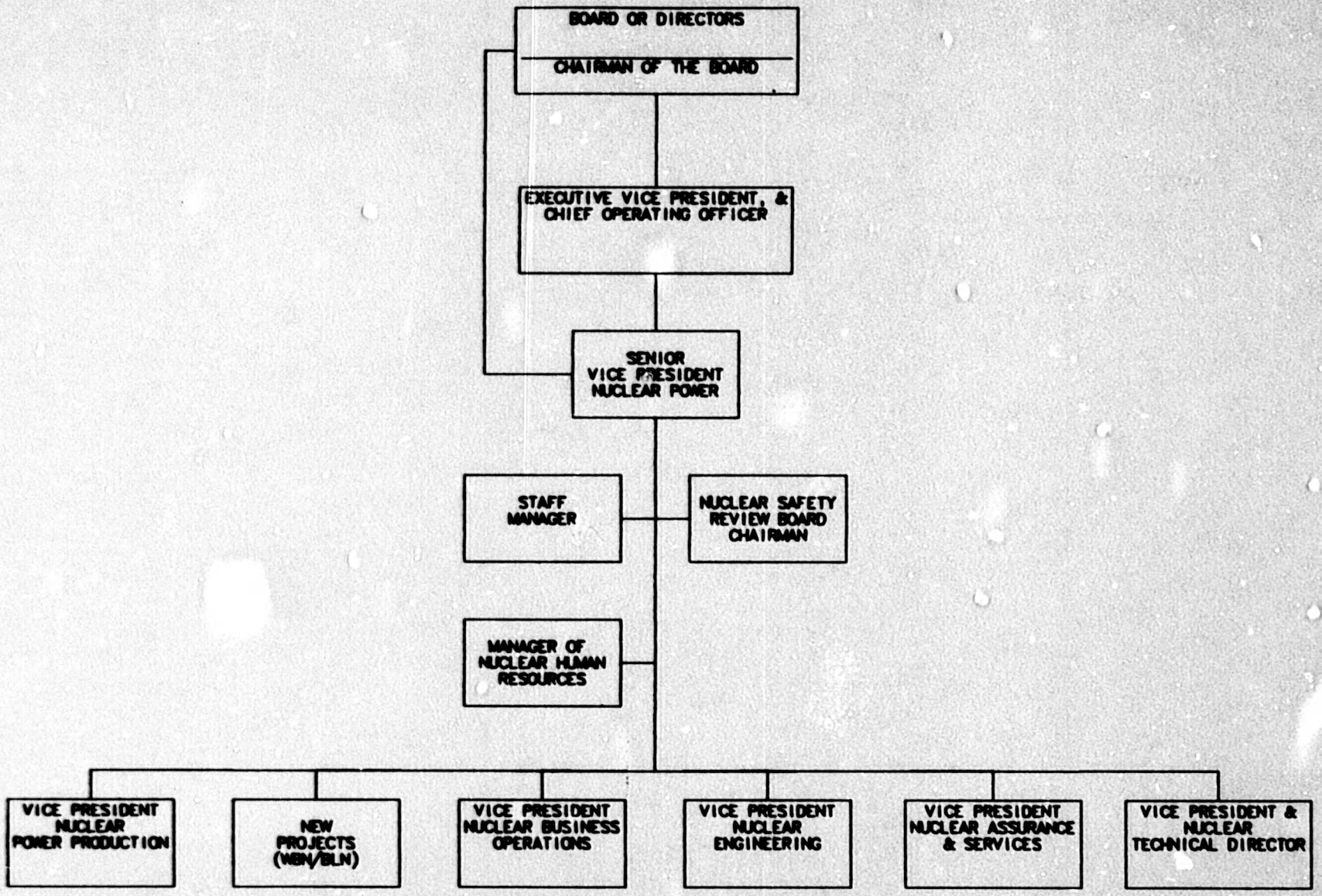


FIGURE 2

2. Interfaces between Nuclear Power and Other TVA Support Groups

Certain of TVA's administrative groups (such as Purchasing) which provide support for the execution of the nuclear program do not report directly to the Senior Vice President, Nuclear Power. Instead Nuclear Power obtains support services from these groups.

There are three basic ways in which Nuclear Power gains support. These are:

a. Support is provided on a scope of effort and budget basis. The supporting organization submits its proposed activities, schedule, and budget for the review and approval of the responsible Nuclear Power manager. All work done by support organizations is under the budget authority controlled by Nuclear Power and the support organization functions similar to a contractor. These organizations include Services and Field Operations, Transmission and Customer Services, Water Resources, and the Power Service Shops.

b. Support is provided by personnel who are an integral part of Nuclear Power activities but who administratively report to an organization outside of Nuclear Power. Examples include the Power Group's Operations Support organization which supports the Materials Management System (MMS) and TVA's Government and Public Affairs which handles media relations.

c. The last area covers support from organizations on an overhead basis which do not have people assigned to Nuclear Power. An example is procurement of materials by Purchasing. While Purchasing does not report to the Senior Vice President, Nuclear Power, the Nuclear Materials organization which reports to the Vice President, Nuclear Business Operations, provides direction to TVA's centralized purchasing activities in support of Nuclear Power's corporate and onsite materials function and the operation of the nuclear site warehouses. Purchasing has been responsive in meeting Nuclear Power requirements and is organized to address unique Nuclear Power needs. Surveillance and performance monitoring occur through periodic reports, monthly interface meetings, as well as daily contact between the Nuclear Materials Organization, the site materials organizations, and the purchasing staff.

Nuclear Power quality-related procurement activities are controlled by the Nuclear Quality Assurance Program to ensure that the regulatory requirements such as 10 CFR 50, Appendix B are properly implemented. Those quality-related procurement activities performed for Nuclear Power by Purchasing are controlled by the Purchasing QA Manual which implements Nuclear Power's Nuclear Quality Assurance Program within Purchasing. Procedures within the Purchasing QA Manual, and revisions thereto, are reviewed and concurred with by NP's Nuclear Quality Assurance organization for

compliance with Nuclear Quality Assurance Program requirements. The Purchasing QA Manual and the implementation of the manual are audited for compliance with regulatory requirements on a periodic basis by Nuclear Quality Assurance.

Purchase requisitions are issued in Nuclear Power to Purchasing. The purchase requisitions contain applicable specifications and quality assurance requirements which have been established by Nuclear Power. Purchase requisition are independently verified for adequacy of quality assurance requirements by a qualified reviewer. Nuclear Quality Assurance performs an independent review of QA purchase requisitions based on a graded approach that considers potential impact to nuclear safety and reliability.

Purchasing is then responsible for ensuring that the requirements as stated in Nuclear Power purchase requisitions are incorporated in requests for proposals or invitations to bid, in addition to the applicable commercial terms and conditions. To ensure compliance with the competitive procurement requirements of the TVA Act, Purchasing issues requests for proposals or invitations for bids, receives and opens proposals or bids, and evaluates the commercial responsiveness of bids and proposals.

Bidder deviations, substitutions, or exceptions to technical and quality assurance requirements require Nuclear Power technical and quality assurance review and approval prior to contract award. After contract award, any proposed changes affecting technical or quality assurance requirements likewise require Nuclear Power technical and quality assurance review and approval before Purchasing processes a change to a contract. Source inspections are performed by Nuclear Power's Quality Assurance organization when specified by the requisitioner or whenever deemed necessary by the quality assurance organization. These procedures take advantage of Purchasing's expertise in meeting Government contracting laws and allow Nuclear Power to focus its efforts on ensuring that nuclear regulatory requirements are properly implemented.

As the Nuclear Power organization is consolidated, standardized procedures have been developed to control the interfaces with other TVA organizations that perform functions for, or provide support to, Nuclear Power.

By divesting the nuclear organization of virtually all responsibility for non-nuclear activities, TVA's nuclear organization is able to focus its full attention on assuring the safety of its nuclear plants. Additionally, by placing all responsibility and authority for TVA's nuclear activities under a single manager reporting to the highest level of TVA's organization, TVA's Board of Directors has established a management position which can exercise strong and

consistent control over its nuclear program and ensure that the activities of TVA's various nuclear organizations are coordinated. Finally, by creating the position of Senior Vice President, Nuclear Power, the Board has established a position where a highly qualified and experienced manager can provide the necessary leadership to remedy TVA's existing nuclear problems, provide a means for quickly resolving any problems which may develop in the future, and provide frequent reports to the Board on the performance of TVA's nuclear program.

C. Consolidation of Responsibility for Functional Areas Within Functional Organizations

As described above, prior to 1985, TVA's organization did not provide for effective centralized management of its nuclear activities. Additionally, responsibility for various functional areas (such as quality assurance) was divided among several groups. As a result, functional activities were not subject to central control, coordination of activities was sometimes difficult, and many support activities (such as quality assurance) did not have high visibility with management. As described below, TVA has taken and is taking steps to improve this situation.

TVA's nuclear headquarters personnel have been divided into several newly created organizations, each of which has responsibility for a discrete type of function. Five headquarter organizations are headed by a Vice President who reports directly to the Senior Vice

President, Nuclear Power and is responsible for all of the activities within the assigned functional areas. These organizations are headed by the Vice President, Nuclear Power Production; Vice President, Nuclear Engineering; Vice President, Nuclear Assurance and Services; Vice President and Nuclear Technical Director; and Vice President, Nuclear Business Operations. A new Projects organization has been established reporting to the Senior Vice President of Nuclear Power which includes the Watts Bar Site Director. Additionally, the Nuclear Safety Review Board Chairman, Staff Manager, and Manager of Nuclear Human Resources report to the Senior Vice President of Nuclear Power.

Additionally, each of TVA's nuclear organizations is responsible for developing programs and standards, providing technical direction, and providing technical support for all activities within its functional area, including activities at TVA's nuclear plants. Moreover, the Vice President or manager of each of TVA's nuclear headquarters organizations (and the line managers under that position) is accountable for the technical adequacy of all TVA activities within the functional area.

This arrangement of TVA's nuclear organization and assignment of functional responsibilities has several advantages compared to TVA's prior organization. First, until the 1986 reorganization occurred, TVA did not have groups with overall responsibility and authority for TVA's nuclear activities in the areas such as nuclear training and nuclear personnel. By establishing these organizations, TVA has provided added emphasis on the importance of these functions.

By placing responsibility for these functions within a single organization, TVA has established the means to effect centralized direction of these functions and has provided added emphasis on their importance. Finally, by making each nuclear organization responsible for the technical adequacy of functional activities within its respective area, TVA has provided a means for establishing centralized direction and control of its nuclear activities at the sites.

D. Centralized Direction of Site Activities

TVA's activities at each of its nuclear sites is headed by a Site Director. The Sequoyah and Browns Ferry Site Directors report to the Vice President, Nuclear Power Production. The Site Director, Watts Bar reports to the Senior Vice President, Nuclear Power. This organizational structure ensures centralized control over the plant activities.

TVA's nuclear site personnel are divided into line organizations for operation of the plant and major support organizations, each of which have responsibility for a discrete type of function. In general, the functions of the support organizations at each site parallel those of the nuclear headquarters organizations but serve the needs and requirements of one particular site.

As is depicted in Figures 3, 4, and 5, each of TVA's nuclear headquarters organizations has responsibility for providing technical direction and assuring the technical adequacy of the

activities performed by its support organizations at TVA's nuclear plants. The Nuclear Power Plant Managers have the authority and responsibility for the safe operation of the plant. The Site Directors have the authority and responsibility for providing general direction to the Plant Manager, and performing the planning, scheduling, coordinating, and project management activities, to achieve TVA's overall goals. This structure assures that nuclear site organizations receive uniform technical direction from nuclear organizations which specifies how an activity should be performed, while giving the Site Directors sufficient authority to determine what site activities should be undertaken and when they should be accomplished.

As a part of the implementation of the above organization, the Senior Vice President initiated a program to assure that lines of authority and responsibility are clear and that personnel understand their duties and responsibilities, that they have the resources to get their jobs done, and that they know they are accountable for the quality and timeliness of their work. This program involved writing position descriptions for each of TVA's nuclear Vice Presidents, managers, and specialists. These position descriptions define the responsibilities for which an individual is held accountable and against which performance is measured. Position descriptions were reviewed by a review team composed of senior TVA and consultant personnel who reported to the Senior Vice President. The purpose of this review was to identify any weaknesses, duplications of effort, or missing functions in the position descriptions and to assure that key interface responsibilities between groups are properly defined.

NUCLEAR POWER
NUCLEAR POWER PRODUCTION
BFN

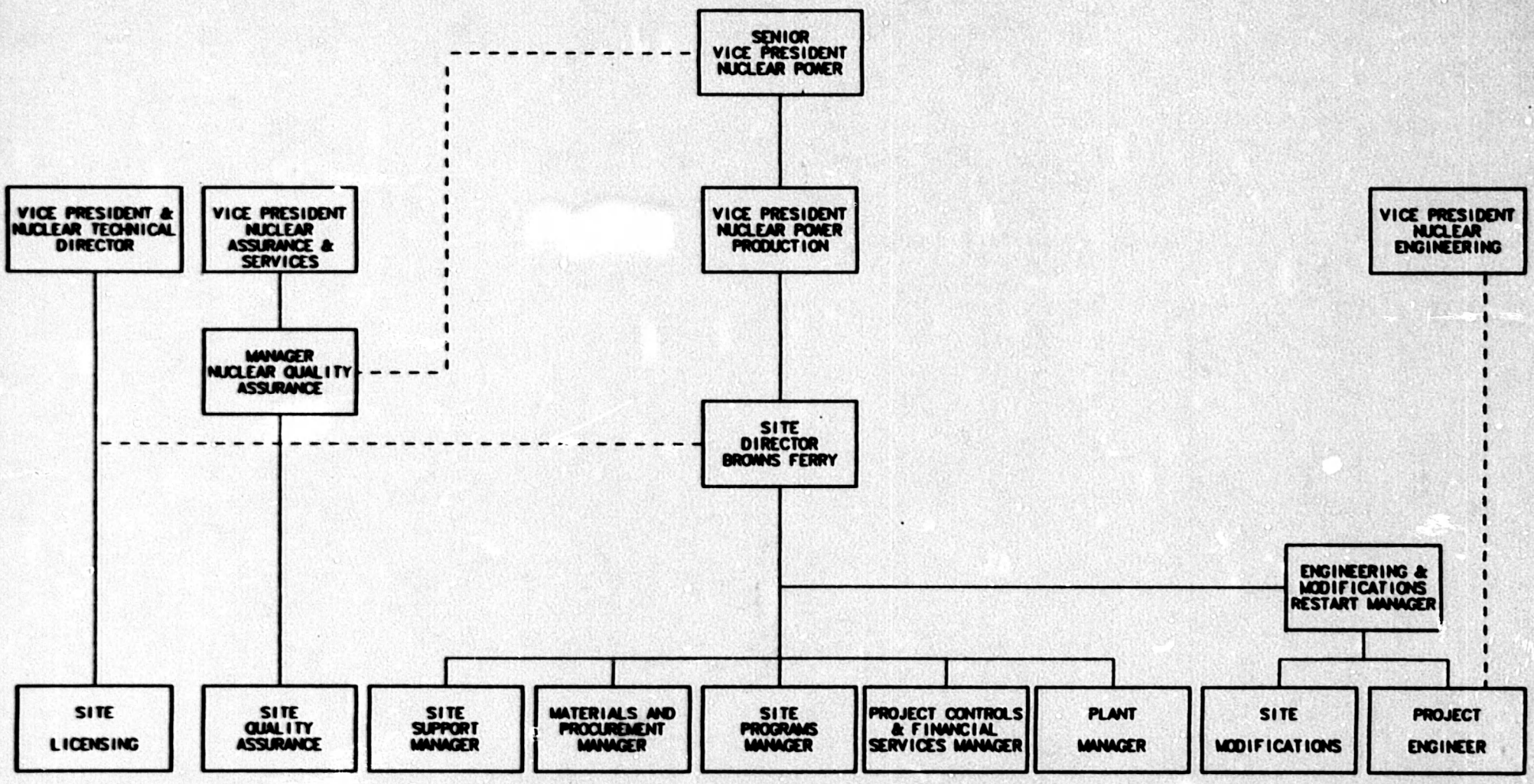


FIGURE 3

NUCLEAR POWER
NUCLEAR POWER PRODUCTION
SQN

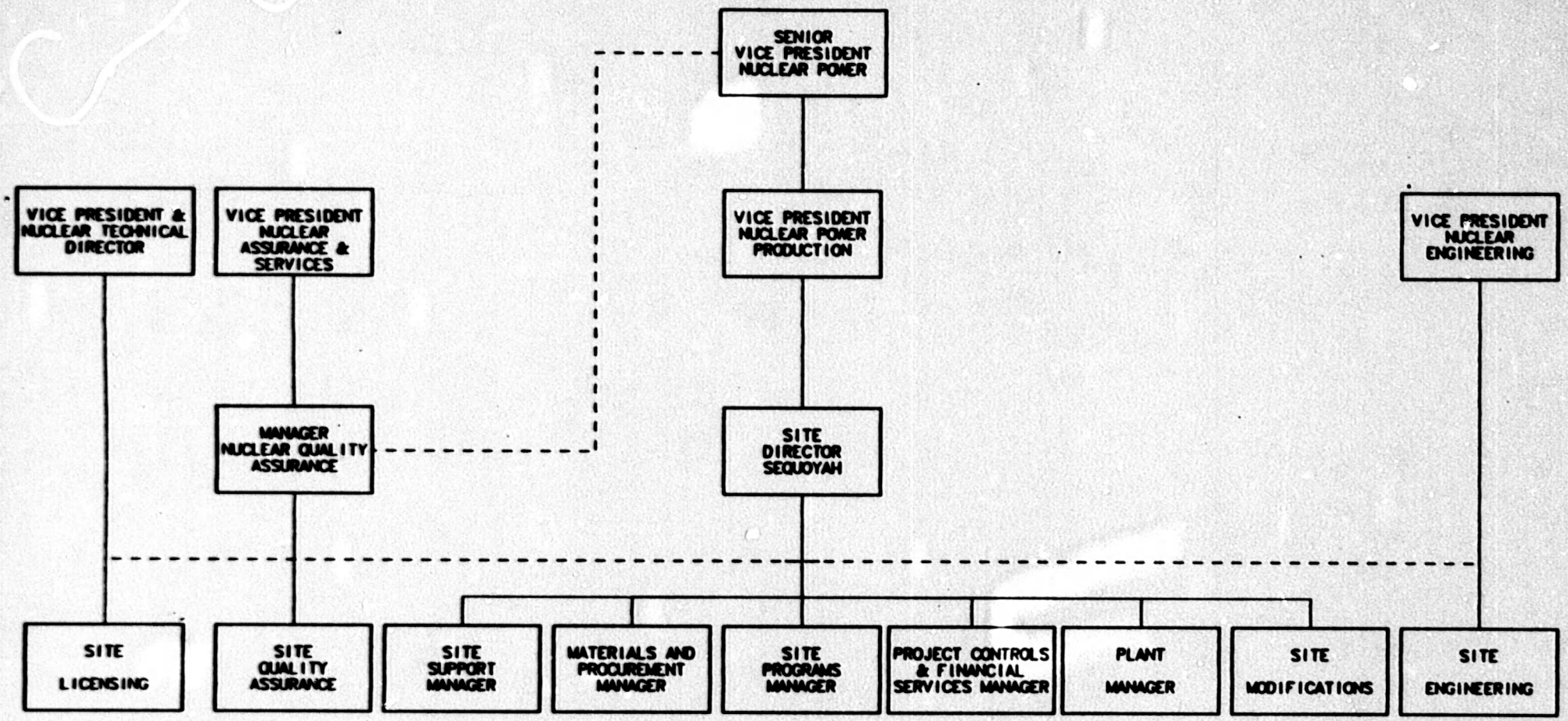


FIGURE 4

NUCLEAR POWER
SITE DIRECTOR, WATTS BAR

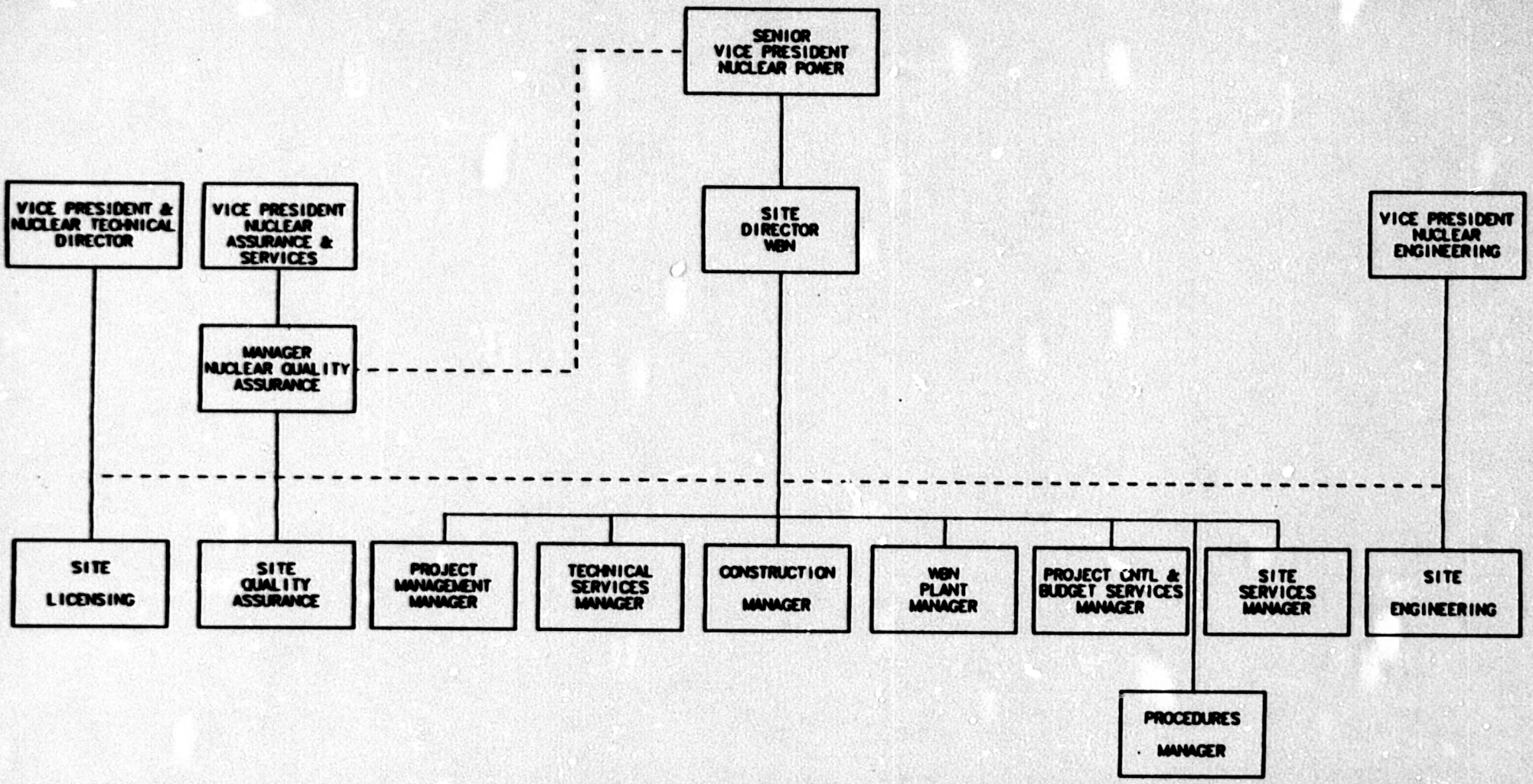


FIGURE 5

The Senior Vice President provided guidance to the organization through the issuance of a Policy and Organization Manual (P&OM) on December 31, 1986, that set forth policy in major areas and defined the organizational structure (in command chart format) together with the organization description for each key functional component of the organization. The P&OM is a living document and will be revised, as necessary, to reflect organizational changes or policy changes.

In the event a conflict develops into a situation where the Vice Presidents cannot agree on an issue, the Senior Vice President has the ultimate responsibility for the resolution of the conflict. The administrative system of policies, position descriptions and procedures is intended to minimize the number of technical and management disagreements or problems that the Senior Vice President is required to settle. It is recognized that policy clarifications and organizational changes will be needed as the system evolves and these are reserved to the Senior Vice President. Future updates to organization descriptions will be made through submittal of, and changes to, an organization description topical report.

E. Improvements in Specific Functional Areas

TVA expects that consolidation of responsibility for functional areas within individual nuclear organizations will result in substantial improvements in quality assurance, engineering, training, licensing, security, and safety review. Accordingly, each of these areas is discussed in more detail below.

1. Quality Assurance

In the past, TVA's nuclear quality assurance (QA) and quality control (QC) functions had not been effectively unified under a single department. For example, TVA had one nuclear QA organization which was responsible for conducting corporate-level audits; it had another nuclear QA group within the construction organization which was responsible for conducting inspections of construction activities; it had another nuclear QA group within engineering which was responsible for conducting audits of engineering activities, and it had still other QA groups at each nuclear site responsible for QA/QC activities at the site. As a result, TVA's nuclear QA activities were not performed under a consistent set of programs and procedures, and TVA's nuclear QA groups did not report to a high level of management within TVA (thereby diminishing the visibility and importance of these activities to management). TVA has taken several steps to improve this situation.

In the current organization, all quality assurance and quality control functions report to the Manager, Nuclear Quality Assurance (NQA). The responsibility for the various quality assurance functions throughout Nuclear Power, including QA/QC activities related to engineering, construction, operations, and maintenance has been consolidated under the Manager, NQA. The Manager, NQA, reports directly to the Vice President, Nuclear Assurance and Services (NA&S). However, the Manager, NQA,

has direct unencumbered access to the Senior Vice President and other vice presidents on quality matters warranting such attention. This is to ensure that the quality organization continues to have sufficient independence and organizational freedom from the influence of cost and schedules to be able to effectively assure conformance to quality assurance program matters.

The Manager, NQA, is responsible for developing and maintaining the quality assurance program requirements and verifying the implementation of a nuclear quality assurance program for the engineering, design, construction, and operation of TVA-nuclear facilities that meet regulatory and TVA policy requirements. The establishment of the requirements of the Nuclear Quality Assurance program is addressed as follows:

- TVA Nuclear Quality Assurance Plan (QA Plan)

The TVA Quality Assurance Topical Report (TVA-TR-75-1A) was revised, upgraded, and submitted to the NRC as proposed Revision 10 on May 4, 1988, to describe the NP organization and QA program as of that time.

The TVA Nuclear Quality Assurance Plan (QA Plan) which replaces the TVA Quality Assurance Topical Report (TVA-TR-75-1A) was submitted to NRC on March 30, 1989. This plan is TVA's standardized Quality Assurance Program and reflects improvements

in that program and changes in TVA's philosophy associated with the responsibilities for quality. Basic improvements include:

1. Consolidation of programs previously described in Sections 17.0 (General), 17.1 (Design and Construction), and 17.2 (Operations) of the TVA Topical into one Topical QA Plan.

2. Broadening of the scope to include not only safety related, but also quality-related augmented programs.

3. Delineation of specific responsibilities for line verification activities, with emphasis on the line organization being responsible and accountable for developing quality programs and for quality performance.

4. Incorporation of the graded approach concept which applies a degree of QA verification commensurate with an item or activity's importance to safety.

5. Clarification and update of TVA's commitment to ANSI Standards and Regulatory Guides.

- Nuclear Quality Assurance Manual (NQAM)

Presently the NQAM, which contains the basic QA program requirements and the "how to" specifics for the operations phase, reflects TVA's current QA commitments. However, sponsorship for the QA program "how to" details now incorporated in the NQAM is being transferred to the responsible line organization and integrated into the Nuclear Procedures System (NPS) documents. The extent of standardization of the detailed "how to" QA program is defined by the Vice Presidents. The resulting quality-related corporate-level NPS documents, Directives and Standards, and their subsequent revisions will require the concurrence of the Manager, Nuclear Quality Assurance. The program is strengthened in that this transition ensures that the regulatory quality requirements are maintained while placing the focus for development of the "how to" program at the responsible organization level.

Site Quality Managers, and the Manager, Nuclear Quality Assurance have the authority and responsibility to issue formal Stop Work Orders to terminate work. Stop Work Orders will be issued when line managers fail to act on a condition which if allowed to continue could have an unacceptable effect on quality or the health and safety of the public or employees.

In the reorganization of quality assurance functions, the Manager, Nuclear Quality Assurance has assumed the

responsibilities for both QA and QC activities. The following actions are being implemented to enhance the procedure system that addresses the Nuclear Quality Assurance (NQA) activities.

a. Where required, additional QA or QC procedures were written to cover new functions.

b. NQA internal QA and QC procedures have been consolidated into a single set of procedures.

c. Functions that will be performed uniformly throughout Nuclear Quality Assurance have been identified and the multiple procedures that now exist for these functions are being replaced by a single procedure applicable to all organizations.

As new quality-related procedures are developed in the Nuclear Power Procedures System, Nuclear Quality Assurance reviews or monitors those that delineate Quality Assurance requirements.

These actions will help elevate the importance of quality assurance and increase management involvement and direction of nuclear QA activities. These actions will also help assure that nuclear QA/QC personnel are independent of production personnel, that lines of responsibility and authority for nuclear QA/QC activities are clearly defined, and that nuclear QA/QC activities are performed consistently.

2. Engineering

In the past, problems and confusion have developed with respect to TVA's nuclear engineering activities since both the headquarters nuclear engineering organization and TVA's nuclear plants performed engineering activities. TVA has taken action to remedy this situation.

a. Responsibility for all nuclear engineering activities has been consolidated in Nuclear Engineering (NE). This includes the following responsibilities that have in whole or part been performed by TVA's nuclear sites in the past:

- Managing engineering service contracts.

- Directing multi-discipline teams created to investigate and resolve engineering issues (such as fire protection and equipment environmental qualification) associated with individual plants.

- Acquiring, or creating, and maintaining the technical record of the as-built facility and maintaining the record current with changes in the plant.

- Preparing and approving modification packages that change the design and configuration of the plant.

By placing responsibility for these and other engineering activities within Nuclear Engineering, TVA has established clear lines of authority and responsibility for nuclear engineering activities. This will help assure that these activities will be properly performed.

b. Engineering support for TVA's nuclear plants has been further strengthened by establishing a Project Engineering function within Nuclear Engineering for each plant.

The responsibility for engineering for each nuclear plant has now been assigned to a Project Engineer who will be located at the plant site. The Project Engineer has been authorized the engineering resources to perform the plant-specific engineering work. A project team has been assigned to report to the Project Engineer. This project team is principally located at the plant site and is comprised of engineers from each of the engineering disciplines, assigned to the project through a matrix organization. Home office staff will be available to supplement each project team as needed to accomplish their objectives.

Additionally, the Project Engineer shall ensure that the engineering organization provides technical support of TVA's nuclear facilities including the following functions:

- Maintaining the documentation which establishes the technical adequacy of plant equipment, including its design and performance characteristics (form, fit, and function); prescribing and supporting the acceptable operating envelope for equipment and systems; preparing and maintaining specifications containing requirements relative to maintenance and modifications.

- Recommending, through established procedures, changes to improve design, safety, and operability for TVA's nuclear installations.

- Supporting operations through established procedures with safety analysis of non-approved or unanticipated system configuration, operation, or special test; analyzing and interpreting operational monitoring data; and utilizing industry operating experience related to design of nuclear equipment and systems.

The Project Engineer has direct and close control over the work produced for that project and ensures that technical direction provided by the chief discipline engineers is followed for project work.

c. The new NE organization will include a Manager of Services who will report to the Vice President of Nuclear Engineering. The Manager of Services is responsible and

accountable for providing services to the project engineers for the control of: (1) Budgets and Financial Performance, (2) Planning and Scheduling, and (3) Project Administration, (4) computer applications, and (5) training coordination. These services will be performed on a centralized basis for the purpose of establishing policy, coordinating, and monitoring the applicable activities at the project sites. NE has also established a corporate manager of Engineering Support of Procurement to support site procurement functions. These new NE organization changes are designed to provide clear lines of authority and to improve effectiveness of the organization.

d. In 1986, an Engineering Assurance (EA) organization was established within Nuclear Engineering (NE) to strengthen the QA program as it applied to NE and their activities. EA was given broad responsibilities to upgrade NE's programs and procedures as well as responsibility to verify effective implementation of the new design control programs. Because of the magnitude of engineering activities associated with TVA's recovery programs, it was decided to have the Manager of EA report directly to the VP of NE. This was done to

ensure a close working relationship between the programs and line implementing functions. However, to ensure EA had the necessary independence to accomplish its quality assuring responsibilities, EA took technical direction on Quality Assurance matters from the VP of NQA. The programs established by EA for NE were consistent with the Quality Assurance direction in other areas of NP. The main objectives of the EA organization have been accomplished and TVA is transitioning from a construction to an operating organization. As a result, the EA Quality Assurance functions are being integrated into NQA. This integration of quality assurance responsibilities will strengthen TVA's QA programs by: 1) minimizing organizational interfaces and duplication of QA activities, 2) providing better focus of QA verification activities especially in the interface areas between NE and other line organizations such as Modifications, Maintenance, and Operations, and 3) removing EA from NE will reinforce that the line is responsible and accountable for quality. The other functions previously performed by EA will continue to be performed under the new integrated NE organizational structure. Continued integrity and effectiveness of these functions is assured by the anticipated continued involvement of key EA personnel in the new organization structure. The EA activities will be transitioned as follows in a controlled manner.

The following QA functions will be integrated into NQA:

1. Auditing and monitoring engineering activities to determine compliance with QA programmatic requirements.

2. Conducting in-depth technical audits and surveillances, utilizing engineering expertise outside of NQA as necessary to assess the technical adequacy of engineering work.

3. Overview of procured engineering services, including review of procurement documents for QA requirements; auditing contractors who provide engineering services; performing pre-award surveys and reviewing contractor QA programs.

4. Trending of engineering problems identified in programmatic and technical verification activities.

5. CAQ coordination for Corporate NE CAQs and generic implications evaluation for nuclear engineering CAQs.

The following non-QA functions will be the responsibility of the Chief Engineers staff:

1. Developing and maintaining quality-related Nuclear Engineering Procedures (NEPs).

2. Ensuring that engineering procedures interface effectively with organizations outside Nuclear Engineering.

3. Ensuring adequate training for NE employees in the use of quality-related Nuclear Engineering Procedures (NEPs).

4. Trending of engineering related problems to determine existence of adverse trends and corrective action to be taken.

3. Nuclear Training

Prior to 1986, there were inconsistencies in the commitment to training, the implementation of training programs, and training performance at the sites. This condition indicated the need for a strong, centralized training program with uniform standards, motivated managerial involvement at the site level, and the support of top management.

In the new organization, the Nuclear Training (NT) Manager reports directly to the Vice President, Nuclear Assurance and Services and is responsible for technical training programs (including accreditation) and conduct of training programs for nuclear plant operations, quality and management systems, engineering and technical support (including training in the areas of maintenance, radiological control, radiochemistry, fitness for duty and industrial safety), and the nuclear plant

simulators. Under this structure, the Site Director ensures that site personnel are properly qualified and receive the necessary training while the responsibility for development and execution of the training programs rests with the Nuclear Training Manager. Nuclear Training is the corporate training organization which provides central direction, planning, and allocation of resources for the training of personnel at each of the sites. Site training organizations have been established at Browns Ferry (BFN), Watts Bar (WBN), and Sequoyah (SQN). The Power Operations Training Center (POTC) located at Sequoyah serves as the corporate training headquarters and houses portions of the SQN training organization as well. Permanent training centers have been built and occupied at BFN and WBN. Simulators are in place and being used for training at BFN, SQN and WBN.

In the fall of 1986, an independent assessment of the Division of Nuclear Training was performed. The assessment report identified significant strengths but also recommended improvements in several areas. NT analyzed and responded to all conclusions and recommendations. These recommendations concerned training program evaluation and feedback, expansion of NT's organizational scope, long range planning, and implementation of qualification standards (e.g., qualification card systems). An independent followup review was conducted to assess the effectiveness of NT's program improvements. NT has also addressed all associated recommendations.

4. Licensing

TVA has had a nuclear licensing group at its corporate headquarters for a number of years, and it also had licensing groups at each of its nuclear plant locations which were essentially independent of the headquarters group. In its SALP V Report on TVA's nuclear activities (Ref. 1), the NRC stated that "there are weaknesses evident in [TVA's] licensing support as indicated by incomplete submittals, inadequate technical evaluations and justifications, late submittals, failure to report to the NRC (10 CFR 50.72), and repeated [NRC] requests for additional information and supplementary responses to Notice(s) of Violation." TVA has taken steps to improve its management oversight and direction of nuclear licensing activities in order to remedy this problem.

TVA has assigned the responsibility for the management of all TVA nuclear licensing, compliance, and regulatory functions for its nuclear activities to the Manager, Nuclear Licensing and Regulatory Affairs (NLRA) who reports directly to the Vice President and Nuclear Technical Director. Nuclear Licensing and Regulatory Affairs has both a corporate staff for central program management and a site licensing staff reporting to the Manager, NLRA but providing services to the nuclear Site Director. Thus, the Manager, NLRA is responsible for central control (and consistency) of the TVA nuclear licensing process, including implementing policies, developing programs and

strategies, and preparing documentation for licensing activities. NLRA also is responsible for the implementation of TVA's Nuclear Power policy and programs which establish the Independent Safety Engineering Group (ISEG) and the Nuclear Experience Review Program. The ISEG function is expected to be transitioned into the NMRG when the necessary technical specification changes are approved by NRC.

By centralizing its nuclear licensing activities in a single organization reporting directly to the Vice President and Nuclear Technical Director, TVA has increased its management oversight of and emphasis on nuclear licensing and is providing a means for assuring timely, complete, and technically adequate licensing submittals for all of its plants.

5. Safety Review

In addition to the key onsite safety and audit functions (Plant Operations Review Committee, Plant Operations Review Staff, and Nuclear Quality Assurance), TVA has three corporate level review groups, the Nuclear Safety Review Board (NSRB), the Independent Safety Engineering Group, and the Nuclear Manager's Review Group (NMRG). The functional responsibilities of each group and the specific interactive relationships between them are as follows:

NSRB is the senior-level board which reviews the total TVA nuclear program with respect to nuclear safety and fulfills

the technical specification requirement for offsite independent review and audit. The NSRB reviews the activities of the line organizations which could affect nuclear safety and also the activities of other review, audit, and verification organizations. The NSRB provides advice to the Senior Vice President, Nuclear Power (NP). A NSRB consisting of senior TVA nuclear managers and outside senior advisors (see Table 3) is constituted for each operating nuclear site. All NSRBs are chaired by the same senior manager and meeting minutes of all NSRB meetings are forwarded to the TVA Board of Directors.

ISEG provides the daily onsite independent review function as set forth in NUREG 0737. An ISEG staff is located at SQN, BFN, and in the corporate office, and will be located at WBN prior to fuel load. ISEG procedures require consideration of reviews conducted by other review groups to preclude duplicate reviews of the same activity or to indicate areas where an ISEG review may be warranted. Close liaison is maintained between NSRB and ISEG to ensure the functions of each group are complementary. The lead onsite ISEG individual normally attends each NSRB meeting to report on ISEG activities and findings and serves on the NSRB Unreviewed Safety Question Determination Subcommittee for that site. All ISEG studies and reports are considered for review by the NSRB. Further, the Chairman and the Technical Secretaries for each NSRB consult regularly with the ISEG

manager concerning potential topics for formal review by NSRB or for formal observation by ISEG. ISEG, in developing its review topics and work schedule, gives strong consideration to NSRB suggestions and requests. In order to avoid duplication, the ISEG and Nuclear Manager's Review Group (NMRG) coordinates their efforts prior to ISEG initiating any new review topics.

The NMRG is responsible for developing and implementing a review program to assess activities associated with the design, construction, and operation of TVA nuclear plants. As directed by the Vice President, Nuclear Assurance and Services, the group provides an independent check on the effectiveness of Nuclear Power policies and programs and their implementation. The group consists of senior TVA staff members expert in various aspects of nuclear plant design, construction, and operation. It may call upon consultants or outside expertise as necessary. The NMRG considers, during the review process, the ISEG review reports and monthly status reports. NMRG routinely reports to the Vice President, Nuclear Assurance and Services on the results of the review program and the safety and effectiveness of the nuclear program and provides periodic reports to the Senior Vice President, Nuclear Power. The NMRG performs followup reviews to verify problem resolutions have been implemented by line management.

TABLE 3

OUTSIDE ADVISORS FOR NUCLEAR SAFETY REVIEW BOARDS

SEQUOYAH NUCLEAR PLANT

J. A. Auxier	Director, International Technologies: Head of Health Physics, President's Commission on TMI Accident Investigation
T. L. Gerber	Executive Vice President, Structural Integrity Associates
J. C. Grigg	Retired: Former Director, I&C For Admiral Rickover
R. E. Uhrig	Distinguished Professor, University of Tennessee: Distinguished Scientist, Oak Ridge National Laboratory: Former Vice President, Florida Power and Light: Former Dean of Engineering, University of Florida
W. R. Stratton	Retired from Los Alamos National Laboratory. Former Member and Chairman, NRCs Advisory Committee on Reactor Safety (ACRS); Member Kemeny Commission investigating IMI; Chairman ANS Special Committee on Source Terms.

WATTS BAR NUCLEAR PLANT

W. H. Hamilton	Retired: Former General Manager, Westinghouse - Bettis
M. Levenson	Executive Engineer, Bechtel International
W. F. Witzig	Retired: Former Department Head, Nuclear Engineering, Pennsylvania State: Cofounder NUS Corporation

BROWNS FERRY NUCLEAR PLANT

L. S. Bohl	Retired: Former Manager, Quality Assurance, General Electric
V. S. Boyer	Retired: Former Senior Vice President, Philadelphia Electric
W. S. Humphrey	Retired: Naval Reactors, Manager Reactor Facilities and Shipyards
H. E. Stone	Retired: Former Vice President and Chief Engineer, General Electric
T. A. Peterson	General Dynamics Services Company, Chairman Boston Edison's Independent Radiation Oversight Committee, SMUD Management Safety Review Committee

When appropriate, the reports of NMRG reviews are used by the NSRB when they direct independent safety reviews of TVA's operating nuclear plants to evaluate adequacy, and identify safety concerns. The NMRG Manager, and the NSRB Chairman, consult regularly concerning safety topics.

Additionally, NMRG and NSRB meet with Nuclear Quality Assurance monthly to establish and maintain a master schedule of Nuclear Power review activities.

These review functions, while administratively distinct, have sufficient interaction, including the exchange of meeting minutes and reports, to provide both a reasonable degree of independence and a reasonable degree of coordination.

A standing Senior Management Assessment of Performance Improvement Committee (SMAPIC) has been constituted to maximize the effectiveness of NP self-assessment activities. SMAPIC is composed of the Vice President of Nuclear Assurance and Services, who serves as chairman; Manager of Nuclear Quality Assurances, as an alternate; Vice President and Nuclear Technical Director; Vice President of Nuclear Power Production; Vice President of Nuclear Engineering; Vice President of Nuclear Business Operations; and the Site Directors. SMAPIC meets on a semiannual basis, or as specified by the chairman, to focus on long-range priorities for Nuclear Power self-assessments and to review progress of corrective actions in areas needing special attention.

6. Security

TVA has previously provided security services through the Office of Corporate Services, resulting in responsibility for security activities being fragmented. TVA had received notices of violations relative to clearances of individuals for access, activities of security officers, and deficiencies in equipment and procedures related to security. As a result, TVA has consolidated nuclear security responsibilities within Nuclear Power.

The new Protective Services organization consolidates responsibilities under the Vice President, Nuclear Assurance and Services for all security services, security programs, and security management activities. A headquarters group is responsible for the centralized processing of clearances for personnel access to plant sites and for standardization of security processes within Nuclear Power. The site security manager receives technical and programmatic direction from corporate headquarters and receives day-to-day direction for the plant-specific activities from the respective site director.

This revised organization will ensure consistent technical direction and management of resources are provided, while the site director has full authority and flexibility for the implementation of site-specific security activities.

Further, the consolidation will provide a consistent basis to meet NRC security requirements and ensure that security officers are properly equipped and trained to perform in a responsive and professional manner.

F. Conclusions

TVA has restructured its organization to consolidate all responsibility for its nuclear power activities within a single organization headed by the Senior Vice President, Nuclear Power.

TVA has also established functional nuclear organizations which have the responsibility and authority for providing technical direction for and assuring the technical adequacy of all TVA nuclear activities within their respective functions, including site activities. As a result, TVA has taken action which provides assurance that lines of responsibility and authority for nuclear activities are clear, that the necessary coordination and communication among nuclear organizations occurs, and that TVA's nuclear activities are subject to centralized management direction and control.