V. Design Baseline and Verification Program

1.0 Background

As discussed in the Section II during the design and construction of Watts Bar, TVA's QA program has identified and documented Conditions Adverse to Quality (CAQs) as required by 10 CFR 50, Appendix B. In addition to these CAQs, TVA has taken advantage of the following programmatic and/or topical reviews to identify shortcomings in the control processes and programs used by TVA during design and construction:

- TVA Internal Evaluations
- External Reviews and Industry Experience
- Employee Concerns
- Regulatory Reviews

For each of the identified shortcomings TVA has developed a corrective action plan to determine the extent of the problem and to correct any deficiencies. These corrective action plans have included either a sampling plan to assess the extent of the condition or a 100 percent review plan.

In each case where the identified shortcoming met the reportability criteria of 10 CFR 50.55(e), a report was submitted to the Nuclear Regulatory Commission (NRC). The 10 CFR 50.55(e) reports are summarized in Appendix 5. The corrective action plans for these 50.55(e) items have largely been completed by TVA and closed by the NRC.

The scope of corrective action plans has included many design and construction activities for Watts Bar.

The collective evaluation of noted shortcomings has necessitated some special programs to assess the resultant conditions and to define corrective and preventive actions. TVA programs have been devised to correct and prevent recurrent problems associated with:

- Design Calculations
- Welding
- Instrumentation
- Electrical Issues
- Concrete
- Environmental Qualification
- Piping Analysis and Hangers
- Main Steam Temperature
- Q-List
- ERCW Soil Liquefaction
- Containment Isolation
- Equipment Seismic Qualification
- "Use-As-Is" Nonconformance Reports
- Piece Parts
- Quality Records
- Pre-startup Testing

These special programs include a variety of design and construction issues to be evaluated. When these programs are completed, a number of quality-related activities will have been evaluated and installations corrected as necessary.

Figure V-1 represents the WBN special programs as they relate to design and construction activities. Within the scope of each special program, the identified design and construction activities are being or will be evaluated to ensure requisite quality in the activities and resultant features.

2.0 Purpose and Scope

The Watts Bar Design Baseline and Verification Program (DBVP) has been established to provide additional assurance that unit 1 is ready for fuel loading and power operation. The program will document and ensure continued maintenance of licensing commitments, design basis, and functional configuration for Watts Bar unit 1. The program scope will include unit 1 and common safety-related structures, systems, and components. However, several of the products of the program areas will also directly apply to unit 2 [for example, the Design Basis Document (DBD), the Licensing Document Commitment Matrix (LDCM), and the Plant Modification Package (PMP)].

DBVP has been planned and will be scheduled to complete any activities required for safe operation of unit 1 before fuel loading. Corrective actions identified by this program requiring plant modifications will be evaluated and approved by the Change Control Board as a part of the implementation decision. The program is comprised of five areas: design basis, licensing, design, construction, and configuration control.

- SPECIFIC CORRECTIVE ACTION PROGRAMS RESULT FROM EVALUATIONS OF NCR'S, SCR'S, PIR'S, AND 50.55e'S. ALTHOUGH EACH OF THESE PROGRAMS HAVE NOT ADDRESSED EACH AREA OF DESIGN AND CONSTRUCTION ACTIVITY, TAKEN AS A WHOLE ALL AREAS HAVE BEEN ADDRESSED.

	ENVIRONMENTAL QUALIFICATION	ELECTRICAL ISSUES	HANGER AND ANALYSIS UPDATE PROGRAM	MAIN STEAM TEMPERATURE ISSUE	INSTRUMENTATION	PLANT WELDING PROGRAM	Q - LIST	CONCRETE QUALITY	DESIGN CALCULATIONS	ERCW SOIL LIQUEFACTION	CONTAINMENT ISOLATION	EQUIPMENT SEISMIC QUALIFICATION	USE-AS-IS NONCONFORMANCES	PIECE PARTS	EMPLOYEE CONCERNS	QUALITY ASSURANCE	DESIGN CONTROL PROGRAM	SPECIFIC CORRECTIVE ACTION PROGRAM
DESIGN ACTIVITIES																		
INTERNAL INTERFACES	X	X	X				X					X	X		X	X	X	X
EXTERNAL INTERFACES	X		X	X								X			X	X	X	X
MAINTENANCE OF DESIGN BASIS	X	X	X	X			X		X	X	X	X	X		X	X	X	X
DEVELOPMENT OF CALCULATIONS	X	X	X	X					X	X	X	X	X		X	X	X	X
DESIGN IMPLEMENTING REQUIREMENTS	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X
DESIGN VERIFICATION	X		X						X	X	X	X	X		X	X	X	X
PROCUREMENT OF MATERIALS AND SERVICES	X											X		X	X	X	X	X
DESIGN CHANGE CONTROL	X		X						X			X	X	X	X	X	X	X
CONFIGURATION CONTROL	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
CONSTRUCTION ACTIVITIES																		
MATERIAL CONTROL	X	X			X	X		X				X		X	X	X		X
WORK CONTROL	X	X			X	X		X				X		X	X	X		X
INSPECTION AND TESTING	X	X			X	X		X				X		X	X	X		X
CONTROL AND PROTECTION OF INSTALLED FEATURES	X				X							X		X	X	X		X

Figure V-1

DBVP will be performed in accordance with the TVA Quality Assurance Program. This will include documented procedures and programmatic and surveillance reviews by the Division of Quality Assurance. A team of Engineering Assurance and Quality Assurance personnel will monitor program development and implementation.

DBVP will not replace any of the WBN special programs. DBVP will evaluate the design and construction processes to identify any problems which did not surface through implementation of the WBN special programs and to provide additional assurance that the design and construction processes have been successful as amended by TVA's corrective action programs.

Figure V-2 extends Figure V-3 to illustrate the design and construction activities to be dealt with in DBVP. The overlap of evaluations and verifications for design and construction activities between the special programs and the DBVP is also shown. In addition, one can see from these figures that the coverage of the design and construction processes within the DBVP is extensive.

By demonstrating that effective corrective actions have been implemented to resolve past deficiencies, the DBVP will provide TVA with the added confidence necessary to overcome any doubts that may have been created by previously identified deficiencies and perceived program weaknesses. Therefore, DBVP will support TVA's request for an operating license for Watts Bar unit 1.

The following discussion addresses each of the five areas within DBVP.

- SPECIFIC CORRECTIVE ACTION PROGRAMS RESULT FROM EVALUATIONS OF NCR'S, SCR'S, PIR'S, AND 50.55e'S. ALTHOUGH EACH OF THESE PROGRAMS HAVE NOT ADDRESSED EACH AREA OF DESIGN AND CONSTRUCTION ACTIVITY, TAKEN AS A WHOLE ALL AREAS HAVE BEEN ADDRESSED.

	ENVIRONMENTAL QUALIFICATION	ELECTRICAL ISSUES	HANGER AND ANALYSIS UPDATE PROGRAM	MAIN STEAM TEMPERATURE ISSUE	INSTRUMENTATION	PLANT WELDING PROGRAM	Q - LIST	CONCRETE QUALITY	DESIGN CALCULATIONS	ERCW SOIL LIQUEFACTION	CONTAINMENT ISOLATION	EQUIPMENT SEISMIC QUALIFICATION	USE-AS-IS NONCONFORMANCES	PIECE PARTS	EMPLOYEE CONCERNS	QUALITY ASSURANCE	DESIGN CONTROL PROGRAM	• SPECIFIC CORRECTIVE ACTION PROGRAM	LICENSING	DESIGN BASIS	DESIGN	CONSTRUCTION	CONFIGURATION
																			DESIGN BASELINE AND VERIFICATION PROGRAM				
DESIGN ACTIVITIES																							
INTERNAL INTERFACES	X	X	X				X					X	X		X	X	X	X	X	X	X		
EXTERNAL INTERFACES	X		X	X								X			X	X	X	X	X	X	X		
MAINTENANCE OF DESIGN BASIS	X	X	X	X			X		X	X	X	X	X		X	X	X	X	X	X			
DEVELOPMENT OF CALCULATIONS	X	X	X	X					X	X	X	X	X		X	X	X	X	X		X		
DESIGN IMPLEMENTING REQUIREMENTS	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	
DESIGN VERIFICATION	X		X						X	X	X	X	X		X	X	X	X	X		X		
PROCUREMENT OF MATERIALS AND SERVICES	X											X		X	X	X	X	X	X		X	X	
DESIGN CHANGE CONTROL	X		X						X			X	X	X	X	X	X	X	X		X		X
CONFIGURATION CONTROL	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CONSTRUCTION ACTIVITIES																							
MATERIAL CONTROL	X	X			X	X		X				X		X	X	X		X	X			X	X
WORK CONTROL	X	X			X	X		X				X		X	X	X		X	X			X	X
INSPECTION AND TESTING	X	X			X	X		X				X		X	X	X		X	X			X	X
CONTROL AND PROTECTION OF INSTALLED FEATURES	X				X							X		X	X	X		X	X			X	X

Figure V-2

3.0 Design Basis

A Design Basis Document (DBD), including design criteria and system descriptions, will be developed. This activity will ensure that appropriate design basis commitments and engineering requirements are properly defined in the DBD. This task will require the development of a more comprehensive set of design criteria and system descriptions than currently exists for Watts Bar. Programmatic enhancements will be defined and implemented to ensure continued maintenance of the design basis document as a part of the design change process.

This activity requires senior engineers who are familiar with the design evolution, to compile and review licensing commitment and engineering requirement source documents and to identify the design basis commitments and engineering requirements applicable to WBN. The senior engineer identifying a commitment or requirement (C/R) will record the C/R on a form which identifies key word topics to which the C/R applies. The information from these C/R forms is entered into a database. The C/R database is then sorted by key word topics for review to ensure proper consideration for inclusion within the DBD. Existing design criteria and system descriptions will be revised (or new documents issued) to include any C/Rs found to be missing. Any inconsistencies identified during this effort will be documented, tracked, and controlled in an open item management system. If an item is determined to be a Condition Adverse to Quality (CAQ), it will be tracked and controlled by the TVA CAQ system.

As the design criteria and system descriptions are completed, they will be placed into the Design Basis Document (DBD). The Design Basis Document will be used to evaluate future proposed design changes to ensure compliance with design requirements, to evaluate abnormal events, to perform safety reviews (e.g., Unreviewed Safety Question Determinations [USQD], Probabilistic Risk Assessments [PRA], etc.), to assess conditions adverse to quality, and to assess operating experience reports. The DBD will be the highest tier design document and will be maintained as a controlled document.

4.0 Licensing

Licensing commitments associated with design, construction, quality assurance, inspection, operation, maintenance, and training will be reviewed to confirm that they have been correctly translated into controlled implementing documents. This assurance process will provide confirmation that the Final Safety Analysis Report and the Technical Specifications are accurate. The results of this effort will be documented in a Licensing Document Commitment Matrix (LDCM). The LDCM will relate licensing commitments to implementing documents. The LDCM and associated programmatic controls will enhance TVA's ability to maintain licensing commitments for the life of the plant.

To perform the licensing verification, commitments from the FSAR, Technical Specifications, and the Safety Evaluation Report (SER) will be compiled and evaluated.

The highest level controlled document which implements each commitment unit will be located and reviewed to determine if the commitment has been correctly captured. Any differences identified during this review process will be documented, tracked, and controlled in an open item management system. If an open item is determined to be a Condition Adverse to Quality (CAQ), it will be tracked and controlled by the TVA CAQ system, including an evaluation for reportability as appropriate. The Final Safety Analysis Report (FSAR) and other licensing documents will be revised to show any necessary clarifications of licensing commitments, and/or TVA and vendor documents will be revised to show any necessary clarifications to ensure proper implementation of licensing commitments. As each commitment unit is verified, the information relating the commitment to the implementing document will be entered into the LDCM. The LDCM will be completed before fuel loading for unit 1 and will become a part of the document revision process for design, construction, quality assurance, inspection, operations, maintenance, and training.

5.0 Design

Proper translation of design basis requirements into design implementing documents for construction, inspection, and operation will be evaluated through design verification. The design process will be evaluated using a selective sampling of elements (components) and design attributes of safety-related systems and structures. This sampling will be biased as described below to require more review of

the elements and attributes which have not received in-depth attention from our special programs. The biased sampling method will provide a comprehensive look at the design of Watts Bar to identify any shortcomings which may not have been corrected by either a corrective action program or a special program.

To facilitate the design verification, a sampling matrix will be developed to list nuclear safety-related systems and structures and the design elements which exist in those systems and structures. For this purpose, an "element" is defined as a class of components such as pumps, valves, electrical protective devices, etc., of similar characteristics. From the sampling matrix of design elements for each safety-related system, specific components and structures will be selected for verification. The design attributes which ensure that the selected components (elements) will perform their intended safety function will be identified for sampling. A typical design element and attributes listing may include:

Element - Pump

Attributes

1. System Requirements
   - Pressure
   - Temperature
   - Flow
   - Configuration
     - NPSH

- Environment
  - Exterior
  - Interior

2. Material Requirements
   - Fluid Characteristics
     - Errosive
     - Corrosive
       - Seals
       - Impellers
       - Casing
   - Lubrication
   - Cooling Water

The selection of elements and attributes to be verified will be biased in two ways. First, any special program which adequately evaluates and corrects problems associated with a particular element or attribute will be justification for exclusion from sampling during the design verification. Second, the selection criteria will concentrate on elements and/or attributes which have had identified deficiencies in the past but no major corrective action program has been determined necessary, to date.

The information to bias the sample will be generated from CAQ trends, employee concerns, and the SQN Design Baseline Program results as appropriate.

In addition to biasing the sample to problem areas, elements and attributes will be chosen from areas where no identified issues appear to exist.

The design verification will provide confirmation that corrective actions have been effective in areas of identified deficiencies and confidence that areas with no identified deficiencies have been designed correctly.

Once the sampling matrix has been established, a pilot sample will be performed to validate the sampling procedures. Sampling enhancements discovered from the pilot sample will be added to the sampling procedure before starting the full program.

Design basis requirements associated with the attributes selected in the sampling matrix will be verified to be properly translated to design implementing documents. The sampling results will be evaluated to identify any inconsistencies. Inconsistencies will be documented, tracked, and controlled in an open item management system. If an item is determined to be a CAQ, it will be tracked and controlled by the TVA CAQ system.

A root cause analysis will be performed on the significant CAQs identified during the sample to determine whether a programmatic problem exists. This evaluation will determine the need to expand the sample for other systems, structures, elements, and/or attributes. If needed, an expanded sample program will be defined and performed in

the same manner as the initial sample. The sample program will be concluded when the sample results establish that confidence exists in the design process.

6.0 Construction

Proper implementation of design requirements into installed hardware will be evaluated through construction verification. The construction process will be evaluated using a selective sampling of elements (components) and inspection attributes of safety-related systems and structures. The sampling will be biased to require more review of elements and attributes which have not received in-depth attention from WBN special programs. The biased sampling method will provide a comprehensive look at the construction of Watts Bar to identify any shortcomings which may not have been corrected by either a corrective action program or a special program.

The construction verification will be accomplished in a manner similar to the design verification. A sampling matrix will be developed to list nuclear safety-related systems and structures and the construction elements which exist in those systems and structures. From the sampling matrix of elements for each safety-related system and structure, specific components will be selected for verification. The construction attributes which ensure that the selected component will perform as intended will be identified for sampling. Construction and design elements are essentially the same; i.e., components. However,

construction attributes are typically inspection and test aspects such as critical dimensions, performance data, etc. A typical construction element and associated attributes listing may include:

Element - Pump

Attributes

1. Receiving
2. Storage
3. Installation
   - Orientation and Location
   - Shimming
   - Material Traceability
   - Anchor Studs/Bolting
   - Welding
   - Coupling Alignment
   - Flange Bolting
4. Preventative Maintenance

The selection of elements and attributes to be verified will be biased in the same way as for the design verification (see Section 5.0). A pilot sample will be performed to validate the sampling procedure. Design implementing requirements associated with the construction attributes selected in the sampling matrix will be verified to be properly implemented into the hardware. The sampling results will be evaluated to identify any inconsistencies. Inconsistencies will be

documented, tracked, and controlled in an open item management system. If an item is determined to be a CAQ, it will be tracked and controlled by the TVA CAQ system.

A root cause analysis will be performed on the significant CAQs identified during the sample to determine whether a programmatic problem exists. This evaluation will determine the need to expand the sample for other systems, structures, elements, and/or attributes. If needed, an expanded sample program will be defined and performed in the same manner as the initial sample. The sample program will be concluded when the sample results establish that confidence exists in the construction process.

7.0 Configuration

Several improvements to enhance TVA's ability to appropriately control plant configuration will be developed and implemented. A Plant Modification Package (PMP) program is being developed to control future design changes. The PMP is to be a complete engineering package for each plant modification. In addition, a one-drawing system is being implemented for plant configuration control. To implement the one-drawing system for the drawings needed to operate the plant, TVA will review and resolve the differences between the "as-constructed" and "as-designed" functional/ operational drawings for safety-related systems. This task will result in baselined functional/operational drawings. To gain confidence that the baselined drawings are accurate, a one-system walkdown will be performed to compare the as-built

condition of the system and components to the information on the baselined drawings.

The PMP process will require a complete engineering package be developed by ONE prior to implementation of a modification. This package will include, as appropriate, revisions or new engineering implementing requirements documents (i.e., drawings and specifications), any existing design requirements documents necessary for installation, inspection, and maintenance, revised OBD, and draft commitments (including FSAR changes) to be revised. (See Section VI.5.3.2)

Once the PMP has been field completed, the new and revised drawings and specifications will be baselined to reflect the as-built plant configuration; and licensing document revisions will be made to reflect the modification as appropriate. When required, licensing document revisions will be requested prior to field implementation. The Licensing Document Commitment Matrix (LDCM) (see Section 3.0) will enhance TVA's ability to identify those licensing documents that need revision.

To initiate the one-drawing system, the functional/operational drawings for safety-related systems will be baselined prior to fuel loading. Functional/operational drawings are the drawings needed to define how systems and components function or operate. To accomplish this, the "as-designed" and "as-constructed" functional/operational drawings will

be reviewed and compared. The differences identified will be documented, tracked, and controlled in an open item management system. If an item is determined to be a CAQ, it will be tracked and controlled by the TVA CAQ system.

Any differences between as-designed and as-constructed drawings will be evaluated to determine if design changes planned and not implemented are required prior to fuel load. These evaluations will be reviewed and approved by the Change Control Board. In addition, the differences will be evaluated to ensure that they have been properly and programmatically defined and controlled. When the differences are resolved, the functional/operational drawings will be baselined to reflect the as-built plant configuration. The former as-designed and as-constructed functional/operational drawings will be voided once the baselined drawings have been issued for use.

All modifications to be performed after fuel loading will be implemented through the PMP program. This program will progressively cause the nonfunctional drawings to be baselined; thus, over time reducing the number of drawings statused under the old dual as-designed/as-constructed system.

A system configuration verification will be performed by field walkdown of one safety-related system. The baselined functional/operational drawings associated with that system will be compared with the as-built system configuration in the plant. Differences found during the system

walkdown will be documented, tracked, and controlled in an open item management system. If an item is determined to be a CAQ, it will be tracked and controlled by the TVA CAQ System.

A root cause analysis will be performed on the significant CAQs identified during the system walkdown to determine whether a programmatic or implementation problem exists. This evaluation will determine the need to expand the system walkdowns to include other systems and/or features of systems. The configuration walkdown will be complete and the results of the walkdown will establish that the baselined drawings are accurate.

8.0 Independent Review

Engineering Assurance/Quality Assurance surveillance of the Watts Bar Design Baseline and Verification Program (DBVP) will occur to verify that the program is fully and effectively implemented. It will be an in-process review, whereby observations will be promptly identified to responsible management and action items immediately defined.

To accomplish this objective, a surveillance team assigned to this activity and lead by a senior quality manager from the Watts Bar Nuclear Site Quality Manager's staff will perform ongoing surveillance of the adequacy and compliance with engineering procedures in each of the DBVP program areas.

Surveillances will be scheduled based on the DBVP program schedule, importance of the activity, specific problem areas, and experience gained from similar programs at other TVA nuclear plants. Prior to the start of each surveillance, a surveillance checklist will be prepared listing the items to be evaluated during the surveillance. The results of the surveillance will be documented on the checklist showing what was reviewed and conclusions as to:

a. Adequacy of the procedures

b. Conformance of the activity to the program requirements

c. Effectiveness of the work

d. Adequacy of the results

e. Need for actions to improve or correct performance

Items requiring action will be recorded on a Surveillance Observation Form, and the evaluator and responsible manager will agree on the necessary project action to address the observation. At the completion of each surveillance, a Surveillance Report describing the scope and results of the surveillance with the checklist and observation forms attached will be issued. Follow-up reviews will be conducted to verify project actions on Surveillance Observations are taken as scheduled and are adequate and effective.

9.0 EA Technical Review

An Engineering Assurance (EA) technical audit will be performed to evaluate the technical adequacy and quality of designs used in constructing the plant, to evaluate the control of the design process,

and to provide added assurance of technical acceptability of the Design Baseline and Verification Program results. The EA audit will be a planned, in-depth technical audit with detailed checklists, sampling of work from every area of activity, and an in-process resolution of concerns.

The primary focus of this in-depth technical audit is to critically and thoroughly evaluate the technical aspects of the engineering process and its products. Two systems will be selected for a "vertical slice" review--an electrical system and a fluid system. The systems will be selected based on the following criteria.

- Performs a safety-related function
- Contains multidiscipline inputs and involvement
- Interfaces with other systems (including NSSS)
- Has different modes of operation
- Not reviewed in previous audits (e.g., Auxiliary Feedwater System reviewed by Black and Veatch will be excluded)

The audit team will consist of a multidiscipline team of senior experienced engineers led by an individual from EA. The audit team personnel will be independent of any direct design responsibility for the selected systems for both Watts Bar and Sequoyah Nuclear Plants. The team will utilize the experience gained from the Sequoyah EA oversight review in its audit plan development and implementation. Action items will be used to identify problems and to facilitate their timely resolution.

The technical audit will be initiated when the DBVP is 50-60 percent complete. A final EA report will be issued at the end of the program which will include:

- Detailed discussion of all action items
- Independent assessment as to the:
  - Adequacy of designs used in constructing the plant
  - Adequacy and effectiveness of the design process
  - Adequacy of project results from the baseline program
- Conclusions/recommendations

10.0 Results Evaluation and Reporting

The results from each program area will be evaluated upon completion of the activities in that area and reports will be prepared. Also, following completion of the program, the results of the individual program areas will be considered collectively along with the recommendations from the Quality Assurance and Engineering Assurance organizations to ensure the program objectives have been accomplished. An additional evaluation will be conducted to determine what assurance and confirmation programs, if any, will be needed for Watts Bar unit 2.

The final report for the program will describe the methods TVA has employed in obtaining confidence in the design and construction processes, the results of the program, and the steps TVA has taken to strengthen any identified weaknesses.

INFORMATION ONLY

VI. CONDUCT OF WATTS BAR ACTIVITIES

Introduction

This section provides a description of the organization and controls necessary for the conduct of WBN activities with specific emphasis and detail for unit 1. Particular subsections address specific actions taken to strengthen WBN management and organization; actions taken and planned for management control and involvement; descriptions of plant operation and maintenance; descriptions of the Design Control Program, Radiological Control Program, and the Security Plan as well as a description of the functions of the Site Scheduling Group.

1.0 Strengthening WBN Management and Organization

TVA's revised Corporate Nuclear Performance Plan sets forth the new TVA nuclear power organization to correct deficiencies in corporate support activities. The Watts Bar Nuclear Plant (WBN) organization has also been restructured. The organizational changes have accomplished a strengthening of corporate support and site line activities and achieved consistency between corporate and site functions.

The plant organization structure provides close association of the activities needed for safe, efficient plant operations. For example, all organizations needed to support the reactor plant report to the Plant Manager. The Plant Manager is responsible for and has control of plant operations including rad waste, testing, refueling, chemistry, PORS, maintenance, radiological controls, and security. Other site functions that do not directly impact but support plant operations report to the Site Director.

In a number of areas, WBN managers and their organizations had lacked clear assignments of responsibility and authority. Accordingly, action was taken to clarify each manager's area of responsibility, establish accountability, and identify resources to perform assignments. A position description for each manager was redeveloped and approved by the Manager of Nuclear Power. Those descriptions are used to set minimum standards.

To assure that the most qualified person is selected for management positions, a Site Management Review Board process has been established for the Site Director's organization. In accordance with formal written procedures, matrices of job attributes including position description requirements are developed for eligible candidates. Personal interviews by the hiring manager and another peer manager are also conducted. The hiring manager presents his analysis of selections to the Watts Bar Review Board composed of Site Director, Plant Manager, Assistant to the Site Director, and the Personnel Officer. The candidate is presented to the Corporate Review Board for final approval if acceptance is given by the Watts Bar Review Board.

This process is designed to assure an objective selection based on technical requirements, performance, qualification, and merit. The documentation presents a ranking of candidates and generally provides management with several candidates from which to choose.

Finally, in some WBN positions, managers and supervisors did not have the desired level of plant knowledge. As a result, TVA is also continuing

efforts to improve the level of plant operations and systems understanding among line managers and supervisors. Selected managers are being given Technical Staff and Managers Training, which includes training in Radiation Protection, Maintenance, and Operations.

1.1 Corporate Support

WBN nuclear site support organizations have been reorganized into functional departments that generally parallel the functional departments in TVA's nuclear headquarters. Where applicable, each site support organization receives technical direction from its respective corporate department.

To ensure effective and consistent design and engineering control at WBN, all design engineering personnel and functions have been placed under the Watts Bar Project Engineer in the Division of Nuclear Engineering (DNE). The Director of DNE reports directly to the Manager of Nuclear Power.

To ensure effective and consistent control of the implementation of plant design changes at WBN, site modifications activities and the Modifications Manager have been placed within the Division of Nuclear Construction (DNC). The Director of DNC reports directly to the Manager of Nuclear Power.

To ensure effective and consistent application of the TVA quality assurance program, site quality assurance and quality control functions have been placed under the Site Quality Manager in the Division of Nuclear Quality Assurance (DNQA). The Director of DNQA reports directly to the Manager of Nuclear Power.

TVA has placed responsibility for TVA nuclear regulation and licensing functions for WBN under the Site Licensing Manager who reports directly to the Director of Nuclear Safety and Licensing. The Director of Nuclear Safety and Licensing (DNSL) reports to the Manager of Nuclear Power.

To ensure effective and consistent application of the nuclear training programs, training of nuclear plant personnel has been placed under the Director of Nuclear Training (DNT), who reports to the Manager of Nuclear Power.

1.2 Site Organization

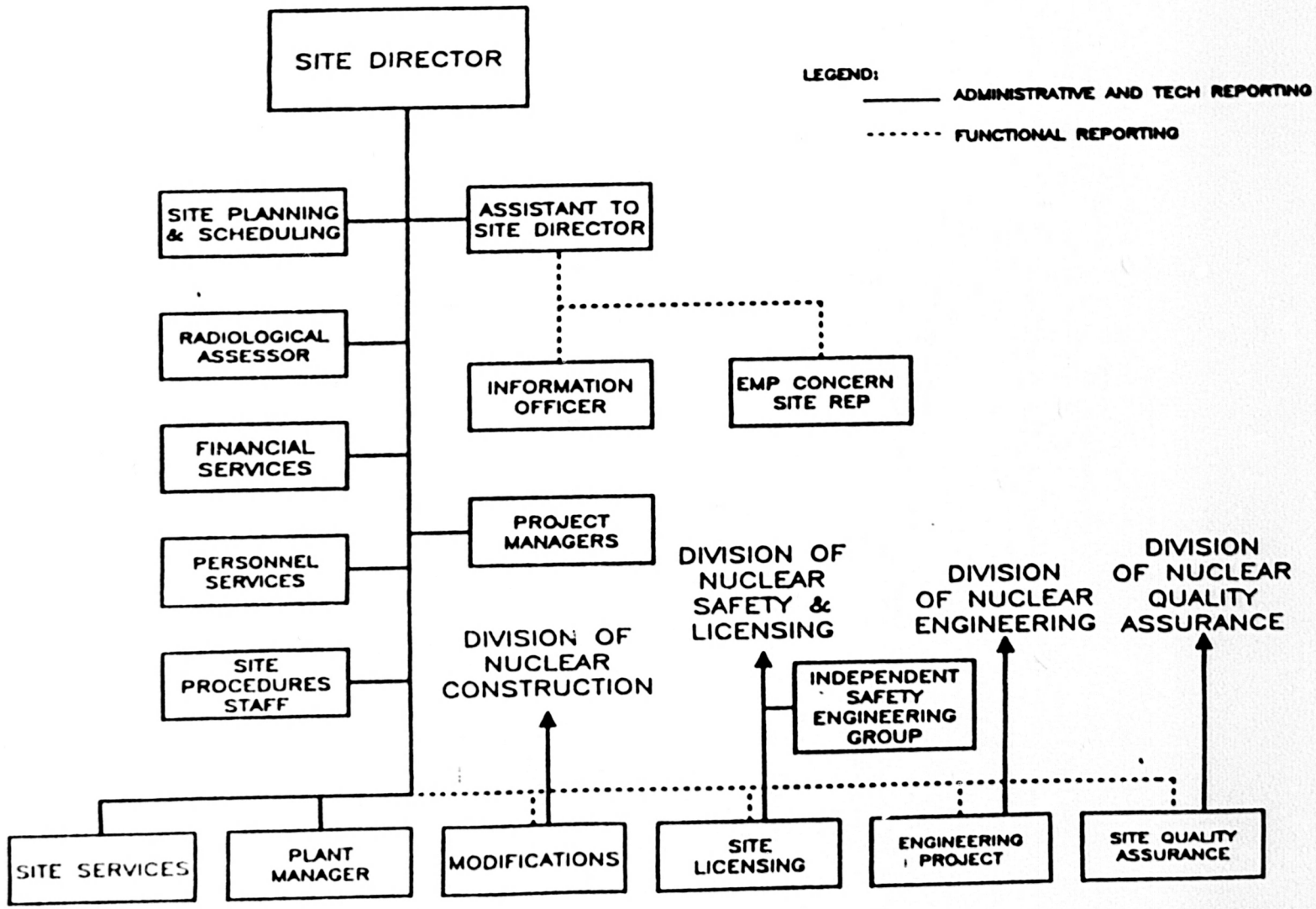
The WBN site organization has been structured to focus maximum attention to the technical and administrative functions involved in starting and operating unit 1 under the WBN Site Director. The management of unit 2 in the final stages of construction and testing is accomplished under the Nuclear Project Manager. Since this plan is intended to address unit 1, the function and a brief description of each major organization responsible to the Site Director is included in this section.

Unit 1

The WBN Site Director is responsible for planning, scheduling, coordinating, and providing project direction for the activities of site organizations related to unit 1 and eventually for unit 2 when transferred to operations personnel. The site organization is shown in Figure VI-1.

Figure VI-1

SITE ORGANIZATION (UNIT 1)



Responsibility for site functions is placed under one of six principal managers: the Plant Manager, the Site Services Manager, the Project Engineer, the Modifications Manager, the Site Quality Manager, and the Site Licensing Manager. These managers are held accountable for all activities in their area of responsibility. Position descriptions have been developed for each management position to ensure that all necessary functions are assigned and responsibilities do not overlap.

Several "assistant to" positions have been created to delegate some administrative duties and focus more attention on technical matters. These assistants are competent, experienced, qualified technical people who will provide additional capability to their respective activity. These assistants alsn provide more management depth and are a source of qualified persons from which to choose for higher levels of management.

The site staff size has been established to be consistent with other well run and managed nuclear plants with similar phases of construction and operation. These changes have structured and strengthened the site organization so that detailed management attention to the safe and reliable operation of the plants is further enhanced.

Unit 2

WBN unit 2 is under the direction of the unit 2 Project Manager who reports to the Manager of Nuclear Power. The unit 2 Project Manager

is responsible for all planning, scheduling, coordinating and providing project direction during the design, construction, and system transfer process. Close communication will be maintained between the Unit 2 Project Manager and the WBN Site Director to assure that no unit 2 work will adversely effect the safe operation of unit 1. As systems are completed and turned over for testing and operation, the plant manager works with unit 2 organizations to assure the systems are turned over in a ready-to-operate status and exercises complete control for maintaining turned over systems.

1.2.1 Site Director

The WBN Site Director, who reports to the Manager of Nuclear Power, approves and controls all activities conducted onsite except those related to unit 2 construction. T Site Director has the authority and responsibility for staffing the site organization and ensuring that the facility is safely and efficiently operated, maintained, and modified within the policies and guidelines established by the Manager of Nuclear Power. The Site Director develops and implements site programs to ensure the performance and documentation of site activities in accordance with established quality program requirements and policies. The Site Director maintains an interface with the directors of Nuclear Engineering, Nuclear Construction, Nuclear Safety and Licensing, Nuclear Quality Assurance, Nuclear Training, Nuclear Services, and other TVA organizations to ensure effective implementation of corporate goals and objectives.

1.2.2 Site Director's Administrative Staff

The Site Director's Staff is composed of the Assistant to the Site Director, the Site Planning and Scheduling Staff, the Financial Services Staff, the Personnel Services Staff, Procedures Staff, the Radiological Assessor, and the Project Management Staff.

1.2.2.1 Assistant to the Site Director

This individual provides senior level management assistance to the Site Director. The Assistant to the Site Director is responsible for site policy formulation and review, special projects, and management interfaces with organizations such as the Employee Concerns Program and the Information Office which have onsite representatives. The Assistant to the Site Director also serves on the Directives and Standards Review Committee as the Site Director's representative.

1.2.2.2 Site Planning and Scheduling Staff

The Site Planning and Scheduling Staff has been charged with responsibility for developing and maintaining the site master schedule for all unit 1 site activities. In the past, site organizations planned and scheduled activities independent of other organizations. This sometimes led to problems in coordination of activities and resulted in schedule delays in modifications, startup, and operation. Currently, planning and scheduling sections functionally reporting to the Site Planning and Scheduling manager are assigned to the plant, modifications, and engineering organizations to coordinate and integrate

schedules. This ensures that all efforts are properly planned and scheduled to meet site goals and objectives. Having all site activities integrated by one organization improves coordination between site organizations and reduces schedule delays. The staff coordinates with the ONP Planning and Financial Staff.

1.2.2.3 Project Management Staff

In the past, major site projects could have benefited from improved control and coordination of functional activities particularly when numerous interface areas are involved. Also, responsibility was often divided among several groups. To improve this situation, individual project managers have been established on site and assigned by the Site Director to major projects. This will give these projects more management attention.

Project managers are responsible for ensuring an appropriate development of work scope and then obtaining and assembling the necessary information needed for project definition. In this endeavor, the project manager works closely with Engineering, Modifications, Licensing, Quality Assurance, Operations, vendors, and other support organizations. The primary objective is to ensure a clear, detailed statement of the issues to be resolved and commitments to be met for each project. Projects requiring the approval of the Manager of Nuclear Power are generally required to have a project manager appointed as well

as any project determined appropriate by the Site Director. The project manager is responsible for monitoring project performance and periodic reporting as well as identifying to the site director any problems that could affect successful completion of the project.

The Project Management Staff also includes an Emergency Preparedness Program Manager and staff which provides overall coordination and direction for implementation of the emergency preparedness program at Watts Bar.

Under the revised Watts Bar site organization, these project managers fill project management positions reporting to the Manager of Projects who reports directly to the Site Director.

1.2.2.4 Radiological Assessor

This is a new position at WBN created to provide programmatic overview of the WBN radiological controls program and to assure that current up-to-date techniques are in use. The Site Radiological Assessor interfaces with the manager of Radiological Control within the Division of Nuclear Services and the Radiological Control Superintendent at WBN to ensure that the ONP radiological control requirements and program implementation features are understood and carried out at WBN. This new position will be filled before fuel load.

01.2.2.5 Site Procedures Staff

The Site Procedures Staff supports the line organizations in developing and revising site procedures and instructions. Additionally, they are responsible for scheduling, tracking, editing, technical evaluation, and coordinating the review, approval and validation of site procedures and instructions. The procedures upgrade effort is further defined in Section 2.4.

1.2.3 Plant Organization

The Plant Manager is responsible for safely conducting the day-to-day plant operations in compliance with licensing and regulatory requirements. Reporting to the Plant Manager is the Superintendent, Operations and Technical Support, who is responsible for plant operations and technical support.

Also reporting to the Plant Manager are three other positions. They are the Maintenance Superintendent, Site Radiological Control Superintendent, and the Assistant to the Plant Manager. The Maintenance Superintendent is responsible for the overall plant maintenance program. The Site Radiological Control Superintendent is responsible for the plant radiological control program. Section VI.6.0 further describes these duties. The Assistant to the Plant Manager is responsible for administering the plant safety/fire protection program in addition to directing plant engineers responsible for reviewing plant operations for operability and reportability considerations.

The plant organization chart is shown in Figure VI-2. Key elements of the organization are discussed below.

1.2.3.1 Operations and Technical Support

The Plant Superintendent, Operations and Technical Support (O&TS), is under the immediate supervision of the Plant Manager. This superintendent is responsible for planning, directing, and coordinating the technical support and operations activities of the plant. This superintendent directs studies to determine the need for plant changes and prepares recommendations for improvement of plant operation, security, and economy. This superintendent coordinates changes in operating procedures and is responsible for supervision of day-to-day operational activities of the plant.

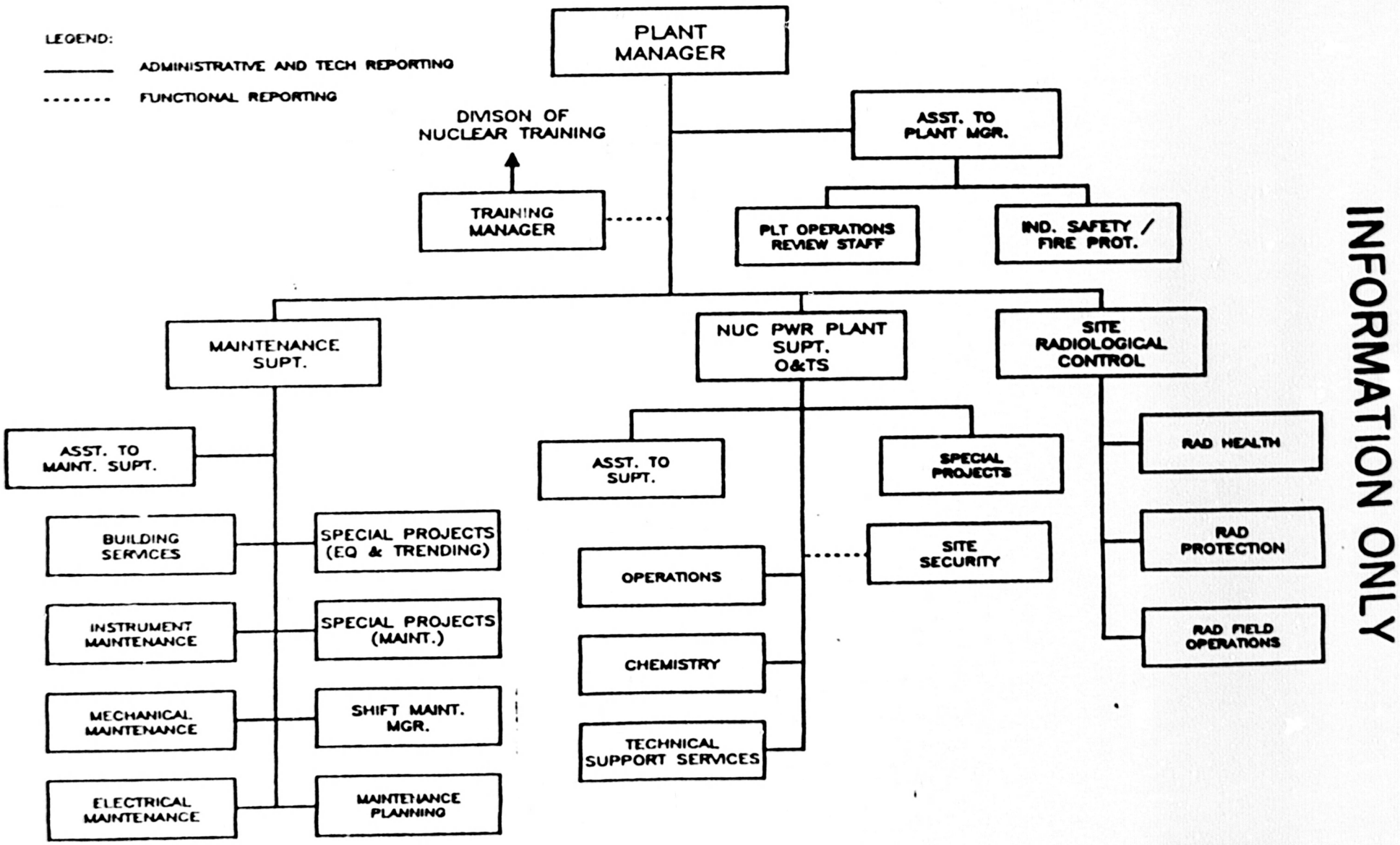
The Nuclear Power Plant Superintendent (O&TS) provides direct supervision of the Supervisor, Operations Group, and Supervisor, Technical Services Group. This superintendent also provides direct supervision of the Chemistry Group Supervisor, and functional supervision of the Site Security Manager.

1.2.3.1.1 Operations Group

The Operations Group is responsible for the safe and efficient operation of the station in accordance with the operating license, technical specifications, and approved procedures. The Operations Supervisor is responsible for the preparation and maintenance of up-to-date operating

Figure VI-2

WBN PLANT ORGANIZATION



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procedures and the preparation of operating records. The Operations Supervisor is also responsible for operating personnel schedules and is charged with the responsibility of keeping the Nuclear Power Plant Superintendent (O&TS) fully informed in all matters of operating significance.

The Operations Group is under the direction of the Operations Group Supervisor and is responsible for all plant operations and operational maintenance. This group provides operating personnel for support of preoperational testing, fuel loading, startup, and operational testing. The Operations Group coordinates and schedules the training program for all operations personnel. It provides the nucleus for emergency teams such as the plant rescue and fire fighting organizations.

1.2.3.1.2 Technical Support Services

The Technical Support Services Group is under the supervision of the Technical Support Services Group manager and is comprised of the Reactor Engineering, Mechanical Test, System Engineering, and Preoperational Test Sections.

The Reactor Engineering Section is responsible for plant reactor engineering activities such as coordinating, site fuel management, implementing the startup test and subsequent restart test programs, implementing clear policies regarding reactor core operation and core performance monitoring, and

performing plant reviews and safety evaluations for changes in core operation, core internals, abnormal operation, and transients. The Reactor Engineering Section interfaces with the nuclear fuel organization of ONS. This section also coordinates implementation of the plant Shift Technical Advisor (STA) program.

The Mechanical Test Section implements and maintains programs for ASME Section XI pump and valve inservice testing, vibration analysis, secondary side performance, 10 CFR 50 Appendix J local and integrated leak rate testing, testing of heating, ventilating, air conditioning, and air cleanup components and systems, plus performance of other assigned mechanical testing activities.

The Preoperational Test Section implements the program of specified preoperational tests in accordance with ONE issued requirements to be conducted prior to and during unit startup. It interfaces with the Division of Nuclear Construction to establish system transfers and establish a post-modification testing program for plant system modifications. For a discussion of the initial testing program refer to section VI.9.0.

In order to preclude instances of inadequate resolution of equipment related problems, a systems approach to finding causes of equipment failures is being implemented at WBN. A systems approach requires personnel with knowledge of

operations, maintenance, and technical considerations. The Systems Engineering Section is a new organization comprised of multidisciplined engineers who are responsible for post modification testing, and system related troubleshooting, and problem resolution. Until some later date when the concept is fully implemented, this section will report to the Preoperational Test Section supervisor.

The systems engineers provide a single contact point for system history, status, testing, and resolution of major system problems and will coordinate across organizational lines to determine the root cause of system problems and formulate effective, timely resolution. Staffing with qualified personnel is in progress and is expected to be completed before fuel load for twenty-five safety-related systems.

The remaining system assignments will be made primarily from within the preop test group as preop testing is completed.

Systems engineering is an improvement to plant performance and reliability and does not address a specific safety issue; therefore, full implementation is not considered a requirement for plant startup.

1.2.3.1.3 Plant Chemistry

The Plant Chemistry Group is responsible for WBN plant water chemistry control, the operation of the Radiochemical Laboratory, and the environmental monitoring and control of plant effluents. Included in this responsibility is the maintenance of chemistry facilities and equipment, the maintenance of plant chemistry pr iures, plant chemistry data management, chemical traffic control, and the storage and quality of bulk chemicals and water testing chemicals.

1.2.3.1.4 Site Security

The Site Security manager reports directly to the Division of Nuclear Services and functionally to the Nuclear Power Plant Superintendent (Operations and Technical Support). The Site Security manager reviews the Physical Security/ Contingency Plan, Security Personnel Training and Qualification Plan, ONP Standards and Directives, and translates applicable security requirements into recommendations to the Plant Manager for security implementing instructions. Under the supervision of the Site Security manager, the Public Safety Service Unit is responsible for implementing requirements of the Physical Security/Contingency Plan and the Security Personnel Training and Qualification Plan as identified in site procedures and instructions. The Site Security manager is responsible for determining the validity and significance of security events at the plant.

[illegible] Controls

[illegible]ical Control Superintendent reports directly to [illegible]nager. This direct reporting relationship will [illegible]ater plant management involvement in this [illegible]on which is responsible for establishing and [illegible]rols for minimizing employee radiation [illegible]uperintendent has the following major areas of [illegible]

[illegible]he Radiation Protection Plan at WBN and [illegible] enforcing this implementation of its policies [illegible]ons.

[illegible]AD CON Staff whose functions and [illegible]s include radiation monitoring, radiological [illegible] implementation, compliance with the Radiation [illegible]. operation of the laundry and decontamination [illegible]e exposure management, dosimetry, and [illegible]tection.

[illegible] and guidance to other branches/sections on [illegible] matters.

[illegible] Browns Ferry and Sequoyah Nuclear Plants and [illegible]arters personnel on radiological matters.

[illegible]o the Radiological Control Superintendent [illegible] Field Operations Manager, Radiological

Protection Manager, Radiological Health Supervisor, and the Radiological Control Administrative Supervisor.

1.2.3.3 Maintenance

The Plant Maintenance Superintendent is under the immediate supervision of the Plant Manager. He is responsible for planning, directing, and coordinating the maintenance activities of the plant. He directs studies to determine the need for plant equipment and maintenance changes and prepares recommendations for improvement of plant equipment, safety, and economy. He coordinates changes in maintenance procedures and is responsible for supervision of day-to-day maintenance activities of the plant.

The Maintenance Superintendent provides direct supervision of the Assistant to Maintenance Superintendent, the managers of the Mechanical, Electrical, and Instrument Maintenance Groups, the Building Services Section Supervisor, Maintenance Planning Section Supervisor, Special Projects (Environmental Qualification and Trending) Manager, Special Projects (Maintenance) Manager, Shift Maintenance Manager, and indirect supervision of the Division of Power system Operation (DPSO) engineering unit.

The WBN maintenance organization has been restructured to more clearly define responsibilities of Maintenance personnel including supervision and steps have been taken to improve the

planning of maintenance activities. The activities are described in Section VI.4.0

Each supervisor in the Maintenance organization is responsible for quality, productivity, industrial and nuclear safety in the performance of the group's assignment.

1.2.3.3.1 Assistant to Maintenance Superintendent

The Assistant to the Maintenance Superintendent is a new position created to assume some administrative duties of the Plant Superintendent (Maintenance). This addresses past problems of overburdening plant management with administrative duties. He assists the Plant Superintendent (Maintenance) with administrative duties related to plant maintenance. He directs the Maintenance Superintendent's staff in his absence.

1.2.3.3.2 Instrument, Mechanical, and Electrical Maintenance Groups

The Instrument, Mechanical and Electrical Maintenance Groups are under the direction of their respective Instrument, Mechanical, or Electrical Group managers.

Each Maintenance Group is responsible for the maintenance of station equipment, components, and systems within their functional discipline in accordance with the operating license, technical specifications, and approved procedures. The Maintenance Groups are responsible for preparation of maintenance procedures, schedules, manpower requirements,

inspections, equipment tests, and changes to maintenance intervals as required to improve efficiency and reliability of plant equipment. Maintenance activities include both preventative and corrective maintenance.

1.2.3.3.3 Maintenance Planning Section

The Maintenance Planning Section is under the direction of the Maintenance Planning Supervisor.

The Maintenance Planning Section is responsible for:

a. Preparation of daily and near-term maintenance schedules and for reviewing their impact on overall plant schedule.

b. Identifying and coordinating plant priorities and critical schedules with maintenance management, operations, and other plant organizations as required and taking corrective action to resolve conflicts.

c. Preparation of short-range and long-range outage schedules for required maintenance.

d. Development of detailed work packages ensuring that the required referenced materials, safety precautions, quality assurance and regulatory requirements are identified.

e. Determining and coordinating requirements for support needed from other sections and engineering groups, and identifying maintenance activities that can be performed in conjunction with other work.

f. Coordinating maintenance activities for the Operations Support Center during site emergencies.

1.2.3.3.4 Special Projects (Environmental Qualification and Trending)

The Special Projects Manager (Environmental Qualification and Trending) is responsible for:

a. Direction and implementation of the maintenance trending program and ensuring proper participation in the Nuclear Plant Reliability Data System. Provides equipment trending information on a periodic basis and as requested to plant personnel to support their activities. Monitoring maintenance trending results and ensuring implementation in the preventive maintenance program.

b. Implementation of a predictive maintenance program by interfacing with work groups that obtain information such as vibration data, oil analysis, acoustic monitoring data, etc., and determining the condition of equipment by joint studies with maintenance groups and other onsite and offsite groups. Make recommendations for scheduling repairs, increasing monitoring of activities, performing

modifications, or other actions to improve equipment reliability in a safe and economical manner.

c. Implementation of the site EQ program.

d. Review of Nuclear Operating Experience Review Program items for applicability to maintenance programs.

e. Review and analysis of data such as Conditions Adverse to Quality Reports (CAQR), quality assurance surveillance and audits, health physics discrepancies reports; and other performance indicators to determine the effectiveness and quality of the maintenance program, making recommendations to the Maintenance Superintendent to correct deficiencies or improve performance.

f. Providing technical and programmatic expertise required to assist the maintenance superintendent and other managers within the maintenance organization in implementing maintenance programs. These activities include performing special studies, developing improvements in maintenance programs and equipment performance, and resolving problems.

1.2.3.3.5 Special Projects (Maintenance)

The Special Projects (Maintenance) Manager is responsible for:

a. Investigating special technical and administrative problem areas as assigned.

b. Developing plans and making recommendations to the maintenance superintendent for corrective actions for assigned problems.

1.2.3.3.6 Shift Maintenance Manager

The Shift Maintenance Manager acts on behalf of the Maintenance Superintendent in directing general foremen and foremen on assigned shifts by implementing established priorities and advising them on special problems. He is responsible for:

a. Coordinating work between maintenance groups, operations, and support groups on shift to avoid conflicts and delays.

b. Ensuring scheduled shift activities are worked and adjusting priorities of work items as directed by the shift engineers.

1.2.3.3.7 Building Services Section

The Building Services Section is under the direction of the Building Services Section Supervisor. This section is responsible for all maintenance and clean-up activities associated with the removal, replacement, and disposal of insulation, protective coatings, and painting. Other janitorial and labor responsibilities include office buildings and areas, lunch rooms, operating laundry and dry-cleaning

facilities for cleaning "C" zone clothing, handling and packaging of radioactive waste material, solid waste management, clean-up of oil and chemical spills, managing onsite landfill operations, and coordinating plant and material decontamination activities with health physics personnel.

1.2.3.3.8 Division of Power System Operation (DPSO)

The DPSO Site Engineering Unit Supervisor is accountable to the Site Director for the performance of assigned responsibilities. The Electrical maintenance Group manager routinely acts as the Site Director's agent for communication, facilitation, and evaluation of these responsibilities and their performance. DPSO is responsible for the calibration, functional checking and other tests required to ensure satisfactory performance of electrical controls, instrumentation and relaying of the switchyard and the auxiliary power system. DPSO is also responsible for making electrical tests on the switchyard (high voltage) electrical equipment, main generator, and the plant onsite electrical equipment.

1.2.3.4 Assistant to Plant Manager

The Assistant to the Plant Manager is a new position created to assume some administrative duties of the plant manager. This addresses past problems of overburdening plant management with administrative duties. The Assistant to the Plant Manager

directs a staff which includes the Plant Operations Review Staff and the Industrial Safety and Fire Protection Section. This position will be filled before fuel load.

1.2.3.4.1 Plant Operations Review Staff

The Plant Operations Review Staff (PORS) will be a staff of multidisciplined senior engineers responsible for day-to-day assessment of plant activities. PORS will provide expertise to assess plant related events, for equipment operability, and adherence to technical specifications to ensure compliance with the reporting requirements of 10 CFR 50.72 and 50.73. PORS will be responsible for coordination of technical specification interpretations and any special projects or assessments assigned by management. The Plant Operations Review Staff will be staffed before fuel load.

1.2.3.4.2 Industrial Safety and Fire Protection

The Industrial Safety and Fire Protection Section is responsible for ensuring WBN is complying with applicable regulations in the areas of fire protection and industrial safety.

1.2.4 Site Engineering

In the past, numerous organizations performed engineering activities. Lack of a centralized engineering organization and a duplication of engineering expertise and overlapping of responsibilities contributed to problems in areas such as design control and configuration control. Actions to correct the causes

of these problems include organizational changes which have consolidated engineering activities into ONE and program changes to strengthen the WBN design and configuration control process. In addition, an Engineering Assurance organization has been established in ONE to ensure effective execution of the QA program as applied to engineering and design activities.

1.2.4.1 Project Engineer

The responsibility for all engineering for WBN has now been assigned to the Project Engineer in the Division of Nuclear Engineering (ONE). A commitment has been made to provide the Project Engineer with the engineering resources to perform the plant-specific engineering work using TVA and contract personnel. The WBN engineering project team is comprised of engineers from each engineering discipline assigned to WBN through a matrix organization. These disciplines include: Civil, Electrical, Mechanical, Welding, and Nuclear Engineering plus Project Services. For each discipline, resources, technical direction, and support are provided from the discipline branch staff to the WBN team as necessary to support the level of engineering effort required at Watts Bar. The project engineering concept thus established requires that all WBN engineering work be authorized and controlled by the Project Engineering team located at WBN, including conceptual and detailed engineering calculations, support for licensing, procurement of permanent plant materials and equipment, and handling of CAQs.

Figure VI-3

WATTS BAR ENGINEERING PROJECT ORGANIZATION

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These changes are being implemented to provide a clea· WBN focus for DNE and to develop clear lines of responsibility and accountability. The control of this work "on-project" does not necessarily mean the work will be performed onsite. The work will be performed where it can be managed and accomplished most effectively, onsite, in Knoxville, in Chattanooga, or in contractor's offices. Due to TVA resource constraints, it may prove necessary to contract work to qualified architect engineering organizations.

The Project Engineer has direct control over all engineering and design activities for WBN and ensures that technical requirements provided by the discipline branch chiefs are followed for WBN. The Project Engineer is responsible for the quality and adequacy of the engineering and design. The Project Engineer is assisted in managing the effort by Assistant Project Engineers, each responsible for a specific portion of the WBN engineering effort. The branch central staffs develop and maintain discipline level guidance and develop design documents such as design guides and standards, general construction specifications, and standard specifications; perform work of highly specialized or unique technical nature such as radiation analysis, water chemistry, and metallurgy; and provide technical support and consultation to the project. The discipline lead engineers ensure that technical direction provided by the discipline branch chiefs' engineers is followed for WBN.

1.2.4.2 Project Engineering Responsibilities

Responsibilities which have been consolidated within engineering include:

- Maintaining the design basis of the as-built facility and maintaining the design documentation current with changes in the plant.

- Directing multidiscipline engineering teams created to investigate and resolve engineering issues associated with the plant.

- Determining and dispositioning corrective actions and actions to prevent recurrence for design related conditions adverse to quality.

- Preparing and issuing design change packages to control changes to the design and configuration of the plant.

- Performing safety evaluations for design related changes, tests, post modification evaluations, and similar items as required under 10 CFR 50.59.

- Contracting for outside design engineering services and managing design engineering service contracts.

- Defining requirements for all permanent plant materials.

- Providing engineering requirements for operations and/or maintenance, and providing engineering support to the plant as requested in the conduct of maintenance and operations activities.

1.2.4.3 Engineering Assurance

The Engineering Assurance (EA) Organization is responsible for administration and management of the QA program as applied to TVA nuclear engineering and design activities.

To facilitate effective involvement in the engineering/design process and monitoring of engineering activities, EA is organizationally located within DNE and reports to the Director, DNE. As an integral function of the TVA quality assurance organization, EA reports to the Director, DNQA, on matters relating to the TVA Nuclear QA Program.

The functions performed by EA include the following:

- Develop, issue, maintain, and control quality related nuclear engineering procedures which establish the systems used to implement the nuclear quality assurance program for engineering and design activities.

- Ensure that engineering procedures interface effectively with those of organizations outside DNE.

- Provide detailed training to DNE personnel in the use of quality related Nuclear Engineering procedures.

- Conduct program audits to assess compliance to Nuclear Engineering procedures and the engineering/design aspects of the TVA QA program.

- Conduct in-depth technical audits, utilizing engineering expertise outside of EA as necessary to assess the technical adequacy of engineering work.

Deficiencies noted during EA audits are reported to the Director of DNE and the Director of DNQA. Follow-up reviews are performed by EA to verify implementation of effective corrective action measures.

The Manager of EA has the authority to stop engineering work that does not conform to established requirements. Additional functions to be performed by EA include review and approval of documents used to procure engineering services, assuring adequate QA program implementation by those suppliers, trending of engineering related deficiencies, and centralized monitoring of engineering related problems to ensure that potentially generic implications are considered and action implemented as required.

The EA functions described above are executed under the direction of the Manager of EA. Additionally, EA personnel are assigned to the WBN Project Engineer by the Manager of EA to ensure close oversight of WBN engineering activities. Assigned personnel provide support in implementation of the TVA QA program relating to engineering and design. EA personnel assigned to WBN report to the Site Quality Manager on matters related to the WBN QA program. Administrative direction regarding WBN EA activities and functions is provided to project EA personnel by the WBN Project Engineer.

1.2.5 Site Quality Assurance Organization

1.2.5.1 Introduction

In the past, TVA's Nuclear QA and QC functions were not unified under a single department. This led to a situation where nuclear QA and QC activities were not performed under a consistent set of programs or procedures. Nuclear QA and QC groups did not report to a high level of management within TVA. To correct this problem and to help ensure adequate implementation of the QA program, the quality assurance organization has been restructured and placed under one manager, the Director of Nuclear Quality Assurance, who reports directly to the Manager of Nuclear Power.

This restructuring of Nuclear Quality Assurance includes a Site Quality Manager for Watts Bar. This section describes the structure and functions of the Watts Bar Site Quality Manager's

Organization. Included are the duties and responsibilities of the Site Quality Manager and a breakdown of the responsibilities of each organization section.

1.2.5.2 Details

The responsibility for the various quality assurance functions throughout the new Quality Assurance Organization has been consolidated under the Director of Nuclear Quality Assurance. The Director of Nuclear Quality Assurance reports directly to the Manager of Nuclear Power on the same level as other division directors thereby giving QA an equal voice in matters relating to quality. The Director of Nuclear Quality Assurance is responsible for developing, maintaining, and assuring the implementation of a standardized design, construction, and operations Nuclear Quality Assurance Program.

The Site Quality Manager reports directly to the Director of Nuclear Quality Assurance. The Site Quality Manager is responsible for establishing and maintaining a site quality assurance organization that performs the quality engineering, quality control, quality improvement, and quality surveillance functions. Site Engineering Assurance engineers interface with the Site Quality Manager concerning DNE quality issues as described in Section VI.1.2.4.

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Figure VI-4 shows the corporate organizational chart for TVA's office of Nuclear Power. Included is a breakdown of the Director of Nuclear Quality Assurance's organization down through the individual Site Quality Managers. Figure VI-4 also shows the organizational chart for the Watts Bar Site Quality Managers Organization.

Duties and responsibilities of the Site Quality Manager include:

- Develop, plan, initiate, and direct detailed nuclear plant quality assurance and quality control programs.

- Performing quality engineering functions relative to site activities and providing verification of those activities, including quality control inspections.

- Evaluating the effectiveness of the nuclear quality assurance program by surveillance and making recommendations to site management regarding its implementation.

- Reviewing and verifying the site instructions contain applicable quality assurance requirements.

- Developing and implementing a quality control inspection program covering receipt of the purchased items, modifications, and maintenance activities.

Figure VI-4

TVA OFFICE OF NUCLEAR POWER ORGANIZATION
DIVISION OF NUCLEAR QUALITY ASSURANCE
SITE QUALITY ASSURANCE