TVA 64 (05-9-65) (OR-WP-5-65)

UNITED STATES GOVERNMENT

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TENNESSEE VALLEY AUTHORITY

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TO : Those listed on page 2

FROM : George Toto, Site Director, Watts Bar Nuclear Plant ONP

DATE : MAR 20 1987

SUBJECT: WATTS BAR NUCLEAR PLANT (WBN) - NUCLEAR PERFORMANCE PLAN, VOLUME 4 - REVIEW FOR CONCURRENCE OF SITE MANAGEMENT

Attached is the revised draft of Volume 4 of the Nuclear Performance Plan for Watts Bar. This draft reflects the resolution of comments made on the February 19, 1987 draft of Volume 4. Please note that all comments received have been evaluated, but that some comments when viewed in the context of all other comments on the same section, could not be completely incorporated.

This draft is being provided for the final review and concurrence of the site managers listed on the Volume 4 cover page. This draft is also being provided to offsite ONP managers and advisors for a second preliminary review to resolve major problems before Volume 4 is distributed on March 18, 1987 for final review and concurrence by ONP division directors.

A complete set of the Appendices and Activities List are included with the copies to those on distribution marked with an asterisk (*).

Please provide any comments to the Watts Bar Phase II Task Force by March 13, 1987. The Watts Bar managers listed on the Volume 4 cover page should sign and return the cover page with their comments.

George Toto

George Toto

DRAFT COPY

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EXHIBIT 59

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TENNESSEE VALLEY AUTHORITY

NUCLEAR PERFORMANCE PLAN
VOLUME 4

WATTS BAR NUCLEAR PLANT

Approval: _____ / _____
George Toto, Site Director — Date

Concurrence:

_____ / _____
E. R. Ennis, Plant Manager — Date

_____ / _____
H. B. Bounds, Project Engineer — Date

_____ / _____
J. A. McDonald, Site Licensing — Date

_____ / _____
H. C. Johnson, Site Quality Manager — Date

_____ / _____
J. A. Thompson, Modifications — Date

_____ / _____
A. E. Little, Engineering Assurance — Date

_____ / _____
D. F. Bailey, Site Services — Date

_____ / _____
W. D. Stevens, Site Procedures — Date

_____ / _____
R. C. Manley, Site Planning & Scheduling — Date

_____ / _____
C. V. Cobia, Personnel Services — Date

_____ / _____
K. G. Frazier, Training — Date

_____ / _____
W. R. Brown, Jr., Emp. Concerns Task Grp. — Date

_____ / _____
R. C. McKay, Phase II Task Force — Date

_____ / _____
W. L. Byrd, Assistant to Site Director — Date

_____ / _____
J. J. Erpenbach, Manager of Projects — Date

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Revised 03/08/87

EXECUTIVE SUMMARY FOR THE

WATTS BAR NUCLEAR PERFORMANCE PLAN OF TENNESSEE VALLEY AUTHORITY

The Watts Bar Nuclear Plant (WBN) consists of two units, each rated at 1160 MW electrical output. Construction of unit 1 will be completed pursuant to the corrective action programs described in this volume. Unit 2 is approximately 85 percent complete and will be subject to similar corrective actions, as appropriate. On March 13, 1984, NRC requested TVA to certify for unit 1 that the as-built plant was in conformance with the Final Safety Analysis Report (FSAR) and other licensing commitments. On February 20, 1985, TVA provided a certification that the design, construction, testing, and preparation for operation of WBN Unit 1 had essentially been completed in accordance with descriptions contained in the WBN FSAR and other licensing documents. In April 1985, the NRC became aware of numerous TVA employee concerns which placed in question the readiness of Watts Bar for operation. Several of these concerns were expressed directly to NRC. Subsequently, on May 30, 1985, the NRC requested that TVA provide a compilation of all reviews which demonstrated TVA's conclusion that the Watts Bar facility met its licensing commitments. On September 17, 1985, the NRC requested, pursuant to 10 CFR 50.54(f), that TVA submit information about its plans for correcting Watts Bar problems and for correcting problems in the overall management of its nuclear program.

In response to its own recognition of problems in the nuclear program and to the NRC's requests, TVA undertook the following actions:

- TVA withdrew, on April 11, 1986, its 1985 certification that WBN Unit 1 was ready for licensing.

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- TVA reorganized its corporate nuclear structure to improve its management of the nuclear program. This included installation of a new and experienced senior nuclear management team to provide leadership and direction to the TVA nuclear program. These actions are described in the Corporate Nuclear Performance Plan, Volume 1, Revision 3.

- TVA reorganized the Watts Bar nuclear facility and installed new and experienced senior staff. The personnel and organization are also described in the Corporate Nuclear Performance Plan, Volume I, Revision 3.

- TVA formed at Watts Bar a high level, highly experienced Senior Task Force to review the implementation of the Corporate Nuclear Performance Plan at Watts Bar, to initiate specific actions at Watts Bar to address the identified problems, to ensure all known problems were identified, and to review the processes for selection of work items to be completed prior to licensing.

- TVA established a credible Employee Concerns Program to ensure employee concerns are identified and addressed.

- TVA established at Watts Bar special programs to evaluate the problems identified and correct them as necessary to ensure Watts Bar is in compliance with the FSAR and associated licensing commitments. This activity is monitored by the Watts Bar Task Force.

- TVA has established a Watts Bar Design Baseline and Verification program to confirm that the design and construction meet licensing commitments.

- TVA will organize and conduct operational readiness reviews prior to certifying the plant to be ready for licensing. These reviews are intended to assure that TVA has completed all of its required commitments prior to certification of readiness for licensing for fuel load (hereafter referred to simply as prior to licensing).

TVA has also prepared a Watts Bar Nuclear Performance Plan (WBNPP) contained herewith. This volume which addresses the problems specifically related to Watts Bar, defines plans for correcting these problems and responds to the NRC's earlier requests for specific information about Watts Bar. Taken together with the corporate plan, these two plans provide a complete account of the actions which TVA is taking to improve its nuclear program for Watts Bar and prepare the plant for licensing and operations.

Shortly after his arrival in January 1986 as TVA Manager of Nuclear Power, Mr. S. A. White initiated a comprehensive review of the TVA nuclear program to identify problems, their causes, and actions to correct them. The problems and corrective actions identified in the Corporate Nuclear Performance Plan included: hiring, developing, and retaining experienced nuclear managers; restructuring the nuclear organization to clarify lines of authority and responsibility and to provide centralized direction and control of nuclear activities; taking steps to restore employee trust in nuclear management; increasing upper management awareness and involvement in nuclear activities; and improving the nuclear management systems and controls, the nuclear corrective action program, and other programmatic areas of operation, maintenance, welding, design change, plant modifications, and quality assurance.

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Corrective actions emanating from the corporate level are being implemented at Watts Bar through the Watts Bar Site Director and the Watts Bar Unit 2 Project Manager as well as through the actions of off-site organizations responsible for direct support to Watts Bar. These corrective actions include organizational changes consistent with corporate level restructuring, improved management control and involvement, revised conduct of maintenance activities, improved quality awareness, centralized design control, and programs to foster employee confidence. Plans for improved performance in each of these areas have been defined and specific programs have been developed as a result of deficiencies identified to date. Other programs are being pursued to assure that all significant deficiencies are identified.

The paramount concern of the Watts Bar Task Force established by Mr. White has been to find and correct deficiencies in construction of Watts Bar that might have occurred and failed to be corrected earlier because of past deficiencies and breakdowns in the quality assurance program. It was assigned the responsibility to review and verify the identification of known Watts Bar deficiencies, to review the adequacy of corrective actions for resolution of those deficiencies, and to establish a program for identifying and correcting any other significant deficiencies prior to licensing. This effort by the Task Force includes those problems and deficiencies identified by the Watts Bar quality assurance program, by employee concerns, by the NRC, by the independent reviews that have been performed at Watts Bar, by the Design Baseline and Verification Program (DBVP), and by the Operational Readiness Review (ORR). Problem identification, categorization, and analysis are essentially complete for the problems identified to date, and corrective action programs are underway. However, as the DBVP, ORR, and routine quality

assurance functions are implemented on the project, additional problems or deficiencies may be discovered which will require categorization, analysis, and correction. Problems and deficiencies that are identified as conditions adverse to quality will be tracked and corrective action will be implemented prior to licensing for all actions required to be complete to assure safe operations and protection of the health and safety of the public.

TVA, the NRC, and members of Congress have received expressions of concern from TVA employees regarding the quality of TVA's nuclear activities and expression of fear that TVA managers or supervisors may take reprisal against them if they express their quality concerns directly to TVA management. In order to foster employee trust in TVA's nuclear management and to instill an atmosphere which is conducive to high quality work, TVA has established a system in which employees are encouraged to express concerns to TVA's nuclear management without fear of reprisal and with assurances that these concerns will be fully addressed. Employee Concern Program (ECP) representatives are located at the Watts Bar Nuclear Plant and at major corporate nuclear locations. Employee concerns identified at any location are evaluated for their potential impact on Watts Bar. Procedures have been established for screening concerns and expediting those issues that have a potential safety significant impact on Watts Bar. Those concerns which have a potential safety significant impact on Watts Bar will be resolved prior to licensing at Watts Bar. A program will be in place to encourage the continued expression of employee concerns after licensing of the plant.

Past deficiencies in the conduct of activities at Watts Bar specifically and at TVA in general have led to specific concerns in a number of areas at

Watts Bar. Some of these involved deficiencies and breakdowns in quality assurance. In recognition of these deficiencies, special programs have been designed by the Special Task Force for implementation prior to licensing. These special programs are designed to address concerns in the following areas: environmental qualification, electrical cable, piping and piping supports, main steam line break criteria and analysis, instrumentation and control sensing lines, welding, Q-List, concrete quality, design analyses and calculations, soil liquefaction, containment isolation, equipment seismic qualification, "use-as-is" nonconformance reports, quality records, and pre-startup testing. In each of these areas, the special programs have been defined and the necessary work to be completed prior to plant licensing has been identified. A composite list of activities has been compiled. Work on these activities is being tracked by management using the Watts Bar planning and scheduling organization to ensure satisfactory planning, execution and control of work required to be complete prior to licensing.

In addition to these special programs, TVA will implement a Design Baseline and Verification Program (DBVP) to provide additional assurance that Watts Bar Unit 1 has been designed and constructed in accordance with licensing commitments and is ready for licensing. The program will document licensing commitments, the plant design basis, and functional configuration of safety-related structures, systems, and components for Watts Bar Unit 1. Several of the elements of the program will also be applied to unit 2.

An Operations Readiness Review Program (ORR) will be conducted to assure Watts Bar Unit 1 has met licensing commitments necessary for plant operations. This review will result in certification by TVA corporate

managers and Watts Bar managers that Watts Bar Unit 1 is ready for operations and has been adequately designed and constructed in accordance with the FSAR and associated licensing commitments.

In the areas of organization, there had been a lack of clear assignment of responsibility and authority to managers and their organizations. There was no clearly established accountability for performance. To rectify this, onsite support of Watts Bar activities has been strengthened by reorganization into functional departments which generally parallel the functional departments in TVA's corporate organization. Where applicable, each site support organization, such as site licensing, quality assurance, modifications, and design engineering, will receive technical direction from its respective corporate department. In addition, specific organizations have been strengthened onsite to assure control of construction, operations, maintenance, design and modifications activities, and quality assurance. Position descriptions are being developed for all Watts Bar managers against which their performance will be measured. Knowledge of the plant is also being strengthened through additional Senior Reactor Operator and plant systems training for plant supervisors who will be involved with the eventual operation at Watts Bar.

The Watts Bar Site Director is responsible for planning, scheduling, coordinating, and providing project direction for the activities of the site support organizations. In order to assist the Site Director in coordinating the many projects occurring simultaneously at Watts Bar Unit 1, several project managers have been established and report directly to the Site Director. Major unit 1 projects and other site projects have their own

project managers who are responsible for integrating the various functions involved in the projects and identifying to the Site Director any problems that could affect adequate completion of the projects. The Site Director also has a Site Planning and Scheduling Staff reporting directly to him. This group implements corporate guidelines for integration of and analyses of project plans, schedules, and budgets to ensure that projects initiated can be completed on schedule or that schedule changes are identified and integrated with other activities.

Watts Bar Unit 2 is under the direction of a unit 2 Project Manager who reports to the Manager of Nuclear Power. He is responsible for all planning, scheduling, coordinating and providing project direction during design, construction, and system transfer. Close communication is maintained between the Unit 2 Project Manager and the WBN Site Director to assure that unit 2 work will not affect ongoing work at unit 1 or, eventually, the safe operation of unit 1.

A number of specific changes have been made in the site staff to focus attention on the technical and administrative functions involved in starting and operating unit 1 after the special programs to assure adequate completion of construction have been accomplished. Changes were made to assure the development of an integrated master plan for all on site activities. The Site Planning and Scheduling Staff has been charged with responsibility for developing and maintaining this site master schedule. A new Systems Engineering Section has been formed with the responsibility for post-modification testing, system related troubleshooting, and problem resolution.

To ensure effective control of design and engineering at Watts Bar, responsibility for engineering support has been placed under the onsite Project Engineer who reports to the Corporate Director of Nuclear Engineering for administrative and technical direction and to the Site Director for functional direction. An Engineering Assurance (EA) Organization has been established within the Division of Nuclear Engineering (DNE) with responsibility to administer the quality assurance (QA) program for nuclear engineering and design activities. As an integral function of the TVA Quality Assurance Organization, EA reports to the Director of Nuclear Quality Assurance on matters related to the TVA Nuclear Quality Assurance program. The Manager of Engineering Assurance has the authority to stop engineering work that does not conform to established requirements.

The Watts Bar maintenance organization has been restructured to more clearly define responsibilities of maintenance personnel, including supervision, and steps have been taken to improve the planning and execution of maintenance activities.

To improve the accountability, control, and quality of plant modification work, the modification function has been placed under the corporate Director of Nuclear Construction. He establishes the methods by which the work will be estimated, scheduled, accomplished, tracked, and reported. Limits have been placed on the number of craft personnel involved in plant modifications at any point in time to assure close supervision and improved control of work. Additional training is being provided to craftsmen, foremen, managers, and engineers in the modifications function to improve their knowledge of systems.

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The TVA nuclear quality assurance organization has been placed under one manager who reports directly to the Manager of Nuclear Power. A Watts Bar Site Quality Manager has been established who reports directly to the Director of Nuclear Quality Assurance. The Site Quality Manager maintains a quality assurance organization to perform the quality engineering, quality control, quality improvement, and Quality Assurance surveillance functions. The Site Quality Manager interfaces with the site EA engineer on audits, corrective actions, procedure review, and employee training to provide for uniform and complete QA program implementation.

The licensing support for Watts Bar has been restructured to provide improved responsiveness to regulatory issues. The licensing functions are now under the control of the Corporate Director of Nuclear Safety and Licensing who supervises a site licensing group to review and process Watts Bar correspondence with NRC. An Independent Safety Engineering Group (ISEG) has been formed to examine plant operating characteristics and other sources which may indicate areas for improving plant safety.

Because of past problems that have been attributed to a lack of management involvement in the control of work practices, a number of actions are being taken in the areas of goal setting, communication with employees, training, procedures improvement, corrective action programs, and resolution of employee concerns. A set of goals and objectives has been issued for Watts Bar which build on the goals set forth by TVA's Manager of Nuclear Power. Communication of performance expectations is being extended to all staff levels through a sequence of periodic meetings which start with the staff meeting of the Manager of Nuclear Power, including the Watts Bar Site Director and Watts Bar

Unit 2 Project Manager. These occur at least monthly. The Manager of Nuclear Power is in close contact with his line managers, including the Watts Bar Site Director and the Watts Bar Unit 2 Project Manager. The Watts Bar Site Director and Watts Bar Unit 2 Project Manager periodically meet with site employees. The Watts Bar supervisors meet frequently with their employees to receive employee feedback. These meetings provide the opportunity to discuss and clarify performance expectations, revise expectations, report progress, and involve management at higher levels, where necessary.

The training programs at Watts Bar are being improved in a number of areas under the Division of Nuclear Training (DNT) which has the responsibility for training program development and execution. Of the ten training programs of the Institute of Nuclear Power Operations (INPO), one has been accredited at TVA, four others have been submitted for INPO review, and the INPO team visits have been conducted. The remaining five programs will be submitted for accreditation after Watts Bar Unit 2 fuel load.

Because recent audits and inspections have identified weaknesses in administrative, maintenance, operational, and surveillance procedures, an overall upgrade of Watts Bar procedures is planned. It will be consistent with the corporate level procedures improvement program. Specific areas of change have been identified for completion prior to licensing of Watts Bar. This program will be directed by a dedicated, permanent Watts Bar procedures staff to ensure its accomplishment.

Actions have been taken to assure timely resolution of conditions adverse to quality (CAQs) at Watts Bar. These actions include frequent meetings to

discuss deficiencies and open items with the Site Director and Unit 2 Project Manager, weekly meetings with the Plant Manager and key plant supervisors to discuss the timeliness of corrective actions, monthly meetings among the Site Director, the Unit 2 Project Manager, and the Site Quality Manager to discuss quality trends and delinquent or unresponsive actions to corrective action reports (CARs), and quarterly meetings among the Site Director, the Unit 2 Project Manager, and the Director of Nuclear Quality Assurance to discuss corrective action status. These meetings provide opportunities for line managers to seek timely action to resolve CAQs. A procedure has been issued requiring automatic escalation of deviations identified by the Division of Nuclear Quality Assurance (DNQA) to higher levels of management when the timeliness or responsiveness at lower levels of management is inadequate to resolve findings of conditions adverse to quality.

Through the course of evaluating problems at Watts Bar, significant weaknesses have been uncovered in the control of Watts Bar plant design changes and modifications. A number of steps have been taken to overcome these weaknesses. First, the improved design control program for Watts Bar is founded on the unification of engineering responsibilities and strengthening of the project engineering function. Second, a multi-phased program leading to long-term improved design control using a single, verified system for configuration control of drawings has been initiated. Third, a Change Control Board (CCB) has been established to provide control of the transition from the existing process to the new control process. A transitional change control system is being established that allows work to proceed in a controlled process pending transition to the permanent system. Specific procedures for Watts Bar are being written to cover transitional change control.

configuration control of drawings, modification criteria, development and control of the design bases and the design criteria, and plant modification packages. The transitional design change packages are reviewed to ensure that a high quality modification has been prepared and that after installation and testing the documentation is traceable and updated and represents the actual plant configuration. A responsible task engineer will be assigned to each package to ensure the design work is performed, ensure the package is assembled, assist in the implementation, and ensure the work is tracked, completed, closed, and documented.

In summary, TVA has taken significant steps to improve the management of its nuclear program and actions directly related to verification of completion of construction of Watts Bar in accordance with licensing commitments. In addition to corporate level actions identified in the Revised Corporate Nuclear Performance Plan, specific changes in the Watts Bar organization, specific changes in the manner in which TVA controls and conducts its activities at Watts Bar, additional verification of plant design, and additional plant improvements are identified in this volume. TVA has developed this nuclear performance plan for Watts Bar Nuclear Plant to address organizational, programmatic, and plant improvements. This plan, in combination with the Corporate Nuclear Performance Plan, is submitted to the NRC to serve as the basis for the eventual licensing for operations of Watts Bar Unit 1 and the completion of construction and eventual licensing for operations of Watts Bar Unit 2.

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I. INTRODUCTION

1.0 Purpose

On September 17, 1985, in a letter from William J. Dircks, Executive Director for Operations, Nuclear Regulatory Commission (NRC), to Charles Dean, Chairman, Board of Directors, TVA, NRC provided its Systematic Assessment of Licensee Performance (SALP) and requested specific information pursuant to 10 CFR 50.54(f). This letter requested TVA to furnish its plans to correct deficiencies in its nuclear program at the corporate level as well as each plant site before restart of any nuclear unit. For Watts Bar (WBN), NRC requested responses to all categories rated 3 in the SALP report as well as information on two specific questions.

Since receipt of the NRC request for information, TVA has significantly changed its nuclear organization, its nuclear management, established nuclear improvement programs, and completed a reevaluation of TVA's approach for correcting the problems that have arisen, including those at WBN.

The revised Corporate Nuclear Performance Plan (CNPP), Volume 1, describes the measures being taken by TVA to improve its nuclear program at the corporate level. This Watts Bar Nuclear Performance Plan (WBNPP), Volume 4, in combination with the revised CNPP, describes the plan for providing vital management control and performing specific actions to document, investigate, and correct problems at WBN. This plan not only responds to NRC's specific request for information under 10 CFR 50.54(f) on TVA's specific activities but also presents an integrated plan for

addressing NRC's general interest in the adequacy of design and construction and safe operation of the plant. The revised CNPP and the WBNPP provide a complete account of the actions which TVA is taking to improve its nuclear program for WBN.

2.0 Plan Arrangement

Volume 4 is written to describe programs and provide NRC with information to plan and conduct audits of the programs. While detailed descriptions of processes are included, technical details are omitted unless they are necessary to describe programs. Documents (procedures, program plans, etc.) are referenced where applicable to allow NRC auditors to readily locate the documents. Detailed technical information will be made available to NRC, as required for its review, and any further information will be furnished on request.

This document is comprised of eight major sections.

- Section I reviews the purpose of the plan, describes its arrangement, provides background information, and discusses the methods used by TVA to identify, evaluate, and resolve issues at WBN. Section I provides the basis for many of the actions described in this WBNPP, Volume 4, to correct past problems.

- Section II is a discussion of the adequacy of design and construction of WBN. This section describes those programs important to the assurance of quality in a nuclear project and their existence at WBN, some highlights of the WBN project

history, the deficiencies identified by the QA program, a summary of independent reviews performed for the WBN project, a summary of special programs to be completed at WBN, the comprehensive employee concerns program at WBN, a description of problem identification programs at WBN, and finally, the program to track problems.

- Section III describes the formalized Employee Concerns Program designed to assure employees present their legitimate concerns and that these are properly and promptly evaluated for safety impact at WBN and other TVA sites.

- Section IV presents specific programs which are designed to resolve specific issues prior to licensing. These programs are typically problem focused programs as compared to the ongoing programs described in Sections II and VI.

- Section V describes the Design Baseline and Verification Program designed to assure that the design of the plant and as-built configuration are in accordance with the Watts Bar FSAR and other licensing commitments.

- Section VI describes the program to improve the overall conduct of operations to achieve and maintain a high performance standard. This long-term program is an integral part of day-to-day site activities.

- Section VII describes the Operational Readiness Review program to be conducted at WBN before fuel load. In addition to each of the programs described in Volume 4 which are intended to be completed before fuel load, a comprehensive certification will be performed that assures necessary activities have been completed before fuel load. This effort will provide assurance that WBN is prepared to load fuel and that before fuel load commitments have been met.

- Section VIII summarizes commitments affecting WBN as contained in both Volume 1 and this Volume 4 Nuclear Performance Plan. The list identifies the commitments as either before fuel load (BFL) or after fuel load (AFL) for unit 1. Where applicable, commitments reference program plans that track to completion each subtasks which in sum fulfill the subject commitment. This listing includes a re-evaluation of items that TVA previously considered to be AFL, as requested in NRC letter dated May 12, 1986. As indicated in the TVA response dated June 11, 1986, many of the items which were formerly AFL have been reclassified as BFL.

- Appendix 1 provides information in response to NRC's concerns stated in the 10 CFR 50.54(f) September 17, 1985 letter. This appendix generally directs the reader to Sections and Appendices for detailed responses to each of the specific NRC concerns.

- Appendix 2 gives the status of the Watts Bar May 20, 1985 license conditions showing which items will be completed prior to fuel load and which efforts will extend beyond unit 1 fuel load.

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- Appendix 3 gives a chronological listing of NRC correspondence indicating TVA's response and references to commitments made by commitment numbers using TVA's Corporate Commitment Tracking System (CCTS). This appendix can be used for easy reference to determine TVA's response to NRC inquiries.

- Appendix 4 is a brief history of the WBN project highlighting the QA program and changes made during the project.

- Appendix 5 is a complete listing of all notifications sent to the NRC of potential deficiencies reportable under 10 CFR 50.55(e). For each report, a summary of the issue, actions taken to define the scope of the issue and action taken to correct the concern are provided.

- Appendix 6 gives a listing of NRC inspection report findings and the corrective action associated with each finding.

- Appendix 7 is a listing of internal audits performed. These audits were governed by the QA program and show that an extensive number of internal audits have been conducted to identify and resolve program problems.

- Appendix 8 is a list of stop work actions issued for WBN and the corrective action taken.

- Appendix 9 provides a detailed report on results of Independent Review relevant to WBN and associated corrective actions. This shows the extensive number of independent reviews conducted on programs related to WBN and the responsiveness of corrective actions.

- Appendix 10 discussed each at the eleven Nuclear Safety Review Staff (NSRS) perceptions presented to Commissioner Asseltine in December 1985. This appendix indicates where each perception is addressed in this Nuclear Performance Plan.

- Appendix 11 presents the corrective action plans developed to resolve each of the findings from the Watts Bar Employee Concerns Special Program.

In each section of this Volume 4, as applicable, root causes of problems are identified; corrective actions to solve the problems are defined; and implementation of the defined actions is discussed.

3.0 Background

Watts Bar Nuclear Plant (WBN) is a two-unit nuclear power plant located approximately 50 miles northeast of Chattanooga, Tennessee. The nuclear steam supply system for each unit is a four-loop pressurized water reactor rated at 3411 MWt furnished by Westinghouse Electric Corporation. Each unit is rated at 1160 MW net electrical output. The plant was designed, is being built, and will be

operated by TVA. Construction of unit 1 is essentially complete except for the corrective action programs described in this volume, and unit 2 construction is approximately 85% complete.

On March 13, 1984, NRC requested TVA to certify for unit 1 that the as-built plant was in conformance with the FSAR and other licensing commitments. On February 20, 1985, the TVA Manager of Power and Engineering provided a certification on behalf of TVA that to the best of his knowledge the design, construction, testing, and preparation for operation of WBN Unit 1 had been completed in accordance with descriptions contained in the WBN FSAR and other licensing documents with the exception of noted items.

In April 1985, the NRC became aware of numerous TVA employee concerns which related to Watts Bar readiness. Several of these concerns were provided directly to the NRC. TVA instituted a comprehensive review of employee concerns in the spring of 1985. Subsequently, on May 30, 1985, the NRC requested that TVA provide a compilation of all reviews which demonstrated TVA's conclusion that the Watts Bar facility met its licensing commitments.

On September 17, 1985, NRC requested under 10 CFR 50.54(f) that TVA submit its plan to correct programmatic and management deficiencies before licensing of Watts Bar unit 1.

Because of these and other events which reflected adversely upon the quality of performance of TVA nuclear activities, TVA withdrew the certification of Watts Bar Unit 1 readiness on April 21, 1986.

As discussed in his letter of January 11, 1987 to Mr. Victor Stello, Executive Director of Operations, USNRC, Mr. White has been concerned about a number of problem areas at WBN and he has directed that reviews be conducted to determine how extensive these problems are and to develop corrective actions. The Watts Bar Nuclear Performance Plan addresses all of the outstanding licensing issues, outlining the problems, and TVA's plans for resolution. This plan identified how TVA will resolve known quality problems, employee concerns, and make improvements in the WBN management and staffing areas. The plan also describes a program of independent reviews designed to provide TVA management with confidence that WBN is adequately designed, constructed, and prepared for fuel load and operations.

4.0 Outline of TVA's Approach to Correcting WBN's Problems

Evaluations by TVA, as well as outside contractors and regulatory and audit agencies such as NRC and INPO, have pointed out specific deficiencies in project performance; but the root causes of these deficiencies have not always been identified and adequately corrected by TVA.

Shortly after his appointment as TVA Manager of Nuclear Power, Mr. S. A. White initiated a comprehensive review of the nuclear program to identify problems, causes of problems and actions to correct these. As discussed in the CNPP, Volume 1, Revision 2, the root causes of the problems in TVA's program were confirmed by a team of senior experienced industry advisors. This team conducted a

study entitled "Systematic Analysis of Identified Issues/Concerns at TVA." This study accumulated issues and concerns from sources external to TVA, encoded these concerns into a data base, analyzed the resultant information, determined the root cause where possible, and supported the preparation of the TVA Corporate Nuclear Performance Plan.

The root causes and corrective actions taken at the corporate level are described in the revised CNPP, Volume 1. In summary, the actions include: hiring, developing, and retaining experienced nuclear managers; restructuring the nuclear organization to clarify lines of authority and responsibility and to provide centralized direction and control of nuclear activities; taking steps to restore employee trust in nuclear management; increasing upper management awareness of and involvement in nuclear activities; and improving the nuclear management systems and controls, the nuclear corrective action program, and other programmatic areas of design, operation, maintenance, and plant modification.

The study of root causes and corrective actions has been carried beyond the corporate level to the WBN project. Corrective initiatives started at the corporate level are being implemented at WBN through the WBN Site Director for unit 1 and the Nuclear Project Manager for unit 2, as well as through offsite organizations responsible for direct support to WBN. These improvements include organizational changes compatible with corporate level restructuring, improved management control and involvement, revised

conduct of operations and maintenance activities, improved quality awareness, centralized design control, a long-term program for upgrading procedures, and programs to restore employee confidence. The efforts to standardize organizations and procedures at all sites and the corporate office are designed to improve the ability to communicate between sites and quickly apply improvements made at one site to all sites. These efforts also have the additional benefit of improving the exchange of information between NRC and TVA.

A special WBN Task Force, consisting of senior and very experienced nuclear technologists, was established by Mr. White on March 19, 1986, to identify specific plant problems and resolve them where necessary before fuel load of WBN. This Task Force has examined the distribution of WBN related issues identified by the corporate level team of industry advisors to confirm that the actions taken at WBN suitably address the problems identified.

In order for the WBN Task Force to complete its assignment, it has developed a list of plant activities (except for those of a routine nature) to be completed before fuel load. This list was compiled from issues identified by NRC, INPO, outside contractor recommendations, and various corporate and site quality assurance related processes. The list of commitments to resolve issues and the identification of those which are required to be completed before fuel load (BFL) are discussed in Section VIII.

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The Task Force has established criteria for evaluating potential fuel load items and has been working closely with WBN line managers in resolving problems. It has provided an overview of site activities and information to the Site Director and the Manager of Nuclear Power regarding potential problems.

In order to assess the overall adequacy of design and construction of WBN, past problem areas have been reviewed, including the effectiveness of the QA program. Although deficiencies in particular aspects of implementation of the QA program have been identified, corrective actions were defined for each problem area.

As indicated by the discussion in Section II, TVA has had a Quality Assurance Program throughout the design and construction of WBN which has included an audit function. In addition, many external reviews have been performed to evaluate the adequacy of the TVA QA program. TVA has made a number of program improvements as a result of these audits and reviews. The TVA expanded program to resolve employee concerns as described in Section III and other allegations provides reasonable assurance that no significant plant deficiencies will remain undetected.

Special programs have been defined in a number of areas to ensure integrated corrective actions dealing with problems created by deficiencies in the past conduct of activities. These special programs are discussed in Section IV of this volume. Special programs which have been identified as important to be resolved before fuel load include:

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1. Establish and implement a documented, and ongoing program for environmental qualifications of safety related electrical equipment.

2. Review of electrical design issues for adequacy of resolution of identified problems.

3. Update of piping analyses and pipe supports design to address current issues.

4. Resolve the effects of increased temperatures during postulated main steam line breaks caused by revised NSSS vendor analysis.

5. Examine instrument sensing line issues identified by employee concerns.

6. Assess the adequacy of the welding program at WBN including those issues identified through employee concerns.

7. Review and verify completeness, and issue an approved Q-list of components requiring specific qualification.

8. Evaluate the potential deficiencies in concrete placement as identified by employee concerns.

9. Establish a minimum set of design calculations required to be maintained.

10. Resolve question about soil liquefaction of the essential raw cooling water system identified by an expressed employee concern.

11. Evaluate containment isolation.

12. Evaluate the effect of design changes on the qualification of seismic equipment.

13. Review dispositioned nonconformance (NCRs) to determine the cumulative effect of multiple NCRs on a single component.

14. Develop a program to address the introduction of commercial grade spare parts into safety-related components during routine maintenance.

15. Describe the program elements being developed and implemented to upgrade quality records development, handling, storage, and retrieval.

16. Develop a pre-startup test plan.

The implementation of the Design Baseline and Verification Program as described in Section V will provide TVA management additional confidence that WBN has been adequately designed and constructed. This program will assure that licensing and design commitments have been implemented in the plant design and construction. It includes

a comprehensive review of all licensing and design basis requirements and sampling of the design and construction programs in areas not examined by other special corrective action programs.

A review of the problems and issues identified at WBN and in TVA's corporate nuclear divisions has established that the following items directly contributed to the difficulties at WBN:

- Lack of clear assignment of responsibility and authority to managers and their organizations that clearly established accountability for performance.

  TVA has continued the overall restructuring of the nuclear organization throughout the WBN. As described in Section VI.1.0, corporate level support for WBN activities has been strengthened by a reorganization at the site into functional departments which generally parallel the functional departments in TVA's corporate organization.

  Specific organizations will be strengthened onsite to achieve better control of operations and maintenance activities, design and modification activities, radiological control, quality assurance, and other activities. A position description has been developed for each WBN manager against which he or she will be measured. Supervisor's knowledge of the plant will be strengthened through additional manager and engineer SRO equivalent and plant systems training before fuel load.

- **Insufficient management involvement and control in the workplace leading to a failure to adequately assure quality.**

Management involvement and control has been substantially enhanced as described in Section VI.2.0. Site goals are being implemented consistent with corporate goals defined in the revised Corporate Nuclear Performance Plan.

Communication with employees has been strengthened to enhance management direction. Examples of this are evidenced by management requirements for supervisors to monitor workplace activity and conduct communication meetings. In addition, frequent site director/plant manager staff meetings and visits by corporate management further reinforce this commitment to open and thorough communication. Training is being strengthened to reinforce management's directive to have practices followed; procedures are being upgraded as a means to ensure better control of work.

Direct management involvement in the corrective action programs has been mandated to improve timely and effective correction of conditions adverse to quality. Furthermore, unresolved items are brought to higher management for resolution. The corporate Employee Concern Program has been extended to the WBN site to restore employee confidence in TVA's nuclear management.

- Failure to maintain consistently a documented design basis for the plant and to control consistently the plant's configuration with that basis.

  Section VI.1.2.4 describes the WBN engineering organization changes to consolidate and control WBN engineering activities. As described in Section VI.5.0, significant improvements are being planned and are underway in configuration management to first reestablish and then to maintain a documented plant design basis.

Specific functional areas of plant activities which require strengthening on a long-term continuing basis are discussed in Section VI.3.0 through VI.9.0. These involve operations, maintenance, radiological controls, plant security, site scheduling, and initial test program.

The actions summarized above and discussed in detail in this Watts Bar Nuclear Performance Plan, Volume 4, address the NRC's request for information related to WBN under 10 CFR 50.54(f). TVA's responses to NRC's specific requests for WBN are provided in Appendix 1.

INFORMATION ONLY