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II. ADEQUACY OF CONSTRUCTION OF WATTS BAR

1.0 Introduction

The purpose of section II is to describe TVA's programs and processes that have been and are being implemented to assure the adequacy of design and construction of Watts Bar and that licensing commitments are being met.

This section provides a description of the design and construction programs, and the quality assurance program. Highlights of the history and evolution of the quality assurance program are included along with the programs and processes that have identified problems at WBN. In addition, the programs and special efforts instituted to ensure complete identification, tracking, and resolution of problems are described.

TVA established a Quality Assurance Program for its nuclear plants in February 1970. The program was designed to meet the requirements of 10 CFR 50, Appendix B, which was to become effective in July 1970 for all nuclear plant licensees. This initial program was eventually replaced by a Quality Assurance Topical Report in April 1976. WBN's QA program was originally described in the Preliminary Safety Analysis Report (PSAR), Chapter 17. The QA program description for WBN remained in the PSAR and the Final Safety Analysis Report (FSAR) until May 1982 when revision 5 of the TVA Topical was issued. Revision 5 applied the QA Topical report requirements to the WBN project.

10 CFR 50, Appendix B, requires that a licensee's QA program be applied to the design, fabrication, construction, and testing of the structures.

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systems, and components of the facility. Appendix B is comprehensive in application covering all activities affecting safety related functions. These functions include designing, purchasing, fabrication, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling, and modifying.

Appendix B's articles, eighteen in number, are written in broad, general terms. These articles embody fundamental quality assurance principles by which the licensee must be guided in formulating an internal management control or QA program. Though 10 CFR 50, Appendix B, has been little changed up to the present time, quality assurance programs in use in the nuclear industry today are immensely more sophisticated, utilize more intricate and detailed procedures, and are more exacting than earlier QA programs. Yet, each such program, in the context of its time, embodied the principles of Appendix B. Each successive program, documentation, and usage were modified to reflect experience, by enhanced interpretations of regulations, and to reflect approaches to attain more rigorous conformance and demonstrability of quality.

TVA commitment to Appendix B reflects the long-term trend within the industry toward improving the quality and the assurance of quality in nuclear construction by applying to it a rising standard of adequacy, within the unchanged principles of Appendix B. Although the implementing documents must embody the fundamental principles of Appendix B, licensees and their architect-engineers and contractors have wide discretion to determine the implementing methods which they will use. They are expected to determine what shall be done, how it shall be

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done, and who will do it. Appendix B expressly refrains from specifying methods and means.

WBN has experienced QA program deficiency which are documented in internal QA program reports, independent reviews, NRC inspection reports, and other sources designed to provide WBN management with feedback in regard to how well quality is being achieved in WBN activities.

Typically, these deficiencies, with some exceptions, are concerned with how, not whether, Appendix B principles are implemented. If the NRC or licensee management chooses to prescribe a different method than that adopted by the individuals within TVA responsible to implement the QA program requirements, and does so by citing a violation, the violation is one of implementing method, not of an Appendix B principle. Correcting violations and the management thereof are intended to bring about improvements in the existing program at a very detailed level such that overall quality is enhanced.

QA program deficiencies will occur even when an effective quality assurance program is in place, but has been managed imperfectly or, in the reviewer's opinion, could be managed better. Nuclear Construction projects are built using a living, changing, interrelated body of quality assurance procedures prepared under the broad umbrella of principles stated in Appendix B and implemented by the management staff. Each of these have grown steadily in satisfaction through the years and continue to grow, in detail and prescriptiveness. It is not

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reasonable to expect perfection at all times either in the documents themselves or in the managed compliance with them. Failure to achieve perfection is not evidence of failure to establish and execute an effective quality assurance program. Susceptibility to improvement is not necessarily indication of nonconformance to Appendix B.

TVA management is committed to the principles of 10 CFR 50, Appendix B. As breakdowns in the implementation of the TVA QA program have occurred, management has intensified their oversight activities and are raising the performance standards that are necessary to effectively manage the correction of the problems and provide reasonable assurance and adequate protection that the health and safety of the public will not be endangered by the operation of WBN. A rising standard of excellence and a view towards NRC requirements as minimum, not maximum, levels of performance are critical elements being embodied in TVA management's self-imposed goals.

2.0 Design and Construction Program Description

2.1 Design Process

Design requirements, such as commitments to regulations and industry codes and standards, are used by engineers to develop TVA design standards and criteria which are referenced in developing other in-process design documents.

In-process design documents are generated which describe the results of the activities performed in translating the requirements

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into WBN-specific design documents. The in-process documents are calculations, computer analysis, engineering studies, evaluations, and others.

WBN-specific design documents that specify the design requirements for systems, structures, and components are prepared and issued for use in procurement, construction, and the other activities associated with plant construction. These documents include drawings, instrument tabulations, Q-List, construction specifications, requisitions, bills of material, system descriptions, design specifications, test scoping documents, procurement specifications, and others.

Specifications and quality assurance requirements emanating from the design process are used in procurement of materials, equipment, and services. The design organization performs contract administration and the quality assurance organization performs vendor surveillance including shop inspection, and receipt inspection.

The design organization specifies installation inspections and tests to verify that equipment, components, materials, and systems will function according to their intended purpose.

Peer reviews and evaluations are performed by TVA personnel and outside organizations at several points in the design process to ensure conformance with requirements. Peer reviews include design verifications and technical reviews.

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Changes to design documents are controlled in the same manner as the original documents and are reviewed and approved before implementation. Changes may occur because of such things as design improvements, design deficiencies, field changes, and changes to design input requirements. They may involve revision of design requirements, calculations, or specific design documents. These changes are controlled by design change requests, field change requests, and engineering change notices.

2.2 Construction and Installation

Controls are established for activities that begin with the receipt of the specific design documents and extend through construction and installation of components and systems. Detailed schedules for bulk construction activities such as earthwork, forming, rebar setting, concrete pouring, and major component setting are then established. Work control systems and documents are provided, and design changes are controlled so that plant configuration is maintained.

Material and equipment are controlled from procurement through receipt, fabrication, installation, and testing by procedures which govern all handling, shipping, and storage requirements.

Special processes (e.g., welding and bending of instrument tubing) are controlled by operation sheets that specify materials, essential parameters, and inspection hold points.

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Measurement and test equipment (M&TE) is stored, controlled, and calibrated in accordance with procedures.

Quality control (QC) inspection begins at the vendor's shop or at site receipt as applicable and continues through fabrication and installation and other activities such as protective coating application, concrete placement, and others as applicable. Provisions are made to track and perform required inspections and tests.

Nonconforming items are controlled and documented in accordance with procedures and tagged, segregated, and dispositioned as required.

Construction progress is tracked by project control programs. Transition from bulk construction to system and component installation and test is placed under operational controls and accomplished in accordance with approved procedures.

This overall effort is documented to provide evidence of the proper completion of activities affecting quality.

2.3 Quality Assurance

The organizations that implement the quality assurance programs for designing and constructing Watts Bar are described in a QA Topical Report. The QA program is governed by management policies and

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requirements detailed in the Nuclear Quality Assurance Manual. The quality assurance program is documented in approved policies and procedures, and an indoctrination and training program for personnel performing quality related activities is maintained.

Design and construction organizations prepare and maintain quality assurance procedures covering those aspects of the quality assurance program in their respective disciplines. These procedures are reviewed by the quality assurance organization and are approved by appropriate levels of management. Revisions are reviewed and approved in a like manner. If disputes over quality assurance requirements are identified, they are normally resolved at the level of management directly involved in the activity in question. Unresolved disputes are carried to higher levels of management for resolution.

Design procedures provide instructions in the areas of preparation, review, and control of design documents (such as design criteria, specifications, and drawings) and those documents which prescribe quality assurance, technical surveillance, and verification of activities for suppliers of engineering services.

Design verifications are performed to provide assurance of the correctness and adequacy of designs. Verifications are performed by an independent person or group by reviewing, confirming, or substantiating, by one or more methods, that the design meets the specified inputs.

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Construction procedures provide for control of documents, materials, inspections, tests, and test equipment, handling and storage, and other items and activities at the construction site. Control of special construction processes such as welding, stress relieving, and nondestructive examination is provided by construction specifications developed by the engineering organization.

Quality control verifications are accomplished through inspections, tests, and examinations of specified attributes of safety-related structures, systems, and components.

Systems for the control of deviations in items and services, including activities to ensure the timely review, disposition, documentation, and closure of deviations, are established for all organizations performing quality related activities. These systems provide for evaluating conditions adverse to quality to identify and correct their root or underlying causes.

Audits are performed of those organizations performing quality related activities to verify compliance with all aspects of the quality assurance program and ensure effective implementation.

Assessments, at the direction of design, construction, and quality assurance management, of the adequacy and effectiveness of the quality programs and their implementation are routinely performed.

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Records of the execution of these quality related oversight activities are generated and maintain.

3.0 History of the Quality Assurance Program

In February, 1970, quality assurance for TVA's nuclear plants was established in the Office of Engineering Design and Construction (OEDC) by the Manager of OEDC. Division level quality assurance controls were subsequently established by divisions.

Development of onsite quality assurance procedures for Watts Bar began in 1973. A formal construction quality assurance unit and a surveillance program were established onsite at Watts Bar in 1974, reporting to and with auditing activities being controlled from the division office in Knoxville.

During the period from 1974 through 1981, the organization of the engineering, construction, and quality assurance functions within TVA remained virtually unchanged. The overall design and construction effort was controlled by the Manager of OEDC, with quality assurance aspects of the program directed by the OEDC Quality Assurance Manager.

The OEDC quality assurance program maintained basically the same structure until 1981, when the TVA Board of Directors created the Office of Quality Assurance (OQA) to improve overall quality assurance with special emphasis on achieving independence of the audit and oversight functions.

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Upon creation of OQA, the site construction organization also reorganized and created the Quality Manager's Organization (QMO). The QMO reported to the Construction Project Manager and assumed many of the functions previously performed by the site Construction Engineering Organization (CEO), including site quality training and certification, site procedure preparation and control, performance of quality control inspections, and licensing activities.

In 1984, the Division of Quality Assurance (DQA) was formed and given responsibility for developing and maintaining the overall QA program for design, construction, and operation of TVA nuclear plants.

In January 1986, the Board of Directors appointed S.A. White as Manager of Nuclear Power to oversee all aspects of TVA's nuclear power program. As a result, changes were made to the former nuclear power organization including quality assurance. A Director of the Division of Nuclear Quality Assurance (DNQA) was appointed to develop and maintain the quality assurance program for design, construction, and operation of TVA nuclear facilities. The Director of Nuclear Quality Assurance functioned at the same levels as the Director of Nuclear Construction and Director of Nuclear Engineering. A Site Quality Manager was assigned, reporting to the DNQA, to establish and maintain a QA staff to perform quality engineering, quality control, surveillance, and quality improvement functions. For design activities, the Manager of Engineering Assurance was given responsibility for developing and maintaining the engineering quality assurance policies, programs and standards in conjunction with the Division of Nuclear Quality Assurance

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(DNQA) and for implementing engineering assurance activities. The manager of Engineering Assurance reports to the Director of Nuclear Quality Assurance on QA matters.

The quality assurance organization described above remains in effect today.

A chronological history of the major project milestones, the quality assurance organization, and the quality assurance program TVA has had in place for Watts Bar is further detailed in Appendix 4.

4.0 Problem Identification Programs

During the design and construction of Watts Bar, quality assurance programs have been in place to provide for the identification of deficiencies and programmatic weaknesses. Three procedurally controlled processes are the nonconformance reports (NCRs) identified by any employee, deviations identified by TVA's internal audit program and the stop work process. Deficiencies documented by the NCR and audit processes were primarily indicators of program implementation problems rather than programmatic deficiencies.

In addition to internal mechanisms for problem identification, management initiated, independent reviews utilizing expertise from other utilities and engineering firms were performed.

These problem identification mechanisms and results are summarized in the following sections.

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4.1 Nonconformance Reports and 50.55(e) Reportability

TVA implemented measures to ensure that deficiencies with plant equipment or programs that are identified by any employee can be reported, documented, and corrected through the NCR process. The number of NCRs indicates the extent to which this program has been utilized. During the life of the project, over 7,100 NCRs have been initiated in the Division of Nuclear Construction, over 550 in the Office of Nuclear Power, and over 1,500 in the Division of Nuclear Engineering.

All nonconformance reports were evaluated to determine if they represented significant conditions adverse to quality; those deficiencies determined to be "significant" were then reviewed for reportability under 10 CFR 50.55(e).

Deficiencies found during the design and construction process meeting the reporting requirements of 10 CFR 50.55(e) were reported to the NRC as required by the Watts Bar construction permit. Reports of deficiencies included the root cause, corrective actions, and actions to prevent recurrence. The NCRs associated with 50.55(e) reports have been tracked by the responsible organization and closed when corrective action is completed. NRC inspectors have reviewed these corrective actions and closed 50.55(e) items when appropriate. Items previously reported to NRC under 10 CFR 50.55(e) are tabulated in Appendix 5.

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In order to correlate the reported deficiencies with special programs that have been undertaken at Watts Bar, an evaluation was conducted. Each reportable deficiency was reviewed to identify which special program addresses the issue described in the deficiency. These Special Programs are discussed in Section IV. For some deficiencies, several special programs are involved. For example, a pipe support that was installed incorrectly due to permissive drawing requirements would be addressed by three programs: Piping and Hanger Update, Design Control, and Quality Assurance. In essence, the augmented Design Control and Quality Assurance program will be preventive of this type of item in the future while the Piping and Hanger Update program will provide the retrospective look to all safety-related pipe supports to determine or reestablish adequacy.

During the review, a total of 543 reportable deficiencies were evaluated. A summary of each deficiency is provided in Appendix 5. Although a small number of these were subsequently downgraded to nonreportable status, they remained in the evaluation. Each reportable deficiency is encompassed by one of the special programs. This study of 543 deficiencies provided 879 indicators (i.e., some deficiencies were encompassed by more than one program) through cause, effect, corrective, or preventive action that the Special Programs were, in fact, addressing the reportable deficiencies. The following illustrates how the indicators align with the Special Programs (Chapter IV) or the Reorganized and Augmented Programs.

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<u>Type Of Program</u>	<u>Number of Indicators</u>	<u>Percent</u>
Special Program	311	35
Reorganized and Augmented	511	58
Other	<u>57</u>	<u>7</u>
Total	879	100

As can be seen from the data, the reorganized and augmented programs, such as Quality Assurance and Design Control, are the primary mechanism for addressing deficiencies, while Special Programs have been used to investigate and resolve specific areas of concern. Items categorized as Other were not considered to be germane because they involved individual, isolated occurrences resulting from vendor or manufacturer processes that are not expected to further affect TVA.

The distribution of indicators for the Reorganized and Augmented Programs is as follows:

<u>Program</u>	<u>Number of Indicators</u>	<u>Percent</u>
Quality Assurance	89	19
Maintenance	7	2
Operations	54	12
Design Control	<u>361</u>	<u>67</u>
Total	511	100

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Indicators attributable to the Special Programs are:

<u>Program</u>	<u>Number of Indicators</u>	<u>Percent</u>
Environmental Qualification	22	7
Electrical Issues	11	4
Piping and Hanger	152	49
Instrumentation	10	3
Welding	29	9
Design Calculations	61	20
Equipment Seismic Qualification	20	6
Other Special Programs (i.e., Main Steam Temperature, Q-List, Concrete, Containment Isolation, Use-As-Is NCRs Construction Program Quality Assurance Records)	6	2
Total	311	100

In conclusion, reportable deficiencies have been evaluated to confirm that they are being addressed by the programs described elsewhere in this Nuclear Performance Plan.

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4.2 Quality Assurance Audits

Quality Assurance organizations have conducted audits of design and construction processes during the construction of Watts Bar. The responsibilities of the design, construction, and operations organizations have been documented; however, the names of the various organizations have changed.

Over 650 audits have been performed. They resulted in the finding of over 1,500 deficiencies of which [_____] remain open. Details of the audits are given in Appendix 7; Audits determined to be reportable under 10 CFR 50.55(e) are included in Appendix 5.

4.3 Stop Work Authority

The Stop Work Authority is the method for stopping construction activities in situations where continued work could cause damage, preclude further inspection, or make remedial action ineffective. Some stop works have resulted from problems with vendor-supplied materials.

Programmatic changes were made before work was resumed or corrective actions following a stop work action.

Changes implemented by the new Manager of Nuclear Power have resulted in the stop work release process being more detailed and comprehensive and ensuring increased management attention to these areas.

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The current procedure for exercise of Stop Work Authority defines the responsibilities of both employees and managers. The Site Quality Manager (SQM) has the responsibility to issue stop work orders and release them when the conditions are satisfactorily resolved. The Director of DNQA has the responsibility to evaluate stop work actions and to approve and issue a stop work order when the identified condition affects other sites. When the condition that prompted the work stoppage is resolved, the order can be partially or completely released, after approval by the SQM or the Director of DNQA.

A total of 22 stop work orders have been issued at WBN. Stop work orders are tabulated in Appendix 8.

Five stop work orders remained open in March 1987. Stop Work Order SW-26, issued due to the lack of qualification of certain supports in seismic category 1 structures under worst case envelope, remains open awaiting completion of DNE corrective action. The four other stop work orders issued by DNQA at the direction of the Manager of Nuclear Power remaining open are: work involving instrumentation sensing, sampling, signal, control, and radiation monitoring lines, supports, and associated instrument installation (DNQA-WBN-87-01); all work involving circumferential welds in spiral HAVC ducts (DNQA-WBN-87-02) and hydrogen collection piping (DNQA-WBN-87-03); and all physical work on wall mounted instrument panel supports (DNQA-WBN-7-04). Based on actions taken by DNE, DNC, ONP, and DNQA to develop design criteria, a technical specification, implementing

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procedures and instruction, and an inspection program; a partial release was authorized to permit physical work on gas and liquid filled sense lines and on non-seismic control air.

4.4 Independent Reviews

In addition to internal problem identification programs, Watts Bar has had the benefit of a number of independent reviews through the initiative of TVA management. These reviews were performed by various outside organizations, the Nuclear Safety Review Staff (NSRS), and the Nuclear Manager's Review Group (NMRG).

4.4.1 Reviews by Outside Organizations

TVA has contracted with several outside organizations to perform independent reviews of nuclear program activities. Beginning in 1978, TVA employed Theodore Barry and Associates (TB&A) to conduct a review of OEDC to determine if adequate policies and procedures were in place and being followed; to review, evaluate, and measure performance relative to management practices; identify areas where management and operating practices could be improved, and to delineate functions being performed satisfactorily. In late 1978 through February 1979, United Engineers and Constructors (UE&C) reviewed EN DES design verification methods, practices, and procedures compared with regulatory requirements and guides for the design of safety-related systems and structures used throughout the industry. During October 1982 through November 1982, Duke Power Company aided TVA in a joint review of design and construction programs for the Bellefonte Nuclear Plant. The

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evaluation covered the specification and implementation of design controls and the performance of construction activities which ensure that a quality end product is achieved. The evaluation ultimately had generic implications for Watts Bar. During September 1982 to April 1983, Black and Veatch (B&V) performed an independent design verification of the Watts Bar unit 1 Auxiliary Feedwater System to determine the adequacy of design and construction activities. In March 1984, INPO conducted a review of the Bellefonte construction project in the areas of design, construction, and test control, project support, training, quality programs, construction experience, and organization/administration. This review ultimately had generic implications for Watts Bar. In August 1984, Duke Power Company was again called upon to review engineering, construction, and QA activities relating to certain piping and support programs at Watts Bar and Bellefonte. During August through November 1984, TVA employed Management Analysis Company (MAC) to perform an in-depth oversight of the QA program. Finally, in May 1985, INPO performed a review of design, construction and test controls, project support, training, QA programs, organization and administration, and construction experience at Watts Bar.

The TB&A review determined the need for an organizational restructuring around a central project manager and identified the need for several improvements in procedures, training and change control. The UE&C review found that TVA's design verification methods were generally as good as other A-E organizations but

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noted the need for a better definition of independence of reviews or checking. The joint TVA/Duke Power review in 1982 determined that the organizational structure and management commitment to quality was acceptable but noted deficiencies in procedures defining responsibility, CAQ resolution, training, and inspection. B&V observations were that design and construction activities were generally adequate and acceptable even through numerous deviations were found. Generic implications of the INPO review of Bellefonte in 1984 identified the need for strengthening the QC inspection program, procedures, audits, record control, and the electrical program. The 1984 Duke Power Company review found that the TVA interpretation and implementation of some code requirements, analysis, and design methods were conservative and restrictive. The need for better training of some personnel was also noted. The MAC review revealed that ultimate authority for the QA program was fragmented and not clearly defined, and recommended that responsibility for site QA programs be transferred to the sites. The 1985 INPO review identified the need for improving recurrence control of identified problems, preventative maintenance, and completion of calculations.

As a result of the TB&A review, TVA eventually reorganized around the central project manager concept and took steps to improve procedures, specifications, and training. The UE&C review findings prompted the revision of engineering procedures to further define reviewer independence. The 1982 TVA/Duke Power review resulted in QC separation from the line function and more

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extensive training programs. Tracking and Reporting of Open Items (TRCI) was also enhanced to improve timeliness of CAQ resolution. As a result of the B&V review, TVA addressed the specific findings and procedural revisions were implemented to prevent recurrence of programmatic deficiencies. The 1984 INPO review of Bellefonte - resulted in further procedural upgrades and implementation of a more extensive records management system at WBN. Findings of the 1984 Duke Power review prompted TVA to evaluate design methods and revise requirements. Improved training of personnel was also implemented. As a result of the MAC review, TVA established the Division of Quality Assurance and shifted primary responsibility for site QA programs to the sites. The 1985 INPO review resulted in an ongoing effort to improve design calculations, and improve preventive maintenance activities.

Further details of independent reviews conducted by outside organizations can be found in Appendix 9.

4.4.2. NSRS Review

The TVA Nuclear Safety Review Staff (NSRS) has performed several independent reviews to examine WBN activities during its design and construction activities. Only the more significant NSRS reviews are discussed here. In 1981, the NSRS reviewed the QFDC written programs to determine if they satisfied TVA policy, commitments, and regulatory requirements. They also reviewed whether the programs were being adequately implemented by knowledgeable and qualified individuals. In 1982, a similar

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review was conducted that also examined whether personnel were aware of their responsibilities, and if the training program was adequate to assure compliance. An in-depth review of the Office of Quality Assurance, its organization, internal operation/implementation and the corrective action program was performed in 1983.

In general, these reviews determined that written programs were established and implemented but did identify areas that needed management attention and improvement. Inadequate control of quality procedures; inadequate drawing information system updates; lack of EN DES review of purchase requisitions; and concerns with NCRs regarding initiation, document changes, and significance definition were reported as findings in the 1981 review. In 1982, findings reported by the NSRS involved the annual audit of QA areas, alternate programs for exceptions to Regulatory Guides, the total scope of OEDC QA program, lack of Q-List, inadequate design control, control of vendor documents, records accountability, ASME personnel qualifications, construction QA audits lacked depth, QA procedures and training. The 1983 review indicated improvements were made in the QA program by management support of a strong program, separation of QA from the line functions, assignment of QA responsibilities to one organization, establishment of a technical staff, and the capability to provide feedback to top level management. Findings were also identified in the Office of QA; internal communication/working relationships being ineffective and inefficient; communications with line management and the NRC

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ineffective; understaffing of OQA; and conflicts between proposed QA requirements and the intent of the verification process existed.

As a result of the NSRS reviews conducted in 1981, program changes were implemented which included procedural changes and retraining of personnel. Establishment of the Office of Quality Assurance and initiation of the 1982 NSRS major management review resulted in additional program changes and retraining of personnel where required. Findings associated with the 1983 NSRS review of OQA prompted establishment of the Division of Quality Assurance in August 1984 and transfer of previous OQA activities to the new organization.

Further details of independent reviews conducted by NSRS can be found in Appendix 9. In addition, eleven NSRS perceptions presented to NRC Commissioner Asseltine in December 1985 are addressed in Appendix 10.

4.4.3. NRC Reviews

The Nuclear Regulatory Commission has performed several reviews of WBN activities during its design and construction phase. From December 1981 through January 1982 and again in June 1982, the NRC reviewed OEDC's corrective action systems, the implementation of OEDC's 1982 Action Plan for Quality Improvement, and examined management and staff function in OQA's Design, Construction, and Operations Branches. In January 1985, a special NRC regional quality assurance team reviewed the overall TVA management control

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of the QA Program requirements involving design, construction, and operating reactor activities. In July 1985 the NRC reviewed activities at Browns Ferry and Sequoyah to verify activities in accordance with regulatory requirements, auditing, corrective action, timely issuance of audit reports and site responses, audit scheduling and follow up, and auditor trainings.

The findings of the 1981-1982 review of OEDC's corrective action systems identified a failure to assure that certain significant conditions adverse to quality were promptly identified or corrected. A failure to delineate the authority and duties of organizations responsible for the transfer of certain safety-related components from OEDC to Power was also identified. The NRC's review of OEDC's 1982 Action Plan found that the plan needed further design verification of previous work. The 1983 review of management and staff function in OQA's Design, Construction, and Operations Branches identified failure to ensure that audit findings were completely resolved, internal audits on operating plants were not being forwarded to appropriate management in a timely manner, audited organizations failed to respond within 30 days, improper training for lead auditors, auditor qualification records were not maintained, and listing of persons contacted during an audit were not maintained. The January 1985 review indicated a failure to submit timely responses and promptly correct CAQs, and the failure to audit all applicable design elements.

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In response to the findings of the reviews, TVA implemented various corrective actions. For the 1981-1982 review, programmatic corrections to address violations were established. A corporate QA organization was established to evaluate the adequacy of actions required to prevent recurrence of significant NCRs. Further action proceeded with the implementation of OEDC's 1982 Action Plan for Quality Improvement. A policy statement emphasizing timeliness and responsiveness to CAQs was issued. The OEDC Project Manager position for WBN was established to oversee design and construction activities. Site procedures and training were enhanced and a computer-based system to improve scheduling and tracking of outstanding work and nonconformances was implemented. In response to the 1983 review, steps were taken to close all overdue and open audits and emphasis was placed on procedural requirements for issuance, and response of audit findings. Procedures were reviewed and revised as required for auditor training, qualification of auditors, and persons contacted during audits. In response to the 1985 review, trends on corrective action timeliness were reported and discussed by TVA top management monthly, quarterly corrective action reviews were performed, and audit deviation followup was aggressively performed by DQA. Guidance for problem escalation to management was provided and an audit plan was issued which addressed each OE organizational element.

Further details of the NRC reviews can be found in Appendix 9.

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4.4.4 WESTEC Environmental Qualification Review

In 1985, a team of WESTEC Services, Inc., and TVA personnel performed a programmatic and technical review of TVA environmental qualification (EQ) activities and documentation to determine the degree of compliance to 10 CFR 50.49. The scope of the review included TVA's entire EQ program for Browns Ferry (BFN), Sequoyah (SQN), and Watts Bar (WBN) plants. The review was conducted at ONE offices in Knoxville and the BFN site. Review of Sequoyah and Watts Bar site activities was postponed in order to focus on the TVA EQ problem resolution phase. The inspection plan outlined five areas for review: identification of equipment on the EQ master list, EQ documentation, maintenance and surveillance, control and tracking, and procurement.

The review team made a total of sixty-one observations - thirty-eight on BFN, fifteen on SQN, and eight on WBN. A management review was conducted to determine which of these observations at BFN and SQN were applicable to WBN, and corrective action programs have begun. A special program was initiated to scope and address necessary corrective action resulting from the EQ review for details on this program, refer to section IV.1.0.

4.4.5 NMRG Reviews

In 1986, the former Nuclear Safety Review Staff (NSRS) was reorganized and became the Nuclear Manager's Review Group (NMRG). During April through July 1986, the NMRG conducted an independent review of corrective maintenance and preventive maintenance at Browns Ferry, Sequoyah, and Watts Bar.

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The results of the review cited the need for aggressive correction and prevention of hardware problems, the need for corporate involvement in nuclear maintenance, and the establishment of goals and objectives for maintenance.

Currently, corrective action plans are being developed in response to the NMRG recommendations for Watts Bar.

Further details of the NMRG review are found in Appendix 9.

4.4.6 Employee Identified Problems

Despite TVA's quality assurance programs, internal and external reviews, and the availability of mechanisms for documenting hardware or programmatic deficiencies, many employees did not feel that quality issues were being adequately addressed by TVA management. After management realized the magnitude and complexity of the concerns to be addressed, TVA established the Employee Concerns Special Program (ECSP) to address all issues raised by employees. The ECSP is described in Section III.

In addition, TVA has established an ongoing Employee Concerns Program to address any future employee concerns and to encourage employees to report safety issues without fear of reprimand.

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4.4.7 Summary

The numbers of NCRs, 50.55(e) items, audit deficiencies, and independent review findings demonstrate the effectiveness of the problems identification process. As problems were identified, corrective actions were initiated to resolve them.

In retrospect, it is evident that even though the individual problems were resolved, the root cause determination was in many cases incomplete. Because of this, the individual corrective actions were also incomplete in many cases.

In some cases the independent reviews resulted in adjustments such as organizational changes and procedure changes, and the findings were resolved to the satisfaction of the reviewers. However, the independent reviews and TVA's internal reviews concentrated primarily on the programs rather than on program implementation. Implementation problems were found, but due to the focus of the reviews and ineffective root cause determinations, some significant problems in implementation of quality assurance programs were not identified until late in the project life.

To prevent similar problems from occurring in the future, new program improvements and management involvement have been instituted by the new Manager of Nuclear Power. These actions are summarized in Section I and addressed in more detail in Section VI.

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5.0 Problem Resolution

TVA has implemented a two-part problem evaluation and resolution program to ensure all problems which are perceived to exist by employees or which have been identified by established programs would be evaluated and any identified problems would be corrected prior to licensing. These two parts are the Watts Bar Task Force and the Employee Concerns Task Group.

5.1 Watts Bar Task Force

A Watts Bar Task Force was established by the new Manager of Nuclear Power, Mr. S. A. White, on March 19, 1986, to review problems and deficiencies that had been identified during design, construction, and preparations for operation of WBN. Further, the Task Force was charged with confirming that actions taken suitably address the root cause and resolve the problems. The Task Force also developed a review process, and associated criteria, for determining whether individual issues must be resolved prior to licensing. The Task Force effort is further described in Section VIII.

5.2 Employee Concerns Task Group

The Employee Concerns Task Group (ECTG) was established to administer the Employee Concerns Special Program (ECSP) and process the employee concerns that had been received before February 1, 1986. Subsequent identified concerns are being addressed by the new Employee Concerns Program.

Approximately 5000 employee concerns have been expressed. These include Watts Bar specific concerns and those considered by ECTG to be generic to other TVA plants.

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The ECTG evaluates concerns to determine if they have been previously addressed. If they have not been previously addressed, a corrective action plan is developed by the the responsible TVA organization. The ECTG approves corrective action plans and the plans are also evaluated by the new Corrective Action Program Manager appointed on January 27, 1987.

The ECTG scope also includes findings from Nuclear Safety Review Staff (NSRS) reports which have not been resolved. Findings from major NSRS reviews are discussed in the independent review summaries in Section II, Part 4.0 and in Appendix 9.

The ECTG is also handling NSRS perceptions which were expressed by some NSRS staff members in December 1985. These perceptions are further described in Appendix 10.

5.3 Special Programs

Special Programs have been established to resolve the significant identified problems.

These special programs are the result of management initiative and management recognition that the size or complexity of certain problems would require special attention and can best be resolved by such programs. These special programs include the following:

- Environmental Qualification
- Electrical Issues

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- Hanger and Analysis Update
- Main Steam Temperature Issues
- Instrumentation Issues
- Plant Welding
- Q-List
- Concrete Quality
- Design Calculations
- Essential Raw Cooling Water Soil Liquefaction
- Containment Isolation
- Equipment Seismic Qualification
- "Use-As'Is" NCRs
- Control of Replacement Items
- Construction Program Quality Assurance Records
- Prestart Test Plan

Details of the special programs are discussed in Section IV.

5.4 Problem Tracking

Those problems which have been identified are being tracked on an activities list described in Section VIII. In addition to these identified problems, all other activities necessary to be completed before Watts Bar licensing are being tracked by this activities list.

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6.0 Industry Lessons Learned Review

A review of NUREG 1055, Ford Amendment Study, was conducted to determine if further actions or commitments need to be specified for WBN.

NUREG 1055 describes the following as underlying concerns and root causes for quality assurance breakdowns:

- Inability or failure of management to implement a management system controlling all aspects of the project
- Failure to properly delegate quality achievement responsibility to management outside of the quality assurance organization
- The ability of management and management system, including quality assurance, to document and adjust to changes in the design bases
- Inadequate and/or incomplete management oversight of construction process

In addition, the following characteristics were identified as significant in the survey of utilities having quality problems:

- Inadequate staffing (number, qualification, experience)
- Selection of inexperienced nuclear contractors

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- Reliance on inexperienced contractors in managing project
- Use of contracts emphasizing cost and schedule
- Lack of management support for QA programs
- Project oversight from HQ with minimal presence onsite
- Lack of appreciation of codes and standards
- Diffusion of project responsibility and diluted accountability
- Failure to delegate authority
- Misunderstanding of the NRC
- Not viewing NRC requirements as lower thresholds of performance
- Inability to recognize that recurring problems were indicative of underlying programmatic deficiencies including deficient project management.

NUREG 1055 recommends that detailed quality performance objectives be developed, describing what the QA program is to accomplish. It goes on to recommend trending of key quality indicators; strong results oriented management; more definitive guidance on determination of root causes; timeliness of corrective action and evaluation of generic implications of

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nonconformances; embracement of the "rising standard of excellence" concept and that 10 CFR 50 Appendix B should be viewed as providing the criteria for a functional closed loop management control system.

The difficulties that WBN has experienced in the quality assurance area involve some factors similar in nature to several of the characteristics discussed in NUREG 1055. TVA management have structured their corrective actions to be consistent with the underlying concerns identified and the relevant recommendations made in NUREG 1055. These actions are expressed in detail in Volume I and this Volume IV of the TVA Nuclear Performance Plan.

7.0 Summary and Conclusions

A quality assurance program has been in place during the construction of the Watts Bar nuclear station that provided for the identification and correction of deficiencies. The quality assurance program has identified and corrected large numbers of individual problems.

TVA has implemented individual corrective actions for problems identified through the QA program as well as enhancements identified by independent organizations. These independent organizational program reviews were initiated by management. The reviews focused primarily on programmatic elements other than implementation of requirements.

Management recognized from employee concerns and independent reviews that the TVA corrective action program was not effective in completely identifying and correcting root causes, either individually or

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collectively. In addition, numerous implementation problems were identified from employee concerns.

Implementation problems had been found before they were identified from employee concerns, but due to incomplete root cause determination, problems were resolved on an individual basis. Some significant problems in implementation were not identified until late in the project life.

When TVA recognized that implementation of corrective action was not fully effective, special programs were initiated by management to ensure that any deficiency in design and construction of Watts Bar would be identified and corrected prior to licensing.

To ensure all identified problems were adequately addressed, the new Manager of Nuclear power established the Watts Bar Task Force and the Employee Concern Task Group.

The WBN Task Force initiated special programs for the known significant problem resolution, and the Employee Concern Special Program was initiated to ensure resolution of employee concerns received before February 1, 1986. The adequacy of problem resolution will be reviewed by the Task Force and Corrective Action Program Manager of the ECSP. These actions in addition to the new Condition Adverse to Quality program will ensure that all future identified problems will be resolved.

To ensure adequate management attention is directed toward the timely resolution of identified problems, they are entered into an activities

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list and tracked to completion. When the problems required to be resolved prior to licensing are corrected, Watts Bar will be in compliance with the FSAR and other licensing commitments.

To ensure that future problems will not exist, new management changes have been made and new programs have been developed and are now functioning as discussed in Section VI. In order to provide even further assurance of the adequacy of WBN design and construction, the Design Baseline and Verification Program has been established. This program is described in Section V.

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III. EMPLOYEE CONCERNS

In the past TVA, NRC, and some members of Congress received expressions of concern from TVA employees regarding the quality of TVA's nuclear activities. In addition, some of these employees expressed fear that TVA managers or supervisors might take reprisals against them if they expressed their concerns directly to TVA management. TVA has taken action to address this issue. Specifically actions have been taken to assure that employee concerns are identified and resolved in a timely manner. Provisions are provided which will assure the confidentiality of the employee when requested. This section of the report discusses these TVA actions and their applicability to the licensing of Watts Bar.

In 1985, TVA initiated efforts to develop a revised and improved approach to handling employee concerns. TVA began discussions with the NRC on this program in November 1985. In February 1986, this approach was implemented and the TVA Employee Concern Program (ECP) (referred to as the "new" ECP) was initiated.

TVA established in this program a number of methods by which employee concerns can be received, not only through TVA supervision and management but also through the TVA ECP or the TVA Inspector General (IG). In the case of the ECP and the IG, confidentiality provisions have been provided. These methods provide an atmosphere where employees may express concerns without fear of reprisal and will foster an attitude which should improve employees confidence in TVA's desire and ability to receive and resolve employee concerns.

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Also during February 1986, TVA began a substantial effort to evaluate and resolve employee concerns already identified through previous formal programs. This work is being accomplished by the TVA Watts Bar Employee Concern Task Group (ECTG). The original scope of this effort included only the employee concerns received through the Watts Bar Employee Concern Special Program (ECSP). Between February and April 1986, the ECTG activity scope was expanded to include employee concerns from the Nuclear Safety Review Staff and the previous TVA employee concern program (referred to as the "old" ECP), open NSRS routine reviews (known as classical reports) initiated prior to disbandment of the NSRS, and the data base of issues developed by the "Systematic Analysis of Identified Issue/Concerns at TVA." In addition to Watts Bar, the ECTG was assigned responsibility for the evaluation and resolution of those concerns which apply to each TVA nuclear location.

The effect of the above was to consolidate TVA activities relative to employee concerns into two programs.

- The TVA Watts Bar Employee Concern Task Group Program for evaluation and resolution of concerns (regardless of location applicability) received prior to February 1, 1986.

- The "new" TVA ECP for concerns received after February 1, 1986.

The ECTG and the new ECP effort has been described to members of the NRC staff at various meetings and in the ECTG program description transmitted to the NRC on August 29, 1986.

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A description of TVA's current ("new") ECP is contained in S. A. White's letter to Victor Stello dated May 2, 1986.

For Watts Bar, each of the two programs related to employee concerns is described briefly below including program results to date.

Watts Bar Employee Concern Special Program

Most of the concerns received through the Watts Bar Employee Concern Special Program may directly or indirectly be applicable to Watts Bar. These, plus the employee concerns received through the Nuclear Safety Review Staff and the "old" ECP represent the TVA employee concerns to be evaluated and resolved by the Employee Concern Special Program.

Prior to April 1986, employee concerns affecting Watts Bar and received before February 1986 had been or were being evaluated and resolved partially by the ECTG and partially by the Site Director's staff. In April 1986, the work to evaluate and resolve concerns was brought within the responsibility of the Watts Bar ECTG. Work done prior to this date will not be redone in its entirety, but will be reviewed for accuracy and incorporated in the Watts Bar ECTG effort. Work done after that date is being performed under the direction of the ECTG and in compliance with the current ECTG procedures. These procedures require the following:

- Review of concerns for assignment to one of nine categories.
- Evaluation of concerns to determine whether they are potentially

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safety related and/or safety significant.

- Element grouping of concerns where possible into logical topics or issues for evaluation and resolution.
- Evaluation of elements to determine whether they are substantiated.
- If substantiated, obtain corrective action proposals from responsible line management.
- ECTG review and concurrence with proposed corrective action.
- An independent review of these activities by outside experts.
- Tracking of corrective action through completion.
- Reporting the results of the overall ECTG effort to TVA management, TVA employees, and the NRC.

The ECSP addressed over 5800 employee concerns. Each of the concerns was a formal, written description as documented by QTC or NSRS of a circumstance or circumstances that an employee thought was unsafe, unjust, inefficient, or inappropriate. The mission of the Employee Concerns Special Program was to thoroughly investigate all issues presented in the concerns and to report the results of those investigations in a form accessible to ONP employees, the NRC, and the general public. The results of these investigations are communicated by three levels of ECSP reports: subcategory, category, and final.

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Subcategory reports summarize the evaluation of a number of elements. The subcategory report does more than collect element level evaluations, however. The subcategory level overview of element findings leads to an integration of information that cannot take place at the element level. This integration of information reveals the extent to which problems overlap more than one element and will, therefore, require corrective action for underlying causes not fully apparent to the individual element level.

To make the subcategory reports easier to understand, three items have been placed at the front of each report: a preface, a glossary of the terminology unique to ECSP reports, a list of acronyms, and an executive summary.

Just as the subcategory reports integrate the information collected at the element level, the category reports integrate the information assembled in all the subcategory reports within the category, addressing particularly the underlying causes of those problems that run across more than one subcategory.

A final report will integrate and assess the information collected by all of the lower level reports done for the ECSP, including the separate Inspector General's report on intimidation and harassment.

A statement of each finding related to WBN was developed as a result of evaluation of issues in each subcategory. Corrective action for each issue will be documented by the ECTG on a Corrective Action

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Tracking Document (CATD) which also documents the concurrence of the proposed corrective action by the responsible ECTG reviewers. These actions will also be reported through the formalized ECTG reports discussed above which will be reviewed by a Senior Review Panel (SRP) of outside experts.

ECSP Results to Date

As noted above, employee concerns have been grouped into nine categories for evaluation and resolution. These nine categories are listed below showing for each category: (1) the approximate number of concerns expressed in the Watts Bar Employee Concern Special Program and (2) the approximate number of potential safety-related (PSR) and potentially safety significant (PSS) concerns related to Watts Bar to date. These totals are for information only and are subject to change as rollup evaluations progress.

The employee concerns program results to date indicate that out of more than 5800 expressed TVA employee concerns, less than (later) have some potential relation to Watts Bar, (later) concerns related to WBN are potentially safety significant (PSS). For Watts Bar, (later) percent of the PSS employee concerns are in the areas of quality assurance, construction, and engineering.

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<u>Category</u>	<u>Approximate Total Number of Concerns from WBECS*</u>	<u>Approximate PSS and PSR Concerns for WBN</u>
1. <u>Construction</u> - Concerns related to the adequacy of: construction practices; the quality of as-constructed facilities (excluding welding and as-designed features); in storage and installed maintenance prior to turnover to Operations; measuring, test, and handling equipment used during construction; and construction testing activities.	(later)	(later)
2. <u>Engineering</u> - Concerns related to the adequacy of the design process and the as-designed plant features. The design process is the technical and management process which commences with the identification of design inputs and leads to and includes the issuance of all design output documents.	(later)	(later)
3. <u>Operations</u> - Concerns related to operational activities including: operator qualifications, maintenance, security, health physics and ALARA implementation, and preoperational and surveillance testing.	(later)	(later)
4. <u>Material Control</u> - Concerns related to the adequacy of materials including their procurement, receipt, handling, storage, and to the controlling procedures.	(later)	(later)
5. <u>Intimidation, Harrassment and Wrongdoing</u> - Concerns related to personnel conduct which interferes with an employee's ability to fulfill his/her assigned responsibility, actions taken against an employee for fulfilling their assigned responsibility, and illegal activities or violations of TVA policies and regulations.	(later)	(later)

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<u>Category</u>	<u>Approximate Total Number of Concerns from WBECS*</u>	<u>Approximate PSS and psr Concerns for WBN</u>
6. <u>Welding</u> - Concerns related to any aspect of welding including welder or weld procedure qualification, weld inspection/nondestructive examination (NDE), heat treatment, weld quality, filler material quality and weld documentation. Welding QA/QC programmatic concerns shall be addressed in the QA/QC category.	(later)	(later)
7. <u>Management and Personnel</u> - Concerns related to the adequacy of policies, management attitude and effectiveness, organization structures, personnel management, and personnel training and qualifications, except those covered by the QA/QC category.	(later)	(later)
8. <u>Quality Assurance/Quality Control</u> - Concerns related to the adequacy of QA/QC programs and procedures (e.g., document control, records, deficiency reporting and corrective action, inspection - except for NDE and weld inspection, auditing, etc.) and the training, qualification, and certification of QA/QC personnel.	(later)	(later)
9. <u>Industrial Safety</u> - Concerns related to the working environment and controls which protect the health and safety of employees in the workplace (excluding health physics and ALARA.)	(later)	(later)

*These totals are subject to change and do not reflect the recent scope additions discussed above.

**This number is subject to additional change pending a re-review of case files.

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Appendix 11 contains the statement of each finding related to WBN developed as a result of evaluation of issues in each subcategory. Included with each issue is a statement of the proposed and approved corrective action. The issues are reported on the Corrective Action Tracking Document (CATD) which also documents concurrence of the proposed corrective action by the responsible ECTG reviewers including the Senior Review Panel (SRP) of outside experts. These actions will also be reported through the formalized ECTG reports discussed above. For each finding included in Appendix 11, an indication is made when the finding is addressed in some fashion by special programs, addressed in this Nuclear Performance Plan.

"New" Employee Concern Program

The "new" ONP Employee Concern Program (ECP) was implemented at WBN Nuclear Plant on February 1, 1986. The key element of the program is the Employee Concern Program Site Representative (ECP-SR). The ECP-SR is a full-time employee at Watts Bar who reports to the Employee Concern Program Manager, who in turn, reports directly to the Manager of Nuclear Power. In addition, the ECP-SR frequently updates and communicates with senior level site managers to identify potential problem areas and to suggest methods to improve employee/supervisor relationships. Presently, three Assistant Site Representatives and a clerical staff are supporting the ECP-SR. The ECP-SR staff members are selected based upon the necessary special skills required to interface effectively with all levels of employees, management, and outside

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organizations. The staff members undergo a special screening process which includes psychological and role playing testing. In addition, the staff members are required to have the necessary investigative and technical skills necessary to evaluate a broad scope of concern issues.

The staff receives concerns from employees which typically arise because the employee believes either that management communication has failed or that the normal systems for potential problem resolution have failed. Concerns are received from walk-in interviews, phone-ins, via mail-in form letters, or from referrals from line management, OIG, and the NRC. In addition, an answering machine is provided to record messages from employees when the office is not manned on backshifts and holidays. The staff also conducts exit interviews for employees transferring or terminating from Watts Bar. The concerns are documented, reported, and scheduled for investigation. The ECP-SR is responsible for the investigations of concerns brought to his attention. The investigation may be performed directly by the ECP-SR, his assistants, or may involve utilizing other investigative resources under the direction of the ECP-SR. The ECP-SR notifies each concerned individual (if requested) of the status of the investigation of his/her concern(s) on a monthly basis.

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The staff utilizes established procedures for investigating and resolving concerns. A case file for each investigation is created and upon completion of the concern investigation, the findings are submitted for final approval to the Employee Concern Program Manager. The approved report and recommendations are provided to the appropriate line managers for information and action. A response to the recommendations is required from the affected line organization. That response is evaluated for concurrence by the ECP-SR. When the ECP-SR has concurred with line organization response, the concerned individual is notified of the results of the investigation and the agreed upon corrective action if applicable.

The status of concerns, investigations, and corrective actions is tracked by a computer data base. Periodic reports are submitted to the NRC and other interested organizations. The ECP-SR interfaces regularly with the OIG during investigation and evaluating concerns.

The number of concerns expressed to the ECP-SR at Watts Bar as of February 28, 1987 is 323, with a total of 136 being potentially nuclear safety related. A categorized breakdown (utilizing the same category definitions as the Watts Bar ECTG) is as follows:

Engineering	4
Construction	21
Material Control	13
Quality Assurance/Quality Control	41

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Industrial Safety	27
Management and Personnel	105
Intimidation, Harassment, and Wrongdoing	75
Welding	19
Operations	17

One concern has not been categorized at this time.

The WBN Employee Concern Program is overviewed and periodically audited by ONQA and OIG.

Other Programs

The Revised Corporate Nuclear Performance Plan describes the ONP-wide employee concern programs and the other activities underway to restore employee confidence in TVA nuclear management. As part of the system established to receive employee concerns, the Manager of Nuclear Power, Mr. White has clearly stated and emphasized to all employee that he will not tolerate intimidation or harassment of any kind and that this policy will be strictly enforced. This position is being demonstrated by the disciplinary action taken in those cases where intimidation or harassment has been confirmed. Management training is being initiated to improve management sensitivity to the needs and concerns of employees and importance of effective communication.

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A program to communicate TVA's actions to resolve employee concerns and improve employee/management relations has been initiated.

Special Programs

In addition to other programs described in the Revised Corporate Nuclear Performance Plan which are designed to improve TVA nuclear management effectiveness and help restore employee confidence, a number of activities specific to Watts Bar are underway. These programs will help to answer the plant-specific concerns raised by employees. This Watts Bar Nuclear Performance Plan describes a number of these programs. Improvements in design control are discussed in Section VI.5.0. These improvements will ensure the adequacy of the new engineering work performed to address concerns about the design process. A special design verification program has been established as described in Section V. This program will provide verification of past plant modification work to ensure conformance with acceptable work standards. Programs for upgrading training and procedures are described in sections VI.2.3 and VI 2.4 respectively. These activities will help in achieving better control of work practices. Improvements in the quality assurance program are described in Section VI.1.2.5 and VI.2.6. These improvements enhance assurance of quality, and reduce the time for closure of outstanding issues.

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Improvements in the organizational structure and in management involvement are described in Section VI.1 and VI.2. They improve the definitions of responsibility, authority, and objectives with the intent to ensure higher quality work. The welding program study at Watts Bar is described in Section IV.6. This project has provided assistance that ongoing welding at Watts Bar meets acceptable quality standards. A number of additional programs are described in Section IV that are intended to demonstrate that Watts Bar plant conditions will be made acceptable prior to fuel load.

This overview of the activities in the Watts Bar Nuclear Performance Plan indicates comprehensive efforts in many areas which should resolve many of the employee concerns that have been expressed.

Summary

TVA is committed to evaluating and resolving employee concerns. However, it is recognized that many concerns applicable to Watts Bar are not related to plant safety or licensing of Watts Bar. TVA will investigate and resolve applicable safety related employee concerns expressed in the ECSP prior to fuel load of Watts Bar. Implementation of corrective actions required for fuel load will be completed prior to plant licensing.

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...evaluation of efforts to resolve employee concerns, to those which are potentially safety related and/or safety related, and to assign priority to potentially safety related concerns for resolution prior to licensing provides that the plant can be operated safely and that long term corrective actions on issues not required for plant fuel cycle be identified, tracked, and completed. In conjunction with other broad based programs initiated by TVA, the resolution of employee concerns should provide a sound base for the management of Watts Bar.

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