

EMPLOYEE CONCERNS SPECIAL PROGRAM

**VOLUME 3
OPERATIONS CATEGORY
SUMMARY AND CONCLUSIONS**

**TVA
NUCLEAR POWER**



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EXECUTIVE SUMMARY

This report is a summary of the major findings, collective analysis of these findings, actions, and conclusions resulting from the evaluation of 634 employee concerns assigned to the Operations Category. The information presented in the report is based on the scope of TVA nuclear plant operations observed in evaluating the concerns and does not cover all aspects of TVA nuclear power operations.

The concerns evaluated by the category dealt with specific areas of the design, construction/modification, reliability, accessibility, operation, and maintenance of plant equipment; the security of nuclear facilities; and the adequacy of nuclear power programs and procedures to accomplish these activities prior to February, 1986. These concerns were grouped by subject matter into 13 subcategories, then into elements (groups of related concerns) for evaluation. The evaluations of the concerns included reviews of applicable baseline requirements documents, TVA implementing procedures and instructions, expurgated concerns files which had been provided by the Nuclear Regulatory Commission, and various audit and evaluation reports. The evaluations also included informal interviews with plant personnel and walkdown observations of plant equipment as appropriate.

Overall, the Operations Category Evaluation Group found that over three-quarters of the alleged problems raised by the category's concerns, which had dealt with conditions in TVA's nuclear program prior to February 1986, either did not require corrective action or had already been corrected by TVA before the employee concerns evaluations. The remaining problems cited by the concerns led to actions which either have been completed, are under way, or are planned. The Operations Category Evaluation Group concluded that complete implementation of these actions should ensure the health and safety of the public and should allow for continuation of restart and recovery activities in TVA's nuclear program.

In reaching this overall conclusion, the Operations Category Evaluation Group identified several specific findings at the subcategory level and escalated them to the category level for collective analysis. These findings dealt with instances of lack of guidance, oversight, and control throughout the organization over several areas, including: (1) implementation of design and construction standards and requirements into various operational activities, (2) maintenance and performance testing of diesel generators, (3) component identification, (4) equipment performance trending, (5) use of consumables, (6) design and modification activities relative to system and equipment accessibility for maintenance, operations, and ALARA (as low as reasonably achievable) considerations, (7) the Plant Operations Review Committee (PORC) process, (8) the workplan process, (9) configuration control, (10) the maintenance program, (11) application of Raychem products to electrical cable splices and

terminations, (12) electrical bus voltage regulation and operation, (13) design and maintenance of electrical manholes, and (14) the design, configuration, materials, and maintenance activities associated with fire protection systems and components. Nine of these 14 subcategory-level findings (findings 2, 3, 5, 6, 10, 11, 12, 13, and 14) had occurred at all of TVA's nuclear sites, and the remaining five had occurred at all sites except Bellefonte Nuclear Plant. Actions to address the 14 subcategory-level findings either have been or are being taken.

For several of the above 14 findings - specifically, findings 1, 9, 11, 12, 13, and 14 - there was evidence that initial design criteria had not been satisfied. Therefore, the applicable nuclear sites were required to perform safety evaluations for these six problems in accordance with applicable regulatory requirements to determine whether or not unreviewed safety questions were raised by the problems and to assess the requirements for reporting the problems to the Nuclear Regulatory Commission (NRC). It was found, particularly at Sequoyah and Browns Ferry Nuclear Plants, that these safety evaluations had not always been formally documented. Sufficient actions to correct the problems themselves either have been or are being taken as a result of the Employee Concerns Special Program and through implementation of TVA's Nuclear Performance Plan. In addition, appropriate procedures are being revised and implemented to ensure formal documentation of the safety evaluation process in the future.

The 14 subcategory-level findings listed above, along with the specific deficiencies that comprised them, were collectively analyzed to identify broad category-level areas of weakness that had existed in TVA's nuclear program. Seven programmatic areas were identified for the category as follows:

1. Deficiency Reporting, Resolution, and Recurrence Prevention

There were specific weaknesses in the numerous deficiency reporting systems previously used by TVA and in the effective implementation of those systems. The factors determined to be underlying causes for these weaknesses were failure of some personnel to understand the benefits that a corrective action system provides as an effective management control tool; an attitude among some employees that stressed short-term performance objectives instead of planning and recurrence prevention; less than fully effective communication, coordination, and cooperation between functional groups; and a lack of clearly defined responsibilities and individual accountability necessary for effective program implementation. In general, the instances of failure observed had been caused by a philosophy throughout the organization that tended to correct specific problems rather than correcting the cause of the problems.

2. Control of Quality Assurance (QA) Level II Materials

There were several individual instances of a failure to adequately control QA Level II materials such as commercial grade components, spare parts, and consumables from the point of issue to the point of installation. The factors judged to have caused these

specific material control problems were lack of understanding by Operations of the QA requirements for consumables; lack of involvement by the Division of Nuclear Engineering in examining the impact on design criteria when using commercial grade items; and lack of design control in the purchase of commercial grade items.

3. **Design Documentation and Configuration Management**

The design documentation and configuration control process, requiring the coordinated participation of site personnel and the design organization, was not fully effective in ensuring that the physical plant configuration conformed to the current approved design. Significant faults were not found in the programs and procedures for the process, although there was evidence to indicate some weaknesses in the programs and implementing procedures. The major weaknesses were in implementation of the established programs and procedures. The weaknesses observed were caused by lack of clearly defined responsibilities and accountability among operations and design personnel; failure in some instances of site personnel to involve the design organization in those activities that potentially affect the plant design and configuration; and failure in some instances to adequately incorporate design input requirements, and subsequent changes, into all affected design output documentation.

4. **Maintenance Program**

Although no major deficiencies were found in the maintenance program at the various sites, there was a need for improved performance in certain areas, including the overall corporate control and direction of the maintenance program; the utilization of operating experience information from TVA units and from outside TVA; the trending of equipment performance; and the application of design and construction standards and acceptance criteria to both maintenance and post-maintenance testing activities. Causes identified for the findings in this programmatic area were failure in some cases to fully incorporate design requirements into maintenance programs and activities; less than fully adequate maintenance program definition and inconsistency in implementation between sites; and lack of clearly defined responsibilities, performance objectives, and organizational accountability.

5. **Work Control Systems**

Weaknesses were observed relative to the control of work at all sites and covering several functional areas. The weaknesses did not appear to be so much in the basic programs or procedures as in implementation and control of the programs. Instances of incomplete planning, implementation, documentation, and closeout and incomplete review of activities and results indicated a lack of an acceptable standard of quality by some management, engineering, and craft personnel responsible for work activities. There were times when there was a reluctance to stop in-process activities to correct or expand procedures that were found during the activities to be in error or incomplete. The performance monitoring and feedback systems needed improvements, particularly

at Watts Bar, and individuals needed to be held accountable for their work. Weaknesses in this area were caused by lack of adequate planning, work execution, and review of work results as well as by lack of clearly defined organizational and individual responsibilities, performance objectives, accountability, and intra-site consistency in work practices.

6. Training

TVA's major training programs were found to be good. However, there existed a need for management to develop and provide on-the-job training for their personnel based on actual job performance requirements, especially for engineers, engineering aides, and supervisors. This training should have included the requirements for performing specific tasks related to workplans, configuration and document control, the quality assurance function, and reporting of occurrences described in Title 10 to the Code of Federal Regulations, Part 50. Also, such training should have included how the organization worked together in these various activities. Weaknesses in performance-based on-the-job training were judged to have been caused by an attitude that such training was only an enhancement rather than an element of improving quality job performance. Therefore, performance-based on-the-job training received a low priority in relation to other activities.

7. Procedures Adequacy and Adherence

Weaknesses were observed relative to procedural adequacy and adherence at all sites and covering virtually all operational areas. Based on the evaluations, personnel understood that strict procedural compliance was a requirement, but all too often they believed that their particular situation was an exception. They did not fully understand that consistent and reliable work results, especially where high standards of performance were required, necessitated adherence to procedures.

This lack of understanding had involved preparers as well as users of procedures. There were instances where preparers of procedures did not obtain and incorporate updated vendor information or upper-tier requirements into implementing procedures and instructions. Additionally, instances were found where related procedures were inconsistent with one another or where procedures were complex or cumbersome. Users of procedures were not providing preparers of procedures with feedback based on their experience in the field with the procedures and were often complying with procedures regardless of the adequacy of the procedures.

Causes for findings in this area were determined to be lack of an integrated procedures system; complexity and volume of administrative and implementing procedures and lack of intra- and inter-site consistency in the procedural hierarchy; failure to adequately train on and "dry run" procedures; lack of adequate review and feedback of identified procedural deficiencies; inattention to detail; and a cultural attitude that strict procedural adherence was not necessary.

The factors for the seven programmatic areas of weakness were collectively analyzed to determine the root causes. Three root causes were determined to have created the conditions found in the category: (1) Shortage of experienced managers and supervisors, (2) Unclear lines of responsibility, authority, and accountability, and (3) Lack of communications and inter-organizational cooperation.

Actions identified in TVA's Nuclear Performance Plan (NPP) are now adequately addressing six of the seven programmatic areas of weakness and three associated root causes. One exception is the area of corporate control of QA Level II materials. Actions for this programmatic area are being taken as a result of a Manager of Nuclear Power directive to all sites. An ongoing program either has been or is being developed at all sites to identify and correct deficiencies in QA Level II material control and to prevent recurrence in the future.

Several specific examples and general areas of good performance by TVA managers and employees were also found during the evaluations. Programmatic areas of good performance at all sites included corrective maintenance, instrument and mechanical maintenance activities, equipment accessibility programs, the Radiological Emergency Plan, Health Physics activities, the plant technical support function, licensed operator activities, and formalized training programs. Specific examples of good performance were found regarding implementation of the Design Change Request/Engineering Change Notice process, conduct of preoperational testing and surveillances, compliance with technical specifications and regulatory requirements (although timeliness in satisfying these requirements needed improvement), and accessibility to and retrievability of documentation (especially at Bellefonte Nuclear Plant). An assessment of the category's findings indicated that TVA personnel had a strong desire to do their jobs correctly.

To date, no deficiencies have been found as a result of the Operations Category evaluations which, had a TVA licensed unit been in an operating mode, would have caused a unit to shut down in accordance with plant technical specification requirements. However, there were certain deficiencies as noted previously that required actions to be taken by TVA pursuant to applicable regulatory requirements. These actions included (1) determining whether or not unreviewed safety questions were raised by the deficiencies, and (2) assessing the requirements for reporting the deficiencies to the NRC.

Currently, the Operations Category Evaluation Group considers (1) that the alleged problems within its category's scope have been adequately evaluated, and (2) that actions completed, under way, or planned for the actual problems found should eliminate these deficiencies in TVA's operating license commitments.

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PREFACE

This report is one of a series prepared under the Employee Concerns Special Program (ECSP) of the Tennessee Valley Authority (TVA). The ECSP and the organization which carried out the program, the Employee Concerns Task Group (ECTG), were established by TVA's Manager of Nuclear Power to evaluate and respond to those Office of Nuclear Power (ONP) employee concerns filed before February 1, 1986 that related to TVA's nuclear power program. Concerns filed after that date are handled by the ongoing ONP Employee Concerns Program (ECP).

The ECSP addressed more than 5,800 employee concerns. Each of the concerns was a formal, written description of a circumstance or circumstances that an employee cited as inappropriate, inefficient, unjust, or unsafe. The scope of the ECSP was to thoroughly evaluate all alleged problems (issues) presented in the concerns and to report the results of those evaluations in a form accessible to ONP employees, the Nuclear Regulatory Commission (NRC), and the general public.

This preface contains background information on how the ECSP was initiated, descriptions of the categories to which concerns were assigned for evaluation, profiles of the Senior Review Panel members who provided independent oversight of the program, and information on feedback of program results to employees.

A HISTORY OF THE EMPLOYEE CONCERNS SPECIAL PROGRAM

In early 1985, a gap in communications between management and non-management employees at Watts Bar Nuclear Plant was recognized. After consultation with the NRC about this situation, the TVA Board of Directors directed that a far-reaching employee concerns program be implemented at Watts Bar. The Employee Concerns Special Program was established to thoroughly review employee concerns. To ensure that employees felt free to express their concerns without fear of retaliation, an independent contractor was selected to interview employees then assigned to Watts Bar.

Precautions were taken throughout the program to protect the identities of those who expressed concerns. The original records of the interviews remain in the custody of the interviewing contractor; the only other copies of these records are held by the NRC. Only the contractor and the NRC have had access to these files. The information provided to TVA was screened to maintain employee confidentiality.

Upon completion of the interview phase on February 1, 1986, 5,876 employees had been interviewed. Approximately one third of the employees (1,850) had expressed one or more concerns, resulting in approximately 5,000 individual employee concerns. Although TVA extended the program to employees at all Office of Nuclear Power sites through the use of mailers and a toll free telephone number, most of the concerns were from Watts Bar employees.

An Employee Concerns Task Group was established to carry out the program. The Task Group's concentration of qualified personnel and its comprehensive approach to problem resolution also made it the logical organization to resolve concerns and items gathered from several other sources. Therefore, the Task Group's responsibilities included the following:

- Concerns expressed during the contractor interviews.
- Concerns generated by earlier employee concern programs.
- Additional concerns identified from the interview files by the contractor and the NRC.
- Additional items identified by Task Group evaluators.
- Concerns received by the NRC before February 1, 1986, and referred to TVA.
- Concerns identified by TVA's former Nuclear Safety Review Staff.
- Open items identified from reviews of TVA incoming correspondence.

CATEGORIZATION OF CONCERNS

The concerns were grouped into nine categories to provide for consistent evaluation of related concerns. This also aided in identifying and developing corrective actions that addressed identified deficiencies specifically and programmatically to prevent recurrence. The responsibility for each category was assigned to a designated Category Evaluation Group. This responsibility included identification of the issues raised by the concerns, thorough investigation, determination of generic applicability and root causes of deficiencies, evaluation of Corrective Action Plans (CAPs) developed by the line organizations, and preparation of the program reports. In addition, the line organizations evaluated identified deficiencies for potential reportability to the NRC under Title 10 to the Code of Federal Regulations, Parts 50.55(e), 50.72, 50.73 and 21.

The concerns were grouped into the following categories:

- **Construction** - Concerns about 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 and test equipment and handling of equipment used during construction, and construction testing activities. TVA personnel evaluated the concerns in this category.

- **Engineering** - Concerns about the adequacy of the design process and the as-designed plant features. The design process consists of the technical and management processes that commence with the identification of design inputs and lead to and include the issuance of design output documents. These concerns were evaluated by Bechtel Western Power Corporation.
- **Operations** - Concerns about operational activities, including operator qualifications, maintenance or equipment needs, security, health physics, and ALARA (as low as reasonably achievable) implementation, and concerns about preoperational and surveillance testing. Personnel from TVA and from Impell Corporation performed the evaluations in this category.
- **Material Control** - Concerns about the adequacy of material, including its procurement, receipt, handling, storage, and installation, and the adequacy of procedures governing material control. TVA personnel evaluated the concerns in this category.
- **Welding** - Concerns about any aspect of welding, including welder or weld procedure qualification, weld inspection/nondestructive examination, heat treatment, weld quality, filler material quality, and weld documentation. The welding concerns were evaluated by personnel from TVA and the EG&G Idaho Corporation.
- **Intimidation, Harassment, Wrongdoing, or Misconduct** - Concerns about personnel conduct that interferes with the ability of employees to fulfill their assigned responsibilities, unauthorized actions taken against employees for fulfilling their assigned responsibilities, and illegal activities or violations of TVA policies and regulations. Concerns in this category were transmitted by the Task Group to the Office of the Inspector General for evaluation.
- **Management and Personnel** - Concerns about the adequacy of policies, management attitude and effectiveness, organization structures, personnel management, and personnel training and qualification, except training and qualification covered by the Quality Assurance/Quality Control Category. These concerns were evaluated by TVA personnel and contracted consultants.
- **Quality Assurance/Quality Control** - Concerns about the adequacy of Quality Assurance/Quality Control programs and procedures (e.g., auditing; document control; records; deficiency reporting and corrective action; and inspection except nondestructive examination and welding inspection) and the training, qualification, and certification of Quality Assurance/Quality Control personnel. The concerns in this category were evaluated by Stone & Webster Engineering Corporation.

- **Industrial Safety** - Concerns about the working environment and controls which protect the health and safety of employees in the workplace (excluding health physics and ALARA). TVA personnel and the DuPont Company - Safety Management Services evaluated these concerns.

Concerns that affected more than one category were assigned to multiple categories. In such cases, each category evaluated the concern from its specific point of view.

Each Category Evaluation Group sorted its assigned concerns into subcategories, according to the subject matter of the concerns, then into elements. An element is a group of related concerns that raise the same or similar issues. An issue is an alleged problem cited or implied, as interpreted by an evaluator, in one or more concerns. Concerns were evaluated according to the issues they raised. A comprehensive explanation of the evaluation and reporting process is contained in the introduction section of each category report and in the program summary report.

PROGRAM OVERSIGHT

The ECSP has been reviewed, audited, and inspected by the NRC, the TVA Office of the Inspector General, and the TVA Nuclear Quality Assurance Division. To provide additional independent and objective oversight, the TVA Manager of Nuclear Power established a Senior Review Panel of recognized experts within the nuclear power industry. Those selected had extensive backgrounds with experience in the design, construction, operation, quality assurance and safety evaluation of nuclear power plants.

The Senior Review Panel provided oversight to ensure that (1) the scope and depth of the evaluation effort was adequate, (2) the evaluation findings and conclusions were logically derived from the evidence, (3) the proposed CAPs adequately addressed identified deficiencies, and (4) the reports adequately described the evaluation effort, the evaluation findings and conclusions, and the measures taken to resolve the identified deficiencies.

Profiles of the Senior Review Panelists

Myer Bender

Querytech Associates Inc., Knoxville, Tennessee. Consultant on engineering practices for nuclear and advanced technology programs. More than 40 years of experience with complex technological activities including the Manhattan Project, and advanced nuclear fuel processing and waste management installations. Former Director of Engineering at the Oak Ridge National Laboratory and, for ten years, a Member of the NRC Advisory Committee on Reactor Safeguards (Chairman in 1977). Known for his work in standards, quality assurance, and system failure assessment.

James M. Dunford

Former startup readiness consultant for Three Mile Island. Former manager in the Naval Reactor Program. Former Vice President for Naval Reactor Plant Construction for New York Shipbuilding Corporation. Former Professor of Mechanical Engineering at the University of Pennsylvania. Nearly 50 years of experience in engineering management, material procurement, quality control, radiological control, construction, and training related to nuclear facilities.

Richard E. Kosiba*

Former Vice President for Quality and Technology, Babcock and Wilcox Company. Former manager in the Naval Reactor Program. Former Assistant Director (Plant Engineering) for the Atomic Energy Commission. Forty years of experience in the design, manufacturing, research and development, testing, operation, and maintenance of nuclear plants.

Joseph C. LaVallee, Jr.

Former Nuclear Project Manager for Sargent and Lundy. Twenty-five years experience in project management, licensing, construction, design, and operation of nuclear power facilities.

Daniel L. Garland*

Former Manager, Nuclear Quality Assurance Program Office for Westinghouse Hanford Company. While at Westinghouse, assisted Department of Energy in developing Quality Assurance standards and programs. Thirty years of experience in the quality assurance of nuclear plants, including preparation of plans, procedures, and manuals; indoctrination and training of personnel; and participation in more than 400 quality assurance audits, frequently as audit team leader.

James R. McGuffy* (Deceased)

Over 40 years experience in ASME Code fabrication work, specialty welding practices, materials technology, and quality assurance methodology. Former Director of Quality Assurance and Inspection for the Oak Ridge National Laboratory.

*These members served on the panel for part of the duration of the program.

QUESTIONS ABOUT CONCERNS

How to Find a Concern

These category reports and their appendices are intended to inform the concerned individual as to how his or her concerns were addressed. These reports summarize the Employee Concerns Task Group's investigations, findings, and line management identified corrective actions. In most cases the concerned individual should be able to identify the resolution of the issue associated with his/her concern using the following steps:

1. Determine which category would contain the concern. A list of the categories begins on page ii of this preface.
2. Review the category report identified in step 1, above. In particular, review the "Category Assessment" and "Conclusions" sections and the appendix titled "Subcategory Report Overviews."

A process has been developed which will permit employees to obtain additional information concerning their specific concern. As has been the case throughout this program, this will be done in a manner that ensures the confidentiality of the individual. Details of this process will be made available coincident with the release of these category reports.

What to Do If You Believe Your Concern Has Not Been Adequately Addressed

The Employee Concerns Task Group has made an intensive effort to thoroughly evaluate and report on all the issues raised by the concerns. In some cases, adequate information may not have been available to properly evaluate your concern or the concern may have been misinterpreted by the Task Group. Any employee who believes that his/her concern has not been adequately addressed by the ECSP is requested to bring this to TVA's attention by taking the question to the Employee Concerns Program site representative.

1.0 INTRODUCTION

The Operations Category Evaluation Group of the Employee Concerns Special Program investigated 634 employee concerns. These concerns alleged the existence of problems with plant operations and related areas such as the design, construction/modification, reliability, accessibility, maintenance and security of plant facilities and equipment, and with the adequacy of nuclear power programs and procedures prior to February 1986. Because many of the concerns were determined to be potentially applicable to more than one nuclear site, the Operations evaluators conducted 919 separate investigations that included all sites and various headquarters activities. Detailed results of these investigations have been published in a series of 13 subcategory reports and 59 Sequoyah Nuclear Plant element reports that are listed in Appendix A, "Operations Category Table of Reports." Summaries of the subcategory evaluations are included as Appendix B, "Subcategory Report Overviews."

This category report presents the cumulative results of the evaluations of employee concerns assigned to the Operations Category Evaluation Group. It summarizes the evaluations in each subcategory and then assesses the collective findings for their overall impact on plant operations. It identifies the significant weaknesses judged to have existed from an operations perspective and presents actions, either planned or taken, for correcting these weaknesses.

Readers are cautioned not to construe this category report as an evaluation of all aspects of nuclear power plant operation. The findings and analyses presented in this report are based on investigations of the 634 employee concerns assigned to the Operations category. Other reviews are underway within the Office of Nuclear Power to evaluate various aspects of nuclear power plant operation.

It is also important, for a proper understanding of the context of this report, that readers be aware of the basic nature of Employee Concerns Task Group evaluations. Although the primary goal was to resolve employee concerns, another goal was aggressively pursued. That goal was to find and fix problems within the scope of the evaluations.

Therefore, major emphasis was placed on analysis of negative findings, and the information in this report reflects that emphasis. The process was designed to identify and resolve any weaknesses in order to improve performance throughout the Office of Nuclear Power.

In an attempt to provide a better perspective on the overall adequacy of TVA's nuclear program, a category-wide assessment of evaluation findings was conducted to identify specific examples of good performance and areas where this type of performance could be inferred from the lack of problems noted during evaluations of those areas. Specific

examples of good performance and general discussions regarding good performance areas are presented in this report and are not necessarily clearly identified in lower-level reports in the category.

1.1 Evaluator Qualifications

All investigations and subsequent analyses of findings in the Operations category were performed by a team of highly skilled evaluators under the direction of the Category Evaluation Group Head (CEG-H). The Operations CEG-H was a TVA manager with 17 years of experience in nuclear power operations and the related areas that comprise this category.

Investigations were performed primarily by a team that included nuclear power specialists provided by an outside contractor and individually selected TVA employees and managers. Team members had an average of over 12 years of experience in service to the nuclear utility industry. The group included certified Reactor Operators, Senior Reactor Operators, Shift Technical Advisors, and personnel certified in other relevant specialties.

A brief profile of the education and experience of each member of the Operations Category Evaluation Group, including resumes of the CEG-H and his two senior assistant contractors, are presented in Appendix C.

1.2 Evaluation Process

1.2.1 General Methodology

The starting point of evaluations in the Operations category was with the 634 employee concerns assigned to the Category Evaluation Group. Before any investigation began, the concerns were divided among 13 subcategories, according to the subject matter of the concerns (e.g., Maintenance, Mechanical Equipment, and Engineering).

Within each subcategory, concerns were further divided into elements. An element is a group of related concerns, i.e., concerns that allege the same or similar problems. An element, then, consists of one or more closely related alleged problems. The alleged problems cited or implied in one or more concerns, as interpreted by an evaluator, are called issues.

Investigations of individual concerns were conducted at the element/issue level. The results of element investigations were reported and evaluated in a series of 13 subcategory reports; subcategory findings were then combined and evaluated to produce the overall evaluation of the Operations category, as presented in this category report. Each step of the evaluation process is explained below.

1.2.2 Element Evaluation Process

Concerns were investigated and the results were documented in accordance with an approved Operations Category Evaluation Plan by personnel who had successfully completed the approved Evaluator Training Program.

The investigators reviewed applicable baseline requirements documents (e.g., regulations, technical specifications), implementing procedures and instructions, relevant files of the Nuclear Regulatory Commission, and investigation reports on concerns that had been previously investigated. They interviewed personnel who had knowledge of or responsibility for items under investigation, visually inspected plant systems and components, and researched relevant historical data such as maintenance records and surveillance documentation.

Issues that were determined to be generically applicable to additional plants were investigated at those plants. Similarly, issues with implied applicability to other structures, components, or processes within a plant were investigated accordingly.

Findings requiring action were reviewed with responsible line managers, who developed Corrective Action Plans (CAPs). CAPs were then submitted to the Operations CEG-H for approval.

The only element reports published were those reporting the results of investigations of issues either specific to or generically applicable to Sequoyah Nuclear Plant. The results of all element evaluations are included in subcategory reports.

1.2.3 Subcategory Evaluation Process

Subcategory reports contain the results of element investigations, including actions for substantiated issues proposed by line management and reviewed by the Operations Category Evaluation Group. Every concern assigned to the Operations category is addressed, either individually or as part of an issue evaluation, in one of the 13 Operations subcategory reports.

Problems identified through the element investigations were systematically analyzed by the Operations Review Committee, which was chaired by the Operations CEG-H and included two senior contractors experienced in nuclear power operations. The Committee analyzed

identified problems to detect symptoms of underlying root causes. Problems identified through this root cause analysis were referred to the responsible managers for preparation of CAPs.

1.2.4 Category Evaluation Process

At the category level, the Operations Review Committee analyzed the negative findings, or weaknesses, identified at the subcategory level. The category evaluation determined important patterns that might not have been apparent when subcategories were examined individually. The Committee assessed these patterns for root causes and identified broader-scoped weaknesses requiring further analysis by the Employee Concerns Special Program. The results of the category evaluation process are presented in this Operations Category Report.

2.0 SUBCATEGORY DESCRIPTIONS AND SIGNIFICANT RESULTS

The concerns in the Operations category were divided among 13 subcategories, according to the subject matter of the concerns. This section presents each of the 13 subcategories by title along with a brief description of the issues (alleged problems) raised by the subcategory's concerns. In addition, the most significant results of the subcategory evaluations are summarized to provide the background for the category assessment that is presented in Section 3.0 of this report. A more detailed summary of the findings and actions resulting from evaluations in each of the subcategories is provided in Appendix B, "Subcategory Report Overviews."

2.1 Subcategory Descriptions

2.1.1 Subcategory 30100, Mechanical Equipment Reliability/Design

This subcategory consists of 70 concerns that raise 44 issues about the reliability and design of mechanical equipment such as valves, diesel generators, piping, heat exchangers, steam generator manways, and plant fire doors.

2.1.2 Subcategory 30200, Electrical and Communications

This subcategory includes 21 concerns addressing 11 issues about design, construction, operation, and maintenance of electrical and communications equipment such as electrical busses, junction boxes, cable penetrations, splices, and telephones.

2.1.3 Subcategory 30300, Instrumentation and Radiation Monitoring

This subcategory is comprised of 16 concerns dealing with 13 issues about the design, reliability, operation, maintenance, and calibration of plant instrumentation and radiation monitoring equipment.

2.1.4 Subcategory 30400, Cables and Conduit

This subcategory consists of seven concerns raising six issues about electrical hardware deficiencies and problems with procedures related to electrical aspects of plant construction.

2.1.5 Subcategory 30500, Accessibility

This subcategory is comprised of 20 concerns which deal with the issue of difficult or limited access to systems and equipment for normal operation, maintenance, testing, and inspection.

2.1.6 Subcategory 30600, Fire Protection

This subcategory includes 13 concerns raising nine issues about the adequacy of the design, operation, maintenance, and testing of fire protection equipment, particularly fire hose station valves and fire door closure mechanisms.

2.1.7 Subcategory 30700, Nuclear Power Site Programs/Procedures

This subcategory consists of 79 concerns addressing 50 issues about programs and procedures such as the Plant Operations Review Committee (PORC) process, handling of safeguards information, the workplan process, surveillance instructions, test procedures and programs, the radiological emergency plan, and management's implementation of these programs.

2.1.8 Subcategory 30800, Maintenance

This subcategory contains 76 concerns addressing 59 issues associated with plant support personnel and how they perform their tasks. The concerns are about the adequacy of procedures, plant maintenance, training, and the use of unqualified personnel to perform plant work.

2.1.9 Subcategory 30900, Engineering

This subcategory consists of 11 concerns raising 11 issues about the adequacy of engineering programs, adherence to procedures, and the adequacy of engineering training.

2.1.10 Subcategory 31000, Operations/Operational

This subcategory is comprised of 57 concerns addressing 30 issues about operator training and performance and operations procedures.

2.1.11 Subcategory 31100, Health Physics

This subcategory contains 72 concerns about Health Physics requirements and practices. The 42 issues raised by the concerns deal with Health Physics staff training, radioactive material control, exposure limits and controls, and the various practices and equipment designed to provide radiation protection.

2.1.12 Subcategory 31200, Security

This subcategory consists of 148 concerns addressing 61 issues about the adequacy of Public Safety Service uniforms, discrimination, training programs, management attitudes, security programs and procedures, entrance and badging requirements, guard tower facilities and design, and security systems and equipment.

2.1.13 Subcategory 31300, Miscellaneous

This subcategory contains 56 concerns raising 52 issues about protection of the environment, personal safety, housekeeping practices, plant procedures, and suggestions for plant improvements.

2.2 Significant Subcategory Results

The 634 concerns assigned to the Operations category addressed a total of 389 issues. One hundred sixty-five (165) of these issues were found not to be substantiated, and 58 other issues, though found to be factually accurate, did not pose problems requiring action. Thus, 57% of the category's 389 issues did not require action to be taken. Eighty (80) issues identified problems for which actions were required, but the actions had already been initiated prior to an employee concerns evaluation. These issues accounted for 21% of the category's issues. Seventy-one (71) issues, or 18% of the category's issues, were factual and presented problems for which action either has been or is being taken as a result of an employee concerns evaluation. Finally, 15 issues were found not to be problems themselves, but the evaluation of the issues revealed other problems for which action was initiated. These represented the remaining 4% of the category's issues. Therefore, in 22% of the category's issues, actions were taken as a result of the employee concerns evaluations that may not have been taken otherwise.

Several specific findings were identified at the subcategory level and were escalated to the category level for collective analysis. These findings dealt with instances of lack of guidance, oversight, and control throughout the organization over several areas, including: (1) implementation of design and construction standards and requirements into various operational activities, (2) maintenance and performance testing of diesel generators, (3) component identification, (4) equipment performance trending, (5) use of consumables, (6) design and modification activities relative to system and equipment accessibility for maintenance, operations, and ALARA (as low as reasonably achievable) considerations, (7) the Plant Operations Review Committee (PORC) process, (8) the workplan process, (9) configuration control, (10) the maintenance program, (11) application of Raychem products to electrical cable splices and terminations, (12) electrical bus voltage regulation and operation, (13) design and maintenance of electrical manholes, and (14) the design, configuration, materials, and

maintenance activities associated with fire protection systems and components. Nine of these 14 subcategory-level findings (findings 2, 3, 5, 6, 10, 11, 12, 13, and 14) had occurred at all of TVA's nuclear sites, and the remaining five had occurred at all sites except Bellefonte Nuclear Plant. Actions to address the 14 subcategory-level findings either have been or are being taken. Details on these findings and actions are provided in Appendix B, "Subcategory Report Overviews."

For several of the above 14 findings - specifically, findings 1, 9, 11, 12, 13, and 14 - there was evidence that initial design criteria had not been satisfied. Therefore, the applicable nuclear sites were required to perform safety evaluations for these six problems in accordance with applicable regulatory requirements to determine whether or not unreviewed safety questions were raised by the problems and to assess the requirements for reporting the problems to the Nuclear Regulatory Commission (NRC). It was found, particularly at Sequoyah and Browns Ferry Nuclear Plants, that these safety evaluations had not always been formally documented. Sufficient actions to correct the problems themselves either have been or are being taken as a result of the Employee Concerns Special Program and through implementation of TVA's Nuclear Performance Plan. In addition, appropriate procedures are being revised and implemented to ensure formal documentation of the safety evaluation process in the future.

The 14 subcategory-level findings listed above, along with the specific deficiencies that comprised them, were collectively analyzed to identify broad category-level areas of weakness that had existed in the T/A nuclear program. The results of this analysis are presented in the following section, "Category Assessment."

3.0 CATEGORY ASSESSMENT

The Operations Review Committee assessed the cumulative findings of the subcategories for indications of general patterns of weakness that had existed in the TVA nuclear program. Common cause factors, i.e., conditions that caused or contributed to more than one negative finding, were quantified as to frequency of occurrence and the degree to which they were responsible for causing problems. This analysis led to identification of seven programmatic areas of weakness and their associated causes. Judgments were made as to the underlying root causes of the negative findings in the Operations Category. The programmatic areas of weakness and root causes were examined to determine the extent to which they have been or are being addressed by the Nuclear Performance Plan and other performance enhancement programs. Finally, the subcategory findings were evaluated to identify specific examples of good performance and programmatic areas where this type of performance could be inferred from the lack of problems found during evaluations of those areas.

Overall, the Operations Category Evaluation Group found that over three-quarters of the alleged problems raised by the category's concerns, which had dealt with conditions in TVA's nuclear program prior to February 1986, either did not require action or had already been corrected by TVA before the employee concerns evaluations. Evaluation of the remaining problems cited by the concerns led to actions which either have been completed, are under way, or are planned. The Operations Category Evaluation Group concluded that complete implementation of these actions should ensure the health and safety of the public and should allow for continuation of restart and recovery activities in TVA's nuclear program.

3.1 Programmatic Weaknesses, Causes, and Actions

The areas of weakness, associated causes, and actions described below were determined through collective assessment of subcategory findings.

3.1.1 Deficiency Reporting, Resolution, and Recurrence Prevention

Findings

Specific weaknesses were identified in the numerous deficiency reporting systems previously used by TVA and in the effective implementation of those systems. Although instances of management's failure to fully implement the program were documented, numerous instances were noted where proper corrective action was taken.

Approximately eighty issues in the category involved deficiency reporting and corrective action resolution. In approximately one out of every seven of these issues, a failure was indicated in either the program or program implementation.

The instances of failure primarily dealt with recognizing and accepting the fact that a deficiency existed. Once a deficiency was recognized, generally the immediate problem was corrected. Recurrence prevention, generic applicability, and problem escalation steps in the various deficiency reporting systems were weak. The result was that similar problems recurred either at the site at which they originally had occurred or at other TVA sites. Both the operating and design organizations were slow to apply lessons learned at one facility to the other nuclear facilities.

Causes

The following factors were determined to have been underlying causes of the above findings:

- Failure of some personnel to understand the importance of an effective corrective action system and the benefits that such a system provides as an effective management control tool
- Attitude among some employees that stressed short-term performance objectives instead of planning and recurrence prevention actions
- Less than the fully effective communication, coordination, and cooperation between functional groups necessary to close deficiency documentation in a timely fashion
- Lack of clearly defined responsibilities and the individual accountability necessary for effective program implementation

In general, the instances of failure observed had been caused by a philosophy throughout the organization that tended to correct specific problems rather than correcting the cause of the problems.

Actions

Volume I of the Nuclear Performance Plan, Section VI.D, identifies "Improving TVA's Nuclear Corrective Action Program" as a performance improvement objective. A new Condition Adverse to Quality (CAQ) system was implemented, throughout the Office of Nuclear Power, on

March 30, 1987. Thus, the findings and assessments made by the Operations Category validate the performance improvement decision made by TVA management.

The new CAQ program will not by itself correct all weaknesses. However, the program, together with full implementation of actions committed to in the Nuclear Performance Plan and currently underway, give assurances that the new CAQ program can be effectively implemented. Therefore, no additional action will be requested by the Operations CEG.

3.1.2 Corporate Control of QA Level II Materials

Findings

There were several individual instances of a failure to adequately control QA Level II materials such as commercial grade components, spare parts, and consumables (e.g., teflon tape and cable termination kits) from the point of issue to the point of installation. The observed weaknesses involved such things as the lack of traceability and violation of specification requirements. TVA did not fully implement a consistent program to ensure that procurement and installation of commercial grade QA Level II items adequately reflected plant design criteria. As a result, the status of some affected plant systems had become indeterminate until those deficiencies had been identified, evaluated, and adequately resolved.

Causes

The following factors were determined to have caused the specific material control problems:

- Lack of understanding by Operations of the QA requirements for certain consumables
- Lack of involvement by the Division of Nuclear Engineering in examining the impact on design criteria when using commercial grade items
- Lack of design control in the purchase of commercial grade items

Actions

The material control deficiencies are being addressed now as a result of a directive dated February 10, 1987 (RIMS R00 870210 910) from the Manager of Nuclear Power to the affected plant sites. The directive enumerated specific actions to be taken to resolve problems in this area through the development of an ongoing program to identify and correct deficiencies and to prevent any recurrence in the future. This directive required each site to provide the Manager of Nuclear Power with a specific plan to resolve the issue, and each plan was to be implemented no later than March 10, 1987. These actions have adequately addressed this programmatic weakness for all sites. Therefore, no additional action will be requested by the Operations CEG. For Sequoyah Nuclear Plant, actions taken to address QA Level II material control were determined acceptable by the Nuclear Regulatory Commission.

3.1.3 Design Documentation and Configuration Management

Findings

The design documentation and configuration control process, requiring the coordinated participation of site personnel and the design organization, was not fully effective in ensuring that the physical plant configuration conformed to the current approved design. Drawings and other design output documents did not fully implement current design input requirements. Additionally, some maintenance and modification practices deviated from current design and construction standards and requirements.

Approximately 45 of the issues evaluated by the Operations category afforded the opportunity for measuring the performance of TVA in the area of design documentation and configuration management. Satisfactory performance was observed in approximately two of every three of these issues.

The assessment that eventually led to identification of this weakness did not find significant fault with the processes established for design documentation and configuration management. Although there was evidence to indicate some weaknesses in the programs and implementing procedures, the major weakness was in execution of the process.

Causes

The weaknesses in this area were judged to have been caused by the following:

- **Lack of clearly defined operations and design (including modifications) responsibilities and the individual/organizational accountability to maintain the plant in an as-designed configuration**
- **Failure in some instances of site personnel to involve the design organization in those activities that potentially affect the plant design and configuration**
- **Failure in some instances to adequately incorporate design input requirements, and subsequent changes, into all affected design output documentation**

Actions

A review of the Nuclear Performance Plan, specifically section IV.B, "Consolidation of TVA's Nuclear Organization," and section VI.E.4, "Improvements in the Control of Design Changes and Plant Modifications," provides assurance that TVA identified the actions necessary to correct the factors that contributed to deficiencies in the design control process. No further action will be requested by the Operations CEG. Current efforts should continue to improve site configuration management functions.

3.1.4 Maintenance Program

Findings

Although there were no major deficiencies in the maintenance programs at the various sites, there were numerous indicators that improvements were required. Approximately two out of every three issues evaluated in this category for the maintenance program area indicated satisfactory performance. However, the standard mode of operation was to do only those things absolutely required - specifically, (1) technical specification required preventive maintenance, (2) vendor required preventive maintenance, and (3) required corrective maintenance.

An assessment of the findings, contributing factors, and causes pointed to opportunities for enhancing performance in several areas. These areas included the overall control and direction of the maintenance program, utilization of operating experience information from TVA units and from outside TVA, use of effective trending programs to perform predictive maintenance, and the more stringent application of design and construction standards and acceptance criteria to both maintenance activities and post-maintenance testing activities.

Causes

The following causes were identified for this programmatic area:

- Failure in some cases to fully incorporate design requirements into maintenance programs and activities
- Less than fully adequate maintenance program definition and inconsistency in implementation between sites
- Lack of clearly defined responsibilities and performance objectives and lack of organizational accountability to ensure an effective maintenance program

Actions

The Nuclear Performance Plan's section VI.E.2, "Improvements in Maintenance," specifically targeted actions that, when implemented, will correct the major causes that contributed to the negative findings related to maintenance activities at the nuclear sites. In particular, the maintenance program is being integrated into an overall site operational perspective. No further action will be requested by the Operations CEG.

3.1.5 Work Control Systems

Findings

Weaknesses were observed relative to the control of work at all sites and covering several functional areas. Approximately one out of every three issues evaluated in this category for the work control area indicated a performance improvement opportunity. The weaknesses did not appear to be so much in the basic programs or procedures as in implementation and control of the programs. Instances of incomplete planning, implementation, and documentation closeout and incomplete review of activities and results indicated a lack of an acceptable standard of quality by some management, engineering, and craft personnel responsible for work activities. There were times when there was a reluctance to stop in-process activities to correct or expand procedures that were found during the activities to be in error or incomplete.

The situation with work control systems was significant in that the individual findings indicated an inattention to the detail required to do a job correctly the first time and the lack of understanding of how that activity fit into the total operational readiness of a nuclear facility. The systems to perform work properly were in place. However, the

performance monitoring and feedback systems needed improvements, particularly at Watts Bar, and individuals needed to be held accountable for their work.

Causes

Deficiencies in this area were caused by the following:

- Lack of adequate planning, work execution, and review of work results
- Lack of clearly defined organizational and individual responsibilities, performance objectives, accountability, and intra-site consistency in work practices.

Actions

The Nuclear Performance Plan's section VI.C, "Improving Management Systems and Controls," proposes some global actions to improve performance in this area. The Operations CEG believes that implementation of these actions will adequately address the weaknesses. Organizational changes have already occurred in the maintenance work control area, including maintenance planners and schedulers that are initiating performance improvements in maintenance activities.

3.1.6 Training

Findings

As a minimum, personnel should have been knowledgeable enough to correct problems related to their work. However, many of the weaknesses found during the evaluations of Operations concerns were not corrected properly because of inadequately trained employees. This was especially true of engineers, engineering aides, and supervisors. Most of the problems noted could have been corrected by managers taking responsibility to develop and provide on-the-job training for their personnel based on actual job performance requirements. This training should have included the requirements to perform specific tasks in workplan development, implementation, and closeout; configuration and document control; the quality assurance function; or reporting occurrences described in Title 10 to the Code of Federal Regulations, Part 50. Also, such training should have included how the organization works together in the various activities.

In general, the lack of on-the-job training provided by managers based on performance requirements in these areas only partly contributed to particular problems and should be kept within that context. The existence of on-the-job training weaknesses should not be used as an excuse for not performing an activity properly.

The evaluations of training issues revealed very few program deficiencies. The major Division of Nuclear Training programs evaluated were found to be good. These training programs included Operators, Shift Technical Advisors, Specialized Maintenance, Health Physics, and General Employee Training. Certain other training programs for which the Division of Nuclear Training is not responsible were also found to be good. These included training programs for Security, the Emergency Medical Team, and Fire Arms Proficiency. Problems were noted in the implementation of plant specific orientation training for the site support organizations of the Divisions of Nuclear Engineering, Nuclear Construction, Nuclear Quality Assurance, and Nuclear Safety and Licensing.

Causes

Weaknesses in performance-based on-the-job training were judged to have been caused by an attitude that such training is only an enhancement rather than an important aspect of quality job performance. Therefore, performance-based on-the-job training received a low priority in relation to other activities.

Actions

The Nuclear Performance Plan describes actions planned to improve training in section III.B.2, "Management Development and Training," and in section IV.E.3, "Nuclear Training." The Operations CEG considers the action described in these sections to be adequate for addressing problems found with training. Some of the actions have already been completed, including elevation of the training organization to a division level corporate function. Specific training needs are continuing to be identified for overall utility performance improvement.

3.1.7 Procedures Adequacy and Adherence

Findings

Weaknesses were observed relative to procedural adequacy and adherence at all sites and covering virtually all operational areas. Procedures were reviewed for essentially one hundred percent of the 389

Operations category issues evaluated. During the CAP resolution process with line management, 60 CAP responses were noted to require a procedure to be either issued, deleted, or revised. Many of the findings related to procedures were relatively minor, but they did exist.

Based on the evaluations, personnel understood that strict procedural compliance was a requirement, but all too often they believed that their particular situation was an exception. They did not fully understand that consistent and reliable work results, especially where high standards of performance were required, necessitated adherence to procedures. This lack of understanding involved preparers as well as users of procedures. There were instances where preparers of procedures did not obtain and incorporate updated vendor information or upper-tier requirements into implementing procedures and instructions. Additionally, instances were found where related procedures were inconsistent with one another or where procedures were complex or cumbersome. The existence of such problems indicated that users of procedures were not providing preparers of procedures with feedback based on their experience in the field with the procedures.

Emphasis was not placed on procedural adherence to achieve consistent, high quality work results, and instead emphasis was placed on procedural compliance simply for the sake of meeting a requirement regardless of the adequacy of the procedures. The required healthy, timely feedback circuit between procedure preparers and users was not fully utilized.

Causes

Problems in this area were determined to have resulted from the following:

- Lack of an integrated procedures system
- Complexity and volume of administrative and implementing procedures and lack of intra- and inter-site consistency in procedural hierarchy.
- Failure to adequately train on and "dry-run" procedures
- Lack of adequate review and feedback of identified procedural deficiencies
- Inattention to detail

- An apparent cultural attitude that strict procedural compliance is not necessary

Actions

The Operations CEG believes that weaknesses in procedure content can be corrected by actions described in the Nuclear Performance Plan's section VI.C.1, "Improvements in Programs and Procedures." Part of the problem is being corrected by streamlining and systematizing TVA's procedures to ensure intra- and inter-site procedure commonality. Also, "dry running" new or revised procedures and evaluating the effects of the revisions is helping to correct procedures problems.

The more difficult problem to correct, however, is that of adherence to procedures. Personnel at all levels are told to follow procedures, and yet the results of the evaluations indicated that some personnel persisted in not adhering to procedures. Unless that attitude is corrected by management interaction with employees, no procedure will be adequate.

3.2 Root Causes and Actions

One important objective throughout the evaluation process was to identify causes of undesirable results so that action could be taken to prevent recurrence. At the element level, the proximate or nearest causes of specific negative findings were identified and corrective actions were initiated to correct and prevent recurrence of the specific problems.

Subcategory root cause analyses looked at all negative findings within the subcategory to determine if there were underlying causes that brought about or helped bring about less than desirable results. Causative conditions identified through subcategory root cause analyses were sent to responsible line managers for consideration during the recurrence prevention action planning process.

At the category level, the perceived root causes of negative findings derived through subcategory analyses were collectively assessed for higher level root causes. The root causes identified through category level analysis were those underlying conditions, events, or circumstances that ultimately led to or allowed unfavorable results.

The following three root causes of programmatic weaknesses were identified for the overall category:

- Shortage of experienced managers and supervisors
- Unclear lines of responsibility, authority, and accountability

- Lack of communications and inter-organizational cooperation

The combined effect of these factors was to create an environment that precluded a completely effective implementation of the nuclear program.

With respect to the first root cause, TVA's ambitious nuclear construction program, and the attendant rapid expansion of the work force, created the need for a greater number of experienced managers and supervisors than was available within TVA. The available qualified personnel were spread thinly throughout the nuclear organization and hundreds of new managers were appointed. Many of these new managers had neither the managerial nor the nuclear power plant experience to effectively fill their new roles, and TVA did not have a program to develop the needed managerial capabilities.

To address this root cause, TVA is now providing effective management of its nuclear activities through the combination of hiring, development and retention of experienced nuclear managers, and the use of loaned managers. Section III of the Nuclear Performance Plan, "Hiring, Development, and Retention of Experienced Nuclear Managers," describes TVA's short-term and long-term efforts to provide experienced managers for its nuclear activities. No additional action will be requested by the Operations CEG.

The final two root causes relate to the structure and interaction of the nuclear organization. In the various organizational structures used for the TVA nuclear program, lines of responsibility and authority were not clearly defined or communicated. As a result, employees either could not be or were not held accountable for weak performance. Functional organizations operated autonomously, often in competition with each other, with no unified sense of purpose. The numerous reorganizations within TVA led to greater attrition of experience and intensified the atmosphere of ambiguous lines of authority, ill-defined responsibility, and virtually no individual accountability.

TVA has restructured its nuclear organization to centralize the responsibility, authority, and accountability under the Manager of Nuclear Power. Within the Office of Nuclear Power, a new organizational structure has been implemented and position descriptions have been developed to provide centralized direction and control of its nuclear activities. A description of this restructuring and the new organization is provided in the Nuclear Performance Plan's Section IV, "Restructuring of TVA's Organization."

Actions as described in the Nuclear Performance Plan, as well as other activities, are helping communications and cooperation to improve between managers and employees and between functional organizations. These global actions for the overall nuclear program are addressing the problems with communications and cooperation specifically noted in the category.

Through the new management training courses being given in accordance with Section III.B.2 of the Nuclear Performance Plan, TVA line managers are being taught the communications skills necessary for working effectively with their employees and with their peers in other functional organizations. The Employee Concerns Program, as discussed in the Plan's section V.B.2, is gathering systematic employee feedback to assist Office of Nuclear Power management to plan and modify the programs that are improving the nuclear program's work environment. Also, various aspects of the new Employee Communications Program are being used to keep employees abreast of management policies and major events within the Office of Nuclear Power.

3.3 Areas of Good Performance

Several specific examples and general areas of good performance by TVA managers and employees were found for various subcategories. Programmatic areas of good performance at all sites included corrective maintenance, instrument and mechanical maintenance activities, equipment accessibility programs, the Radiological Emergency Plan, Health Physics activities, the plant technical support function, licensed operator activities, and formalized training programs. Specific examples of good performance were found regarding implementation of the Design Change Request/Engineering Change Notice process, conduct of preoperational testing and surveillances, compliance with technical specifications and regulatory requirements (although timeliness in satisfying these requirements needed improvement), and accessibility to and retrievability of documentation (especially at Beilfonte Nuclear Plant).

An assessment of the category's findings indicated that TVA personnel had a strong desire to do their jobs correctly. There was evidence of strong employee loyalties to the success of their functional group. Personnel within functional groups appeared to communicate well with one another in conducting their work. The strong orientation towards accomplishing assigned work tasks may have led employees in some cases to work around procedures that they believed to be deficient.

4.0 CONCLUSION

The Operations Category personnel evaluated 634 concerns at one or more of TVA's four nuclear sites. Because many of the concerns were determined to be potentially generic to multiple sites, the actual number of evaluations conducted was 919. Negative findings were documented in the subcategory reports and Corrective Action Tracking Documents (CATDs) were issued to correct both specific problem areas and, where applicable, common mode cause areas. The various organizations have already provided acceptable CAP responses on all CATDs.

Initial problem identification, follow-up evaluation, and exhaustive cause analysis led to the seven major program areas requiring performance improvement and the three associated root causes as presented in this report. Interestingly enough, every one of the program areas and root causes had been targeted for improvements either prior to or concurrent with the Employee Concerns Special Program. CATDs were not issued at this level since six of the seven program areas and all root causes were targeted for performance improvements in the Nuclear Performance Plan and the seventh program area fell within the scope of the Manager of Nuclear Power directive to all sites mentioned in Section 3.1.2.

In its Safety Evaluation Report on the Revised Corporate Nuclear Performance Plan (NUREG-1232, July 1987), the Nuclear Regulatory Commission noted programmatic areas of weakness in the TVA nuclear program and associated root causes that were similar to those found by the Operations Category Evaluation Group. The commission staff found the actions described in the Nuclear Performance Plan acceptable for resolving the problems that had existed with management of TVA's nuclear program. However, the staff noted that the effectiveness of the plan depends on its implementation, and the Operations Category Evaluation Group concurs with this statement.

To date, no deficiencies have been found as a result of the Operations Category evaluations which, had a TVA licensed unit been in an operating mode, would have caused a unit to shut down in accordance with plant technical specification requirements. However, there were certain deficiencies as noted in Section 2.2 of this report that required actions to be taken by TVA pursuant to applicable regulatory requirements. These actions included (1) determining whether or not unreviewed safety questions were raised by the deficiencies, and (2) assessing the requirements for reporting the deficiencies to the NRC.

Currently, the Operations Category Evaluation Group considers (1) that the alleged problems within its category's scope have been adequately evaluated, and (2) that actions completed, under way or planned for the actual problems found should eliminate these deficiencies in TVA's operating license commitments.