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SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

EMPLOYEE CONCERNS PROGRAM

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

I. INTRODUCTION

The issues addressed in this Safety Evaluation Report (SER) for the Sequoyah Nuclear Plant (SQN) are programmatic in nature and refer to organizational and/or procedural problems in the engineering design process, and in inadequate safety and licensing evaluations. This report addresses 31 individual concerns categorized in the following 11 element and/or subcategory reports:

ELEMENT/SUBCATEGORY	DESCRIPTION
20104/24500	Policy & Practice on Utilization
20105/24500	Tracking of Commitments & Design Change
20106/24500	Traceability of Design Requirements
20303/24500	Tracking System for Commitment Inadequacy
20401/20400	Organization Structure
20402/20400	System Design Responsibility
20403/20400	Design Responsibility Field vs. Office
20404/20400	Design Document Completeness
20405/20400	Design Review Process
20702/24500	Safety & Licensing Evaluations
20704/24500	Deviation in CAQ Documentation

Most of the concerns were originally raised at the Watts Bar Nuclear Plant (WBN). Although no specific concerns were noted for SQN the organization and procedures that regulate the SQN design were essentially identical to WBN. If determined to be valid, these programmatic deficiencies must be resolved for the engineering design process for SQN.

II. EVALUATION

The NRC consultant, Parameter, Inc., has reviewed the 11 employee and/or subcategory reports and prepared the attached Technical Evaluation Reports (TER). In some cases those elements found to be similar in content were combined into one TER. The staff has reviewed the TERs and concurs in their bases and findings.

Those elements that were initially submitted as non-restart justification issues were reviewed as part of a sub-category report. The review included the evaluation of the employee concerns as well as addressing the SQN restart issue.

All allegations identified during the review of employee concerns as being related to the issues outlined in the element/subcategory reports were evaluated. The review of these allegations indicated that the TVA actions to resolve employee concerns properly encompassed the related allegations. In some cases they provided additional information, but did not broaden or show any inconsistency with the issues in question.

Where corrective action has been warranted, the staff's acceptance is based upon satisfactory fulfillment of all commitments as described in the TVA corrective action plan. In some cases NRC inspections of the DBP/DBVP/IDI are acceptable verification of satisfactory completion of required corrective actions.

III. CONCLUSION

Based on the staff review of the attached TERs relating to the employee concerns program for SQN, the staff concludes that TVA has adequately addressed the employee concerns and that their conclusions and corrective actions are acceptable.

Certain corrective actions have been implemented for SQN Unit 2 only. It is the responsibility of TVA to assure that acceptable implementation of such corrective action will be performed for Unit 1. Any additional program changes should be submitted for staff review and should not be implemented prior to review and approval by the staff.

SEQUOYAH NUCLEAR POWER PLANTS, UNITS 1 AND 2

TECHNICAL EVALUATION REPORT FOR EMPLOYEE CONCERN
ELEMENT REPORT 20104(B) "STANDARDS AND GUIDES"

I. SUBJECT

Category:	Engineering (20000)
Subcategory:	Incorporation of Requirements and Commitments in Design (24500)
Element:	Standards and Guides (20104)

The basis for Element Report 20104(B), Rev.0, 4/17/87 is contained in the four employee concerns listed below:

WI-85-100-019	(Standards and Guides treated as guidance documents. Electrical design criteria is vague and incomplete)
WI-85-100-038	(Drawings do not include design requirements)
BNP-QCP-10.35-8-26-2	(Standards changed after job is completed)
IN-86-259-X11	(Inclusion of IEEE standards requirements in TVA electrical procedures)

II. SUMMARY OF ISSUE

Industry and TVA design standards, with IEEE standards noted specifically, are treated as guides; design criteria are not fully incorporated into design documents and drawings, and design documents are thus incomplete or vague. In some cases, standards are changed after the work is performed to bring the standard and the work performed into alignment.

III. EVALUATION

TVA subcategory report 24500, Rev.4, 12/3/87, and TVA element report 20104(B), Rev.0, 4/17/87 identify the issue as not valid and not related to Sequoyah restart.

In report 20104(B) TVA indicated that design standards were incorporated into design criteria, design documents and drawings, and that design guides were used as guidance, with incorporation of provisions into design documents and drawings as TVA engineers determined appropriate. TVA also indicated that deviations from design standards occur and that nonconformance reports are written to obtain formal disposition in these cases. TVA also defined that changes to TVA design standards are made where changes are appropriate, and that this process is formalized.

Nine allegations were identified during NRC review as related to the issue of concern, numbers 86-A-012, 042, 050, 051, 052, 055, 060, 062, and 063. Allegations 86-A-051 and 055 are most germane to element EN 20405 and have been addressed as part of that element. Review of the other seven allegations shows that TVA actions taken to improve the design data base encompass the issue on TVA use of design standards and guides.

TVA recognizes the necessity to fulfill requirements of 10CFR50 Appendix A and Appendix B, Criterion III and Regulatory Guide 1.64 and ANSI N 45.2.11 in performing design activities. TVA also recognizes their obligation to meet FSAR commitments. The overall TVA conclusion from the evaluation is that while some of the statements of concern are factual such as the use of design guides as guides and making of changes to TVA standards, none of the concerns constitute a valid problem in the engineering design activity at Sequoyah. Also the TVA evaluation considers these concerns to not detract from safety and thus to not be pertinent to Sequoyah restart actions.

Notwithstanding the TVA evaluation and it's conclusions, it is significant that the TVA Design Basis and Verification Program (DB & VP) directly addresses the concerns. For each safety-related system, TVA has reviewed the incorporation of regulations and standards; has developed a Commitments/Requirements Data Base; has reviewed design basis criteria in equipment specifications, engineering analyses and calculations, and safety analyses; and has determined proper incorporation of the foregoing requirements into plant design documents, drawings and technical specifications. The methodology for this effort is presented SQEP-29, Rev.4, 7/2/87. TVA has verified the as-built configurations of these systems and performed an engineering review to reconcile the design with the as-built configurations.

Implementation of the DB & VP has had thorough NRC overview with results recorded in the following listed NRC special inspection team reports:

50/327-328/86-27, 4/22/86
50/327-328/86-38, 9/15/86
50/327-328/86-45, 10/31/87
50/327-328/86-55, 2/3/87
50/327-328/87-14, 6/4/87

The NRC Integrated Design Inspection of the Essential Raw Cooling Water System and safety-related structures, in report 50/327-328/87-48, 10/30/87, encountered deficiencies in TVA's usage of codes and standards. These are discussed in section 2.3, page 2-6; section 3.5, page 3-8; and section 4.9, page 4-9; and indicate a potential as generic problems.

IV. CONCLUSION

It is considered that the TVA categorization of these concerns as not valid is literally, but not essentially, correct. It is considered more important that TVA actions taken to address other employee concerns have overlapped these issues and established an improved design data base, which has been inspected in many plant systems and verified as properly incorporating design standards and guides by NRC special team inspections. However, an NRC IDI review disclosed deficiencies in TVA's application of codes and standards. When these IDI findings are resolved, the expressed concerns regarding usage of standards and guides may be considered properly addressed and TVA's actions a proper basis for Sequoyah restart.

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TECHNICAL EVALUATION REPORT FOR EMPLOYEE CONCERN ELEMENT
REPORT 20105(B) "TRACKING OF COMMITMENTS AND DESIGN CHANGES"

I. SUBJECT

Category:	Engineering (20000)
Subcategory:	Incorporation of Requirements and Commitments in Design (24500)
Element:	Tracking of Commitments and Design Changes (20105)

The basis for Element Report 20105(B), Rev.1, 11/23/87 is contained in five employee concerns listed below:

WI-85-100-041	(Inadequate tracking of commitments and design changes)
WI-85-100-002 I-85-132-SQN-01 XX-85-122-006 XX-85-122-007	(Diesel generator margins are inadequate; design changes not current; license documents not up-graded)

II. SUMMARY OF ISSUE

Several TVA systems for tracking commitments and changes for incorporation into the plant design were not integrated, and not consistently utilized to achieve certainty of proper incorporation of commitment and changes into design documents, into governing operating requirements in the FSAR, and into as-built plant equipment. Commitment and change tracking systems were used for both safety-related and other plant equipment.

III. EVALUATION

TVA element report 20105(B) Rev.1, 11/23/87 identifies TVA tracking systems, discusses reviews and improvement of these tracking systems and indicates their present effective utilization. TVA recognizes the necessity to track commitments and design changes to the point of full resolution and incorporation, and to fulfill applicable requirements of design control, control over operations and configuration control as established in 10 CFR 50 App. B, Criterion III, ANSI N 45.2.11, and ANS 3.2.

Allegations identified as possibly overlapping the issue, numbers 86-A-040 and 86-A-067 were reviewed. They provide detail, but do not broaden nor show inconsistency with the issue description. The TVA evaluation and resolution encompasses both these allegations and the issue of concern.

The depth and extent of the evaluation team review of this programmatic issue is adequate, and properly identifies the root cause of the problem. The TVA corrective action is appropriate: revitalize and integrate the commitment tracking systems, and

recapture commitments and changes that were not incorporated into design documents, operating requirements and equipment maintenance/ modifications during the period when the tracking systems were not effectively utilized.

The evaluation describes TVA's action taken to centralize and integrate the tracking systems; primarily the Corporate Commitment Tracking System (CCTS) and Tracking and Reporting Open Items (TROI). It is significant that the CCTS procedure specifies that only the Site Director can modify a commitment or its due date. The evaluation report identifies TVA's implementation of the Design Baseline Verification Program and Design Calculation Review Program; these TVA actions are important to the recovery from design commitments or changes for which tracking was lost during the period of inefficient TVA tracking. These latter two programs are under TVA QA monitoring activity, and have been reviewed in depth by NRC special inspection teams. Results are given in the following NRC reports.

NRC Special Inspection, Design Baseline and Verification Program

50/327/328/86-27, 4/22/86
50/327-328/86-38, 9/15/86
50/327-328/86-45, 10/31/86
50/327-328/86-55, 2/3/87
50/327-328/87-14, 6/4/87

NRC Special Inspection, Design Calculation Review

50/327-328/87-06, 4/8/87
50/327-328/87-27, 8/24/87

In addition, an NRC visit to Sequoyah, September 28 - October 1, 1987, reported in a memorandum from B.D. Liaw to J.A. Zwolinski dated 11/10/87, included a verification of the implementation of the Corporate Commitment Tracking System (CCTS) to procedures PMP 0605.01, Rev.1, 12/30/87 and SQA-135, Rev.6, 3/23/87.

Several actions related to this issue are being followed by TVA under a Corrective Action Plan specific to Element 20105 identified in four Corrective Action Tracking Documents, (CATD).

CATD 201.05, SQN-01 relates to procedures for CCTS, and is accomplished, verified and closed by TVA on 7/6/87.

CATD 201.05, SQN-02 relates to review of certain categories of TVA correspondence with NRC back to January 1, 1981, and is accomplished, verified and closed by TVA on 6/6/87.

CATD 201.05, SQN-03 relates to review of certain other categories of TVA correspondence with NRC back to January 1, 1986. This has been properly categorized by TVA as a non-restart aspect of this issue, and has not been formally reported as completed.

CATD 201.05, SQN-04 relates to the lack of closure of many TVA ECN's and verification of accuracy of the FSAR and was partially

remedied by TVA, with a Phase I close-out on 6/19/87 identified by TVA as an adequate basis for Sequoyah restart.

The case file for element 20105 was audited by NRC, to verify the content; it was found to be complete and in excellent order. Background information on TVA Corrective Action Plans (CAP) and CATD's is contained in the trip report issued via memorandum B.D. Liaw to J.A. Zwolinski, Nov. 10, 1987.

IV. CONCLUSION

TVA evaluation and resolution to this expressed concern is an adequate basis for Sequoyah restart, and implementation of corrective actions under revised and improved systems, practices and procedures is acceptable. TVA QA monitoring and NRC overview applied at normal levels will be adequate to verify TVA adherence to effective commitment and change tracking system management.

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TECHNICAL EVALUATION REPORT FOR EMPLOYEE CONCERNS
ELEMENT REPORT ENG-20106 - SEQUOYAH

"TRACEABILITY OF DESIGN REQUIREMENTS"

I. Subject

Category: Engineering (20000)
Subcategory: Incorporation of Requirements and Commitments in Design (24500)
Element: Traceability of Design Requirements (20106)
Employee Concerns: I-85-128-NPS (Inadequate design effort)
WI-85-100-037 (Design requirements not traceable)
WI-85-100-043 (Design calculation problems)

The bases for the Element Report 20106 portion of Subcategory Report 24500 are the Employee Concerns listed above which state in part that:

> "An individual from BFN wrote NSRS expressing his opinion that the control and quality of OE's design effort is inadequate." Issues were actually developed from a review of the expurgated interview file for this employee concern.
>
> "[There is a] Lack of traceability of design requirements."
>
> "There is inadequate ... control of design calculations, which impacts traceability of design requirements."

II. Summary of Issue

The issues identified in this element refer to possible programmatic deficiencies having to do with the non-availability and non-traceability of design bases and design requirements.

III. Evaluation

TVA divided the employee concerns in this element report into eleven issues. Four of these issues are evaluated in this element report. The other seven issues are evaluated in other element reports. The four issues evaluated in this element report are: 1) lack of traceability of design requirements, 2) inadequate control of design calculations impacting the traceability of design requirements, 3) basic design input is not available and 4) design requirements and their bases are not readily available.

TVA's evaluation of these issues concluded that:

> "All issues identified in the employee concerns are valid."

A similar conclusion was expressed in a TVA Memorandum from W.C.Drotleff, Jr. to Those Listed, dated April 8, 1986 which states that:

> "Although a design basis for all of the TVA nuclear plants exist, it is not always readily retrievable in a verified form."

Despite the above conclusions, TVA also concluded that resolution of these issues should not be a requirement for Sequoyah restart. The basis for this non-restart decision is contained in the Non-Restart Justification Summary for Element Report 20106 (Revision 1 dated 1-6-87) which states that:

> "The issues are documentation and records related."
>
> "The fact that documentation rather than hardware is addressed in this element, provides some latitude in determining when necessary corrective measures should be completed."

The non-hardware characterization of these issues is appropriate since the employee concerns do not mention any hardware or quality deficiencies. However, 10CFR50, Appendix B, Criterion III requires that:

> "Measures shall be established to assure that applicable ... design basis ... are correctly translated into specifications, drawings, procedures, and instructions."

A necessary part of assuring the correct translation of the design basis is its availability and traceability. In addition, various ANSI Standards and TVA procedures also require that the design basis be available and traceable. Therefore, resolution of these issues is required prior to Sequoyah restart.

TVA's corrective action for these issues is to complete the C/R (Commitments/Requirements) Database Program (SQEP 18 R2), the Design Basis Program, and the Design Baseline and Verification Program (DBVP) as applicable to meet the restart requirements for each unit at Sequoyah. The objectives of these programs do encompass the employee concerns in this element. Although the issues of traceability and availability are not specifically addressed by these programs, these issues are implicit in the program descriptions. In the April 8, 1986 Memorandum from W.C. Drotleff, Jr. to Those Listed, the Design Basis Program is described as:

> "...a top-down approach in which commitments made to generic upper tier input documents, commitments made in licensing documents, design requirements needed to satisfy the plant safety analysis, and TVA policies and existing design criteria must be captured in either plant-specific design criteria or other design input documents."

The Design Baseline and Verification Program, Sequoyah Nuclear Plant, Revision 1, January, 1987, states that one essential element of the overall program is:

> "Reconstructing the Design Basis"

In a FEB 03 1987 TVA letter from J. A. Domer to Mr. James Taylor, the C/R Database Program is described as part of the Design Basis Document development process in which:

> "... commitment/requirements (C/Rs) are identified by senior engineers and managers who are familiar with the design evolution of the plant."

Three allegations were identified during NRC review as being closely related to the issues in this element report. The three allegations are: OSP-86-A-042 (TVA downgrades design requirements), OSP-86-A-050 (Inadequate design and construction criteria) and OSP-86-A-052 (Lack of traceability of requirements within design offices). The issues of design requirement availability and traceability contained in these allegations are properly encompassed in this element report. Other issues contained in these allegations will be addressed in other element report and/or allegation evaluations.

IV. Conclusion

TVA's evaluation and corrective actions for this element are acceptable. Although the corrective actions remain in the implementation stage, NRC inspections of the C/R Database Program, the Design Basis Program, and the Design Baseline and Verification Program are acceptable verification of the satisfactory completion of the required corrective actions.

NRC inspection of these programs has been reported in reports number 50-327,328/86-27, 4/22/86; 50-327,328/86-38, 9/15/86; 50-327,328/86-45, 10/31/86; 50-327,328/86-55,2/3/87; and 50-327,328/87-14, 6/4/87.

Disagreement with TVA's non-restart designation of this element is considered a moot point since the restart requirements are being monitored by the NRC review of the corrective actions contained in the C/R Database, the Design Basis, and the Design Baseline and Verification Programs.

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TECHNICAL EVALUATION REPORT FOR EMPLOYEE CONCERN
ELEMENT REPORT 20303 (B), "EXPERIENCE FEEDBACK"

I. SUBJECT

Category:	Engineering (20000)
Subcategory:	Incorporation of Requirements and Commitments in Design (24500)
Element:	Experience Feedback (20303)

The basis for El ent Report 20303(B), Rev.1, 1/27/87 is employee concern WI-85-100-034 which states that industry requirements and practices are not adequately considered in the design process, and that there is poor tracking of INPO and NRC experience information.

II. SUMMARY OF ISSUE

The information flow to TVA engineering on nuclear industry experience from NRC, INPO and directly from other utilities is not adequate and experience from other plants is not adequately considered in the design process. Also, tracking of problems and resultant commitments to INPO and NRC is not performed adequately.

III. EVALUATION

TVA element report 20303(B), Rev.1, 1/27/87 presents the history of operating plant experience reporting since it was initiated under requirements of NUREG 0737 in 1980. The evaluation confirmed the validity of the expressed concern, especially during 1985 when changes made by TVA decentralized the experience reporting function and decreased its effectiveness. It was also concluded that the failure to implement the procedures governing the acquisition, distribution and tracking of experience feedback and related commitments was the major contributing cause to loss of effectiveness rather than the provisions of the procedures.

Two allegations were identified during NRC review as related to the issue of concern, numbers 86-A-049 and 86-A-064. Review of these two allegations shows that TVA actions taken to resolve this concern properly encompass the issue related to experience feedback in these allegations.

TVA recognizes the necessity to fulfill applicable requirements of NUREG 0737 and to be in compliance with ANSI N 18.7/ANS3.2. TVA has described a new Nuclear Experience Review (NER) program within the Corporate Nuclear Performance Plan, Volume I, Rev.0, 3/86 and Rev.1, 7/86. These commitments establish a centralized program for administering the NER, including use of a monitoring system, Tracking and Reporting Open Items (TROI).

Four Corrective Action Tracking Documents (CATD) have been issued to follow progress of the NER program, CATD's 203.03 SQN-1, 2, 3 and 4, concerning issuance of policy directives, top-level procedures, working-level procedures and personnel training, and implementation of the NER system. These four actions have been completed, reported as accomplished, and verified as satisfactory by TVA. These actions include the issuance of NER procedure PMP 601.01, with an effective date of 3/16/87. The TVA final closure letter on CATD 203.03 SQN-4, dated 8/17/87, recognized the NER system as operating but still evolving, and suggested actions to reach a higher level of effectiveness in it's implementation, to achieve full functionality. A memorandum from B.D. Liaw (NRC) to J.A. Zwolinski (NRC) dated 11/10/87 reported an NRC inspection visit to Sequoyah September 28 - October 1, 1987, which included a verification of the implementation of NER procedure PMP 601.01 and the functionality of the NER process.

NRC Inspection Report 50/327/87-37 and 50/328/87-37, dated October 5, 1987 described an extensive NRC inspection of the NER system (item 12, pages 46-48) and reported it as functional and satisfactory.

IV. CONCLUSION

TVA evaluation, resolution and corrective action taken to address the expressed concern is an adequate basis for Sequoyah restart. The NER system has been inspected and determined to be adequate. Implementation of the NER system (which was not being accomplished and was the major cause of the problem when reported in 1985) has been inspected and verified as functional and effective.

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TECHNICAL EVALUATION REPORT FOR EMPLOYEE CONCERNS
SEQUOYAH ELEMENT REPORTS
ENG-20401, ORGANIZATIONAL STRUCTURE
ENG-20402, SYSTEM DESIGN RESPONSIBILITY

I. Subject

Category: Engineering (20000)
Subcategory: Organization or Operating Procedures (20400)
Elements: Organizational Structure (20401)
System Design Responsibility (20402)
Employee Concern (20401): IN-85-029-002 (Managerial structure)
Employee Concern (20402): IN-86-209-010 (Fragmented design responsibility)

The bases for the element 20401 and 20402 portions of Subcategory Report 20400 are the above Employee Concerns which state in part that:

> "TVA's managerial structure is unwieldy and cumbersome. This situation sometimes leads to confusion in the design process. Example: excessive amount of paperwork ... too many EP procedures."
>
> "No specific overall system design responsibility is currently assigned to a specific person ... The responsibility is fragmented ... As a result of this fragmented approach, quality has been affected."

II. Summary of Issues

The issues identified in these elements refer to possible programmatic deficiencies having to do with confusion in the design process caused by unwieldy and cumbersome managerial structure and compromised quality caused by fragmented design responsibility.

III. Evaluation

In Element Report 20401 TVA divided the employee concern into three issues: 1) unwieldy and cumbersome managerial structure, 2) excessive paperwork and 3) too many engineering procedures. TVA's evaluation concluded that the first issue was valid. However, the evaluation concluded that the other two issues were not valid.

In Element Report 20402 TVA divided the employee concern into two issues: 1) overall system design is not assigned to a specific individual and 2) system design responsibility is fragmented. TVA's evaluation concluded that the first issue was valid in that it was a statement of fact. The evaluation concluded that the second issue was not valid.

TVA's evaluations of these elements is somewhat limited because of the narrow, literal interpretations given to some of the wording in the Employee Concerns. In Element 20401 the statements about excessive paperwork and too many procedures appear to be examples provided by the employee to substantiate his primary concern about the unwieldy and

cumbersome managerial structure, rather than being separate concerns. Therefore, the evaluation of these as separate, stand-alone issues is somewhat inconsequential. In Element 20402 the primary concern of the individual appears to be the fragmented responsibility and its affect on quality rather than the lack of a specific individual having overall system design responsibility. Since responsibility is a direct function of organization and structure, these two elements should both be evaluated as concerns about TVA's organization and structure. Therefore, they have been grouped together in this one Technical Evaluation Report.

In Element Report 20401 TVA points out that an NRC SALP report, various TVA audit reports and memoranda, and an INPO inspection all were critical of TVA's management of its nuclear power plants. The following INPO Finding is quoted in the element report:

> "Responsibility and authority for the various Office of Nuclear Power organizations have not been clearly defined or sufficiently communicated. As a result, there is confusion in the organization."

TVA accepted this finding as valid. In addition, the Sequoyah Nuclear Performance Plan (NPP) contains the following statements:

> "In the past, major site projects could have benefited from improved control and coordination of functional activities. Also, responsibility was often divided among several groups."
>
> "In the past, problems and confusion existed within TVA's Nuclear Engineering Program, as both the Engineering Organization and the Sequoyah Nuclear Power Organization performed engineering activities..."

Therefore, the validity of both Employee Concerns is well established and accepted by TVA in Element Report 20401 and in other documents.

The restart requirements of these elements are discussed in the Non-Restart Justification Summary for Subcategory Report 20400. The general conclusion of this Summary is that the issues deal with non-hardware, procedural/paper deficiencies, are not safety-related and should not preclude plant restart. This characterization of the Subcategory 20400 issues is appropriate for Elements 20401 and 20402 since the Employee Concerns in these elements relate to organization and structure and do not mention any hardware or quality deficiencies. However, existence of the conditions described in the concerns could lead to hardware and quality deficiencies. In addition, 10CFR50, Appendix B, specifies organization requirements as well as hardware requirements. Therefore, non-hardware, procedural/paper concerns should not be dismissed too lightly.

TVA's corrective action for Element Report 20401 is to fully implement the organizational restructuring specified in the Corporate NPP. No corrective action was specified for Element Report 20402.

In addition to the corporate restructuring prescribed in the Corporate NPP, TVA is also restructuring the Sequoyah organization as prescribed in the Sequoyah NPP. This fact is mentioned in both element reports, but implementation of the Sequoyah NPP is not included as a corrective action for either of these elements.

One allegation was identified during NRC review as being closely related to the issues of these elements. This allegation is OSP-86-A-047 (Communications Problems). The issues of organizational structure and system design responsibility contained in this allegation are properly encompassed by these element reports. Other issues contained in this allegation will be addressed in other element report/allegation evaluations.

IV. Conclusion

The above evaluation describes several disagreements with TVA's evaluations and corrective actions for Element Reports 20401 and 20402. However, the disagreements are considered to be moot points since TVA's evaluation of Element 20401 encompasses the employee concerns expressed in both elements. And, TVA's implementation of both the Corporate NPP (CNPP) and the Sequoyah NPP (SNPP) will provide corrective actions for both Employee Concerns. In addition, any design deficiencies related to these Employee Concerns should be found and corrected by the Design Basis Program and/or the Design Baseline and Verification Program (DBP/DBVP). Although implementation of the CNPP, the SNPP, the DBP, and the DBVP are all incomplete at this time, NRC inspections of these plans and programs are acceptable verification of the satisfactory completion of the required corrective actions.

NRC inspections of the DBP and DBVP have been reported in reports number 50-327,328/86-27, 4/22/86; 50-327,328/86-38, 9/15/86; 50-327,328/86-45, 10/31/86; 50-327,328/86-55, 2/3/87; and 50-327,328/87-14, 6/4/87.

NRC evaluations of the CNPP and SNPP are currently in process and should be issued shortly.

The NRC has also conducted an Integrated Design Inspection (IDI) at Sequoyah to provide additional input as to the acceptability of Sequoyah for restart.

Results of the IDI have been reported in reports number 50-327,328/87-48, 10/30/87 and 50-327,328/87-52, 9/25/87.

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TECHNICAL EVALUATION REPORT FOR EMPLOYEE CONCERNS
SEQUOYAH ELEMENT REPORTS
ENG-20403, DESIGN RESPONSIBILITY - FIELD vs OFFICE
ENG-20404, DESIGN DOCUMENT COMPLETENESS - INADEQUACY

I. Subject

Category: Engineering (20000)
Subcategory: Organization or Operating Procedures (20400)
Elements: Design Responsibility - Field vs Office (20403)
Design Document Completeness - Inadequacy (20404)
Employee Concern (20403): WI-85-091-015 (Craft technical decisions)
Employee Concerns (20404): WI-85-100-034 (Inadequate design considerations)
WI-85-100-017 (Inadequate specifications)
WI-85-100-038 (Inadequate drawings)
EX-85-061-004 (Incomplete drawings)
IN-86-133-004 (Drawings not workable)
IN-85-886-001 (Designs not constructable)

The bases for the Element Report 20403 portion of Subcategory Report 20400 and Element Report 20404, Revision 1 dated 6/15/87, are the Employee Concerns listed above which state in part that:

"TVA leaves too many technical decisions up to the craft's discretion...

"Engineering (ENDES) inadequately addresses and considers operation, maintenance, testing and construction requirements and general industry practices in the design process."

"Construction, test and installation specifications (called general construction specs, with a G-__ number) are often incomplete and inadequate."

"Drawings do not always show complete details."

"TVA designs were not developed well enough to be constructible ..."

II. Summary of Issues

The issues identified in these elements refer to possible programmatic deficiencies having to do with incomplete and/or inadequate design drawings and general construction specifcations.

III. Evaluation

Element Report 20403 addresses the single issue of too many technical decisions being left to the discretion of craft personnel. The basis for this issue must be a concern about the technical completeness and adequacy of installation drawings and specifications, since complete and adequate installation information would leave no technical decisions to the craft personnel. Therefore, this element has been grouped with Element 20404 for evaluation because inadequate engineering drawings is also an issue in Element 20404. TVA's evaluation of Element 20403 concluded that there was evidence to validate this issue and to indicate that a problem might exist.

In Element Report 20404 TVA divided the Employee Concerns into twelve issues. Five of the issues are evaluated in Element Report 20404. The other seven issues are evaluated in other element reports. The five issues evaluated in Element Report 20404 are: 1) Engineering inadequately addresses construction, testing, operation, maintenance and general industry practices in the design process,2) inadequate and incomplete G-Specs, 3) inadequate engineering drawings cause constructibility problems, 4) conflicts between TVA and vendor drawings and 5) engineering changes late in the project. TVA's evaluation of these concluded that issues 1), 3), 4) and 5) were generally valid, but only to a limited extent. TVA concluded that issue 2) was not valid.

The restart requirements of these elements are discussed in the Non-Restart Justification Summary for Subcategory Report 20400. The general conclusion of this Summary is that the issues deal with non-hardware, procedural/paper deficiencies, are not safety-related and should not preclude plant restart. This characterization of the Subcategory 20400 issues is appropriate for Elements 20403 and 20404 since the Employee Concerns in these elements do not specifically mention any hardware or quality deficiencies and generally relate to constructibility. However, existence of the conditions described in the concerns could lead to hardware and quality deficiencies. In addition, 10CFR50, Appendix B, specifies requirements for procedures and paperwork as well as for hardware. Therefore, non-hardware, procedure/paper concerns should not be dismissed too lightly.

Element Reports 20403 and 20404 both state that no corrective action is required for these elements. However, both reports state that corrective action is in place that provides additional assurance that the issues raised in these employee concerns have not led to any quality deficiencies. The primary corrective action is implementation of the Design Baseline and Verification Program (DBVP).

Five allegations were identified during NRC review as being closely related to the issues of these element reports. These allegations are OSP-86-A-012 (Similarity of Sequoyah and Watts Bar), OSP-86-A-047 (Communication problems), OSP-86-A-049 (Improperly considered operability, maintainability and testability), OSP-86-A-050 (Inadequate design and construction criteria) and OSP-86-A-138 (Surveillance testing requirements). The issues of incomplete and/or inadequate design drawings and general construction specifications contained in these allegations are properly encompassed by these element reports. Other issues contained in these allegations will be addressed in other element report/allegation evaluations.

IV. Conclusion

TVA's evaluation, corrective actions and non-restart determination are all acceptable. Although the validity of most of the issues in these elements is supported by the element reports and by other observations, there is no evidence of programmatic breakdown or extensive quality deficiencies related to the employee concerns expressed in these elements. There is room for improvement, and TVA has taken corrective actions to improve its performance in this area. The corrective actions most applicable to these elements are contained in the Sequoyah NPP (SNPP) and the DBVP. Although these corrective actions remain in the implementation stage, NRC inspections of the SNPP and the DBVP are acceptable verification of the satisfactory completion of these corrective actions.

NRC inspections of the DBVP have been reported in reports number 50-327,328/86-27, 4/22/86; 50-327,328/86-38, 9/15/86; 50-327,328/86-45, 10/31/86; 50-327,328/86-55, 2/3/87 and 50-327,328/87-14, 6/4/87.

NRC evaluations of the SNPP are currently in process and should be issued shortly.

In addition, the NRC has conducted an Integrated Design Inspection (IDI) at Sequoyah to provide additional input as to the acceptability of Sequoyah for restart. Results of the IDI have been reported in reports number 50-327,328/87-48, 10/30/87 and 50-327,328/87-52, 9/25/87.

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TECHNICAL EVALUATION REPORT FOR EMPLOYEE CONCERN ELEMENT
REPORT 20405(B) "DESIGN REVIEW PROCESS/INDEPENDENT"

I. SUBJECT

Category: Engineering (20000)
Subcategory: Organization or Operating Procedures (20400)
Element: Design Review Process/Independent (20405)

The basis for Element Report 20405(B) Rev.0, 11/25/86 is contained in seven employee concerns listed below:

Employee concerns:

WI 85 100 047 (design reviews)
WI 85 100 046 (design reviews)
IN 85 148 001 (design verification)
IN 86 209 003 (design verification)
IN 85 103 003 (design verification)
IN 85 103 N04 (design verification)
WBP 86 025 X02 (control of design analyses)

II. SUMMARY OF ISSUE

Deficiencies existed in engineering design verification practices and in control of the design analysis process, and design reviews were not performed for vendor designs and for TVA design efforts. Deficiencies in the design verification practice included lack of independency of reviewers, inadequate depth of review, and improper qualification of reviewers. Concerns are inferred to be generic and would affect safety-related systems and equipment.

III. EVALUATION

TVA element report 20405(B), Rev.0, 11/25/86 primarily considers the programmatic aspects of the issues raised. The applicable regulatory criteria are identified as 10 CFR 50 Appendix B, Criterion III and ANSI N 45.2.11-1974. The procedures defining the design process and design control are listed, and characterized by the evaluation team as an adequate basis for overall control of the design process. The evaluation team concluded that the issues raised are not valid on these bases: design control procedures are adequate; independent design verification was performed by a checker in accordance with regulations; technical reviews were scheduled as necessary and demonstrate adequate technical depth; the quality verification process was applied by TVA QA to oversee conformance to procedures.

Existence of specific instances of deficiencies of the type identified in the employee concerns was recognized by TVA and contributed to the decision to establish major design overview programs. The Design Baseline and Verification Program, the Design Basis Program and other related programs are cited in the evaluation report, and a Design Calculation Review Program has also been implemented. The root causes of these deficiencies and matching corrective actions considering organizational structure, procedures

and practices for performing design verification of design calculations, design drawings and other design documents, control of changes and interfaces are described throughout Report 20405(B).

Allegations identified as possibly overlapping the issue, #'s 86-A-005, 86-A-007, 86-A-023, 86-A-040, 86-A-050, 86-A-051, 86-A-055, 86-A-065, and 86-A-072 were reviewed. They do not broaden the scope of the issue, but do attest to its generic aspects and provide some detail and clarification. TVA corrective actions including the Design Baseline and Verification Program, the Design Calculation Review, the Configuration Management Review, and restructuring of the commitment tracking systems encompass both the allegations and the issue of concern, getting at root causes and recognizing the generic nature of the issue.

The evaluation team position that the concerns are not valid because design verification procedure violations are not corroborated is correct. However, it is an insufficient basis for close-out in light of specific design verification discrepancies noted in NRC inspections. An appropriate basis for recommending close-out of these seven employee concerns hinges on completion of TVA corrective actions applied via Design Baseline and Verification Program, Design Basis Program, Design Calculation Review Program and other related activities. Implementation of these programs and activities has had thorough NRC overview with results recorded in the following listed NRC special inspection team reports:

Design Baseline and Verification Program

50/327-328/86-27, 4/22/86
50/327-328/86-38, 9/15/86
50/327-328/86-45, 10/31/86
50/327-328/86-55, 2/3/87
50/327-328/87-14, 6/4/87

Design Calculation Review Program

50/327-328/87-06, 4/8/87
50/327-328/87-27, 8/24/87

NRC memorandum B.D. Liaw to J.A. Zwolinski, August 24, 1987 "Revision of SER Input for Sequoyah on Design Control" provides a review of TVA corrective actions on design control procedures and practices, identifies two open issues on drawing control and concludes that the pre-restart phase of the DB & VP has been fully and effectively implemented by TVA. However, the TVA DB & VP scope has not been demonstrated as sufficiently extensive considering later findings of an NRC Integrated Design Inspection (IDI) team. These findings of the IDI performed on the Essential Raw Cooling Water (ERCW) system and other safety-related structures (Report 50-327/328-87-48, July - September 1987) are pertinent to the issues raised by the employee concerns. The cover letter dated November 6, 1987 contains this paragraph:

"A second observation can be made regarding design verification. In view of the problems previously discussed regarding the adequacy of the structural calculations, the use of incorrect dimensional information on pipe support and equipment calculations and the improper use of the piping codes of record, the IDI team concluded that weaknesses exisited in TVA's design verification process during the initial plant design. Design verification, as required by 10 CFR 50, Appendix B, if properly implemented, should have detected these types of errors."

Section 1.4.1, pages 1-7, 1-8; section 1.4.2, page 1-9; section 1.4.4, page 1-13; and section 3-6, pages 3-10, 3-11 contain detail enlarging upon inadequacies of TVA design verification and design control.

IV. CONCLUSION

TVA actions to substantiate design adequacy and to generically improve the practice of design verification, design review, design calculations and overall design control are necessary, substantial, and appropriate. The design review process improvements have not been fully extended to all areas, as evidenced by the IDI report 50-327/328-87-48. TVA corrective action on this aspect of the issue will be tracked as part of the NRC overview and resolution to the IDI report findings. The TVA actions on the design verification process, including its depth and independency, are considered adequate for Sequoyah restart.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2

TECHNICAL EVALUATION REPORT FOR EMPLOYEE CONCERNS
ELEMENT REPORT ENG-20702 - SEQUOYAH

"SAFETY AND LICENSING EVALUATIONS"

I. Subject

Category: Engineering (20000)
Subcategory: Incorporation of Requirements and Commitments in Design (24500)
Element: Safety and Licensing Evaluations (20702)
Employee Concern: WI-85-100-027 (Safety and licensing evaluations)

The basis for Element Report 20702, Revision 1 dated 1-23-87, is the Employee Concern listed above which states:

"TVA Safety and Licensing Evaluations by EN DES (including NEB) are inadequate and appear too much in a cover up mode."

II. Summary of Issue

The issues identified in this element refer to possible programmatic deficiencies having to do with inadequate safety and licensing evaluations by engineering.

III. Evaluation

TVA divided the employee concern in this element into two issues: 1) inadequate safety and licensing evaluations and 2) safety and licensing evaluations are in a cover up mode. Since the employee concern is not specific and does not provide any examples of deficiencies, and TVA's evaluation team did not find any other documentation of these issues, it reviewed the applicable Engineering procedures and performed an audit type review of nine different types of reports which contained engineering evaluations. A total of 65 reports were reviewed for compliance with procedures and appropriateness of technical content. The TVA evaluation concluded that:

"These randomly selected documentation packages were complete, legible, and adequate. There was no evidence of a cover up by EN DES."

Since the report concluded that the issues were not valid, it also concluded that no corrective action is required.

Despite the above conclusions TVA has admitted to weaknesses in the area of plant modifications and design control which are closely related to the issues in this element. Volume 2, section 3.2 of the Sequoyah Nuclear Performance Plan (SNPP) lists the following among the root causes of these weaknesses:

"Inadequate engineering evaluations ... " and

"SQN has performed the design of plant modifications on a drawing-by-drawing basis. This system of releasing design drawings makes it difficult to establish the USQD [Unreviewed Safety Question Determination] of the final design configuration."

Therefore, in a broadened view there is evidence to support the issues in this element report. However, TVA has addressed these broader issues in other element reports and proposed corrective actions in the SNPP.

Three allegations were identified during NRC review as being closely related to the issues of this element report. These allegations are OSP-86-A-005 (TVA safety and licensing evaluations), OSP-86-A-023 (Independent design reviews) and OSP-86-A-041 (Definition of significance to safety). The issues of the adequacy of safety and licensing evaluations and of their being in a cover up mode contained in these allegations are properly encompassed by this element report. Other issues contained in these allegations will be addressed in other element report/allegation evaluations.

IV. Conclusion

TVA's evaluation of this element report is rather narrow, but the approach and methodology are acceptable since the broader issues are addressed in other element reports and in the SNPP. TVA concluded that corrective action was not required for the issues in this element, but corrective action is contained in the SNPP to address the broader issues. Although implementation of the SNPP is not complete at this time, NRC inspections of this plan are acceptable verification of the required corrective actions. NRC evaluation of the SNPP is currently in process and should be issued shortly.

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TECHNICAL EVALUATION REPORT FOR EMPLOYEE CONCERN ELEMENT
REPORT 20704(B) "CONDITION ADVERSE TO QUALITY DOCUMENTATION"

I. SUBJECT

Category:	Engineering (20000)
Subcategory:	Incorporation of Requirements and Commitments in Design (24500)
Element:	Documentation (20704)

The basis for Element Report 20704(B), Rev.0, 2/4/87 is employee concern I-85-761-NPS which states that the practice in TVA Engineering of obtaining supervisory approval of Condition Adverse to Quality (CAQ) documentation hinders the reporting of such conditions.

II. SUMMARY OF ISSUE

Reporting of Conditions Adverse to Quality (CAQ) within the Division of Nuclear Engineering is hindered by the practice requiring supervisory approval of initiating CAQ documentation. This restriction on the flow of information into corrective action channels has a potential for affecting safe plant operations.

III. EVALUATION

TVA subcategory report 24500, Rev.4, 12/3/87, and TVA evaluation report 20704(B), 2/4/87, including changes made 2/6/87, consider the issue as a valid programmatic deficiency. The TVA procedure NEP-9.1 "Corrective Action" Rev.2, 6/30/87, has been revised to enable the originator of a CAQ report to escalate a concern to higher management in the event of disagreement on the validity of the concern between the originator and the supervisor. The evaluation report recognizes the TVA obligation to meet requirements of 10 CFR 50 Appendix B, Criterion XVI and ANSI N 45.2.11, Section 9, "Corrective Action." The report identifies a lack of management support and attention to the corrective action program as the root cause of the deficiency. The specific corrective action taken by TVA as incorporated in the 6/30/87 revision 2 of procedure NEP-9.1 gets at the root of the problem. This procedure is reinforced by additional measures to enhance management openness and availability to employees, such as the Employee Concerns Special Program. TVA's action and resolution is considered appropriate and acceptable.

IV. CONCLUSION

TVA evaluation and resolution of the expressed concern is adequate. Both the specific implementation of the revised procedure for initiating CAQ reports, and the generic attention given to TVA management openness to employee information are positive steps to creation of a better rapport and unhindered issuance of CAQ reports. TVA actions to close out this element are acceptable and are an adequate basis for Sequoyah restart.