

TVA EMPLOYEE CONCERNS
SPECIAL PROGRAM

REPORT NUMBER: 20600

REPORT TYPE: SUBCATEGORY REPORT FOR
ENGINEERING

REVISION NUMBER: 3

TITLE: AS-BUILT RECONCILIATION

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REASON FOR REVISION:

1. Revised to incorporate comments from SRP, TAS, and other Category Evaluation Groups.
2. Revised to incorporate comments from SRP.
3. Revised to incorporate comments from SRP, TAS, OGC and to add Attachment C (References).

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EXECUTIVE SUMMARY

Subcategory 20600 consists of one element that was applicable to and evaluated for all four of TVA's nuclear power plant sites. This report summarizes those evaluations and examines their results for significance and broader issues. The employee concerns that were grouped into this element were about as-built drawing inaccuracies; documents in poor condition or nonexistent; unchecked drawings, drawing errors, inaccurate data in workplans, and drawings not changed in a timely manner to reflect plant changes. The report also addresses a concern, applicable only to Sequoyah, that the stress analysis for the essential raw cooling water (ERCW) system was not kept current to take into account piping material changes.

Of the five issues at Sequoyah and four at each of the other three nuclear plants, the evaluation team found only one issue at each plant to be invalid. In addition, one valid peripheral issue was identified at each of the plants as a result of the evaluations. Of the 17 valid issues, TVA had already acknowledged eight and had initiated corrective action. The remaining nine valid issues required TVA to develop corrective actions, which included evaluation of ERCW material change effects on stress analysis at Sequoyah and procedure changes at each of the plants.

A review of TVA's nuclear performance plans by the evaluation team revealed that TVA acknowledged that it had formal drawings that did not match actual plant configurations. If TVA had not acknowledged deficiencies in the as-built drawing - configuration control processes and taken corrective action, either prior to, or as a result of, the ECTG evaluation, plant operations could have been affected. New TVA programs, identified in its nuclear performance plans, along with the corrective actions resulting from the ECTG evaluations, should correct any deficiencies and preclude their recurring. At Sequoyah, the potential existed for some ERCW piping and/or pipe supports to be stressed higher than documented because the piping stress analysis did not match the actual system configuration. TVA committed, in the corrective action plan, to evaluate the ERCW system changes for effects on the analysis and to revise drawings to reflect the as-built condition.

The evaluation team has identified the causes of deficiencies in the as-built drawing - configuration control processes as:

- o An inordinate time elapsed between physical plant changes authorized by engineering (DCRs, FCRs, and ECNs) and the corresponding formal drawing revisions because procedures did not specify a time limit in which drawings were to be formally revised to show a change.
- o A "Fragmented Organization," without clear lines of responsibility, authority, and accountability, resulted in Engineering and Operations or Construction maintaining separate sets of drawings for the same systems.

- o Correlation was not ensured between issued drawings and actual plant configuration. This was the result of procedures which permitted two sets of drawings depicting the same systems to exist at the same time.
- o Poor communication between the engineering and plant organizations resulted in Engineering not being fully cognizant of actual plant configuration nor of the degree to which design modifications had been implemented by Operations or Construction.

The stress analyses were not being kept current to include material changes in the ERCW system at Sequoyah because procedures were not followed.

At Sequoyah, the evaluation team has verified the completion of corrective action plans that:

- o Revised procedures to impose a time limit between a physical change made to a CSSC system and the updating of as-built drawings to reflect that change
- o Evaluated ERCW material changes for effects on the stress analysis

Causes and other evaluation results are being examined from a wider perspective by the Engineering category evaluation.

Preface, Glossary, and List of Acronyms
for ECTG Subcategory Reports

HISTORY OF REVISION

REV NUMBER	PAGES REVISED	REASON FOR CURRENT REVISION
3	i	To clarify that one or more attachments will help the reader find where a particular concern is evaluated

Preface

This subcategory report is one of a series of reports prepared for 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 report on those Office of Nuclear Power (ONP) employee concerns filed before February 1, 1986. Concerns filed after that date are handled by the ongoing ONP Employee Concerns Program (ECP).

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

Element reports, the lowest reporting level, will be published only for those concerns directly affecting the restart of Sequoyah Nuclear Plant's reactor unit 2. An element consists of one or more closely related issues. An issue is a potential problem identified by ECTG during the evaluation process as having been raised in one or more concerns. For efficient handling, what appeared to be similar concerns were grouped into elements early in the program, but issue definitions emerged from the evaluation process itself. Consequently, some elements did include only one issue, but often the ECTG evaluation found more than one issue per element.

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

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

Additionally, at the end of each subcategory report will be a Subcategory Summary Table that includes the concern numbers; identifies other subcategories that share a concern; designates nuclear safety-related, safety significant, or non-safety related concerns; designates generic applicability; and briefly states each concern.

Either the Subcategory Summary Table or another attachment or a combination of the two will enable the reader to find the report section or sections in which the issue raised by the concern is evaluated.

The subcategories are themselves summarized in a series of eight category reports. Each category report reviews the major findings and collective significance of the subcategory reports in one of the following areas:

- management and personnel relations
- industrial safety
- construction
- material control
- operations
- quality assurance/quality control
- welding
- engineering

A separate report on employee concerns dealing with specific contentions of intimidation, harassment, and wrongdoing will be released by the IVA Office of the Inspector General.

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

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

For more detail on the methods by which ECTG employee concerns were evaluated and reported, consult the Tennessee Valley Authority Employee Concerns Task Group Program Manual. The Manual spells out the program's objectives, scope, organization, and responsibilities. It also specifies the procedures that were followed in the investigation, reporting, and closeout of the issues raised by employee concerns.

ECSP GLOSSARY OF REPORT TERMS*

classification of evaluated issues the evaluation of an issue leads to one of the following determinations:

Class A: Issue cannot be verified as factual

Class B: Issue is factually accurate, but what is described is not a problem (i.e., not a condition requiring corrective action)

Class C: Issue is factual and identifies a problem, but corrective action for the problem was initiated before the evaluation of the issue was undertaken

Class D: Issue is factual and presents a problem for which corrective action has been, or is being, taken as a result of an evaluation

Class E: A problem, requiring corrective action, which was not identified by an employee concern, but was revealed during the ECTG evaluation of an issue raised by an employee concern.

collective significance an analysis which determines the importance and consequences of the findings in a particular ECSP report by putting those findings in the proper perspective.

concern (see "employee concern")

corrective action steps taken to fix specific deficiencies or discrepancies revealed by a negative finding and, when necessary, to correct causes in order to prevent recurrence.

criterion (plural: criteria) a basis for defining a performance, behavior, or quality which ONP imposes on itself (see also "requirement").

element or element report an optional level of ECSP report, below the subcategory level, that deals with one or more issues.

employee concern a formal, written description of a circumstance or circumstances that an employee thinks unsafe, unjust, inefficient or inappropriate; usually documented on a K-form or a form equivalent to the K-form.

evaluator(s) the individual(s) assigned the responsibility to assess a specific grouping of employee concerns.

findings includes both statements of fact and the judgments made about those facts during the evaluation process; negative findings require corrective action.

issue a potential problem, as interpreted by the ECTG during the evaluation process, raised in one or more concerns.

K-form (see "employee concern")

requirement a standard of performance, behavior, or quality on which an evaluation judgment or decision may be based.

root cause the underlying reason for a problem.

*Terms essential to the program but which require detailed definition have been defined in the ECTG Procedure Manual (e.g., generic, specific, nuclear safety-related, unreviewed safety-significant question).

Acronyms

AI	Administrative Instruction
AISC	American Institute of Steel Construction
ALARA	As Low As Reasonably Achievable
ANS	American Nuclear Society
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BFN	Browns Ferry Nuclear Plant
BLN	Bellefonte Nuclear Plant
CAQ	Condition Adverse to Quality
CAR	Corrective Action Report
CATD	Corrective Action Tracking Document
CCTS	Corporate Commitment Tracking System
CEG-H	Category Evaluation Group Head
CFR	Code of Federal Regulations
CI	Concerned Individual
CMTR	Certified Material Test Report
COC	Certificate of Conformance/Compliance
DCR	Design Change Request
DNC	Division of Nuclear Construction (see also NU CON)

**TVA EMPLOYEE CONCERNS
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DNE Division of Nuclear Engineering
DNQA Division of Nuclear Quality Assurance
DNT Division of Nuclear Training
DOE Department of Energy
DPO Division Personnel Officer
DR Discrepancy Report or Deviation Report
ECN Engineering Change Notice
ECP Employee Concerns Program
ECP-SR Employee Concerns Program-Site Representative
ECSP Employee Concerns Special Program
ECTG Employee Concerns Task Group
EEOC Equal Employment Opportunity Commission
EQ Environmental Qualification
ENRT Emergency Medical Response Team
EN DES Engineering Design
ERT Employee Response Team or Emergency Response Team
FCR Field Change Request
FSAR Final Safety Analysis Report
FY Fiscal Year
GET General Employee Training
HCI Hazard Control Instruction
HVAC Heating, Ventilating, Air Conditioning
II Installation Instruction
INPO Institute of Nuclear Power Operations
IRN Inspection Rejection Notice

L/R	Labor Relations Staff
MAI	Modifications and Additions Instruction
MI	Maintenance Instruction
MSPB	Merit Systems Protection Board
MT	Magnetic Particle Testing
NCR	Nonconforming Condition Report
NDE	Nondestructive Examination
NPP	Nuclear Performance Plan
NPS	Non-plant Specific or Nuclear Procedures System
NQAN	Nuclear Quality Assurance Manual
NRC	Nuclear Regulatory Commission
NSB	Nuclear Services Branch
NSRS	Nuclear Safety Review Staff
NU CON	Division of Nuclear Construction (obsolete abbreviation, see DNC)
NUMARC	Nuclear Utility Management and Resources Committee
OSHA	Occupational Safety and Health Administration (or Act)
ONP	Office of Nuclear Power
OWCP	Office of Workers Compensation Program
PHR	Personal History Record
PT	Liquid Penetrant Testing
QA	Quality Assurance
QAP	Quality Assurance Procedures
QC	Quality Control
QCI	Quality Control Instruction

QCP **Quality Control Procedure**
QTC **Quality Technology Company**
RIF **Reduction in Force**
RT **Radiographic Testing**
SQN **Sequoyah Nuclear Plant**
SI **Surveillance Instruction**
SOP **Standard Operating Procedure**
SRP **Senior Review Panel**
SWEC **Stone and Webster Engineering Corporation**
TAS **Technical Assistance Staff**
T&L **Trades and Labor**
TVA **Tennessee Valley Authority**
TVTLC **Tennessee Valley Trades and Labor Council**
UT **Ultrasonic Testing**
VT **Visual Testing**
WBECSP **Watts Bar Employee Concern Special Program**
WBN **Watts Bar Nuclear Plant**
WR **Work Request or Work Rules**
WP **Workplans**

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1. INTRODUCTION

This subcategory report summarizes and evaluates the results of the ECSP element evaluations prepared under Engineering Subcategory 20690, As-Built Reconciliation.

The employee concerns provide the basis for the element evaluations and are listed in Attachment A. The plant location where the concern was originally identified and the applicability of the concern to other nuclear plants are also identified.

Revision 8 of TVA Topical Report TVA-TR75-1A, which is the Quality Assurance Program Description for the Design, Construction, and Operation of TVA Nuclear Power Plants, was the revision available when this element was evaluated. Revision 9 of the Topical Report (Ref. 8) is available at the writing of this report; its effects on the 206.1 element evaluations have been assessed, but they do not alter the findings and conclusions.

The evaluations are summarized in the balance of this report as follows:

- o Section 2 -- summarizes, by element, the issues stated or implied in the employee concerns and addresses the determination of their generic applicability
- o Section 3 -- outlines the process followed for the element and subcategory evaluations and cites documents reviewed
- o Section 4 -- summarizes the findings by element and identifies those negative findings that must be resolved
- o Section 5 -- highlights the corrective actions required for resolution of the negative findings cited in Section 4 and relates them to each element and to each plant site
- o Section 6 -- identifies causes of the negative findings
- o Section 7 -- assesses the significance of the negative findings
- o Attachment A -- lists, by element, each employee concern evaluated in the subcategory. The concern number is given along with notation of any other subcategory with which the concern is shared and the plant sites to which it could be applicable. The concern is quoted as received by TVA, and is characterized as safety related (SR), safety significant (SS), or not safety related (NO)
- o Attachment B -- contains a summary of the element-level evaluations. Each issue is listed, by element number and plant, along with its corresponding findings and corrective actions. The reader may trace a concern from Attachment A to an issue in

Attachment B by using the element number and applicable plant. The reader may relate a corrective action description in Attachment B to causes and significance in Table 3 by using the CATD number which appears in Attachment B in parentheses at the end of the corrective action description.

The term "Peripheral finding" in the issue column refers to a finding that occurred during the course of evaluating a concern but did not stem directly from an employee concern. These are classified as finding class "E" in Tables 1 and 2 of this report

- o Attachment C -- lists the references cited in the text

2. SUMMARY OF ISSUES

The employee concerns listed in Attachment A have been examined for each plant, and the potential problems raised by the eight concerns were developed into 17 separate issues. In addition, four peripheral issues were identified. These 21 issues are evaluated for each nuclear plant site and can be summarized as follows:

206.1, As-Built Inaccuracies - As-built drawings are inaccurate or nonexistent, or do not represent the installation, and changes to drawings are not made in a timely manner.

Sequoyah had the additional issue that actual installed essential raw cooling water (ERCW) piping changes may not have been stress-analyzed.

Each specific issue evaluated is stated fully in Attachment B (by plant), which also lists the findings and corrective actions that are discussed in Sections 4 and 5 of this report. Seventeen of the 21 issues were found to be valid. All of the concerns listed were evaluated for each of the four plants except concern HI-85-094-N02, which was judged to be unique to SQN. This concern was raised at SQN and addresses the SQN ERCW system. This situation existed because of the sequence of events that occurred; i.e., engineering authorized a piping material change from carbon steel to stainless steel, the material changes were physically made to portions of the ERCW system resulting in a system configuration not fully supported by the stress analyses, and the system was operated. The evaluation team judged there was little likelihood of the same sequence of events occurring at other plants. Therefore, there was no basis to suggest a need to evaluate this concern at the other plants.

3. EVALUATION PROCESS

This subcategory report is based on the information contained in the applicable element evaluations prepared to address the specific employee concerns related to those issues broadly defined in Section 2. The evaluation process consisted of the following steps:

- a. Defined issues for the element from the employee concerns. Attachment A of this report lists the employee concerns addressed herein. Attachment B of this report lists the issues, as well as the findings and corrective actions for the issues.
- b. Reviewed documents such as OIE Information Notices (Ref. 6) and INPO Good Practices publications (Ref. 24) which provide information on as-built/configuration control practices in the nuclear industry.
- c. Reviewed applicable Safety Analysis Report (SAR) (Ref. 7), NQAM (Refs. 9-11), Topical Report (Ref. 9), and Nuclear Performance Plans (NPPs) (Ref. 19) to understand how TVA will accomplish regulatory compliance, and to identify any open issues or TVA commitments related to the design.
- d. Reviewed corporate and site level procedures to determine TVA requirements for configuration control (Refs. 13-18).
- e. Reviewed any other documents applicable to as-built/configuration control and determined to be needed for the evaluation, such as correspondence (Refs. 21-23, 25-28, 30, 34-38, 41-45, 49, 50, 52-54, 56, 61-63, 65, 66), transcripts of interviews (Ref. 23), Condition Adverse to Quality Report (CAQR) (Ref. 32), Nuclear Safety Review Staff (NSRS) reports (Refs. 48 and 51), reports by others (Refs. 47-55, 57, 59, 63), and Corporate Commitment Tracking System (CCTS) (Ref. 45) in the NPPs.
- f. Using the results from steps a through e above, evaluated the issues for the element and documented the findings.
- g. Tabulated issues, findings, and corrective actions from the element evaluations in a plant-by-plant arrangement (see Attachment B).
- h. Prepared Tables 1, 2, and 3 in this subcategory report to permit comparison and identification of common and unique issues, findings, and corrective actions among the four plants.
- i. Classified the findings and corrective actions from the element evaluations using the ECSP definitions.
- j. On the basis of ECSP guidelines, analyzed the collective significance and causes of the findings from the element evaluations.
- k. Evaluated defined corrective actions to determine if additional actions are required as a result of causes found in step j.

1. Provided additional judgment or information that may not have been apparent at the element level.

4. FINDINGS

4.1 As-Built Inaccuracies - Element 206.1

Finding (for issues "a," "b," and "c" as shown in Attachment B for all four plants): Investigations by TVA and other organizations (Refs. 47-55, 57-60, 62-64) indicate problems in as-built drawings and configuration control and in the management and control of plant change and plant change documentation (FCRs, ECNs, etc.). At SQN, WBN, and BFN there was no list, at the time of the initial investigation, of those drawings that must be updated before startup (or fuel load) to reflect the as-built configuration of the plant, and there was insufficient management attention to engineering practices and to the Quality Assurance function of assuring that procedures for controlling plant changes and plant change documentation are adequate and that they are being followed. This inattention has resulted in extensive inaccuracies in as-built documentation. At WBN, SCR 6297S was written to address an apparent adverse trend related to as-constructed drawing discrepancies based on a series of construction nonconformance reports (NCRs). The evaluation did not identify a significant breakdown in the WBN as-constructed drawing program.

The evaluation team found that none of the procedures defines the time limit allowed between the time an engineering approved physical change is made to a critical structures, systems, and components (CSSC) system in the plant and the formal revision of the as-built drawings to reflect that change, nor do the procedures limit the amount of mark up, or "red-lining," of drawings to show changes before drawings have to be formally revised and reissued.

Discussion (for issues "a," "b," and "c" as shown in Attachment B for all four plants): 10 CFR 50, Appendix B and Appendix A (Refs. 1 and 2) and ANSI N45-2.11 (Ref. 6), committed to by TVA, state that procedures must be developed to specify that as-built drawings for safety-related systems and structures be current and be available at all locations where they are needed. These documents also require periodic inspections or audits of the design, construction, and operational processes to ensure that the procedures are being followed, and that the drawings reflect the current as-built configuration of the plant.

TVA has acknowledged these regulatory requirements, and has stated in the TVA Topical Report (Ref. 8) that drawings for safety-related systems, as defined in the FSAR, will be maintained in a current as-built condition. In response to these requirements, and to maintain configuration control, TVA developed engineering procedures (EN DES-EPs, OEPs, and NEPs) to govern the preparation, approval, and tracking of change-authorizing documents. In 06/83 the Configuration Control Task Force (CCTF) (Ref. 49) was initiated to resolve

audit findings in the area of modification control at BFN. In 07/83, the task force was chartered to investigate configuration management throughout TVA nuclear plants, make recommendations for corrective action, and propose programs to prevent recurrence of drawing update problems. The task force found that configuration control and as-built problems at TVA nuclear plants were mostly due to:

- o Lack of management involvement and lack of emphasis on adhering to in-place procedures
- o The use of a two-drawing system of as-designed and as-built drawings
- o Partial implementation of engineering change notices (ECNs) without updating drawings
- o Improper handling of the design change request (DCR) process and documents

In the two-drawing system, "as-designed" drawings were issued by engineering and "as-constructed" drawings were issued by the plant depicting the same systems without correlation necessarily existing between the two sets of drawings.

Other investigations at the various nuclear plant sites indicated problems in the areas of as-built drawings and configuration control. The "as-designed" drawings were based on design changes as issued by engineering. Engineering was not always aware of the status of previously issued modifications. The "as-constructed" drawings that were maintained by the plant were based on the actual plant system installations, but were not always maintained up to date to reflect the most current actual system configuration.

A list of drawings that must be brought up to date to reflect the as-built condition of safety systems required to mitigate accidents defined in the PSAR/FSAR is necessary so that TVA will know when the effort has been completed.

Limits on the accumulation of system modification documentation before a drawing is formally revised to incorporate that documentation is desirable so that the drawings remain easily readable and as up to date as possible. This will minimize problems that might be associated with inaccurate drawings.

The control room drawings and those in the Shift Engineer's office are marked up in red to show the change immediately after the change is fully implemented in the plant.

Finding (for issue "d" for WBN, BFN, BLN; issue "e" for SQN per Attachment B): The evaluation team found no evidence of unchecked drawings and thus no as-built difficulties caused by unchecked drawings.

Discussion for issue "d" for WBN, BFN, BLN; issue "e" for SQN per Attachment B): The issue pertaining to checking of drawings was cited in Employee Concern IN-85-152-001 received by TVA in May 1985. At that time, the EN DES procedures (EPs) were in effect for issuing original (Ref. 13) and revised engineering drawings. The evaluation team found that the procedure was quite comprehensive and required at least seven signatures, including that of the checker, before the drawing could be issued. The checker's signature signified that (a) the design review is complete; (b) all required interface coordination (including requested review) is done; (c) the design complies with all design input and the necessary assumptions; and (d) calculations (including referenced computer printout) necessary to prove the design on the basis of (c) are approved.

The present procedures (NEPs) (Ref. 14) are somewhat simplified and meet the requirements in a different manner, but they also require signatures of preparer, checker, applicable reviewers and approver before a drawing is issued.

The evaluation team reviewed approximately 100 samples of various types of drawings for each of the four nuclear plants and did not find any examples of unchecked drawings.

Finding (for issue "d" for SQN per Attachment B): The identification of the physically modified ERCW stainless steel piping transmitted to the Rigorous Analysis group was not made in accordance with standard quality assurance procedures and practices.

Discussion (for issue "d" for SQN per Attachment B): TVA issued ERCW system modifications to change the piping material from carbon to stainless steel. TVA has stated that there is no guarantee that every past configuration of ERCW piping had a design calculation on file demonstrating the qualification of the piping in such configuration before actually being placed in service (Ref. 19). TVA has stated that:

"All piping which had been changed or was scheduled to be changed through Unit 2 Cycle 3 outage was indicated on a set of drawings prepared by [the] Plant Modifications Section. This piping was reviewed by the Rigorous Analysis section to ensure that all Rigorously analyzed piping which had been changed was adequately considered" (Ref. 68).

TVA has also stated that "any replacement done after November 1985 will be under our present program which will have the analysis done before the actual pipe replacement."

The evaluation team concurs with the TVA approach of (a) identifying piping to be changed by a particular time, (b) assuring that documentation exists showing such changed piping is qualified, and (c) requiring analysis to be complete before future changes are to be made. However, the evaluation team also believes that the performance of these steps must be a quality controlled activity. The drawings prepared by the Plant Modifications Section for the ERCW piping system change were not formally prepared and transmitted (Ref. 69). Therefore, the information provided to the Rigorous Analysis Group could be incomplete or incorrect.

Finding (for issue "e" for WBN, BFN and BLN; issue "f" for SQN per Attachment B): As an additional finding, it appears to the evaluation team that the Primary and Critical drawings listed in the Drawing Control Instructions do not meet the as-built drawing criteria of NUREG-0737 Supplement 1 (Refs. 4 and 12) or of NUREG-0696 (Ref. 3), which require drawings, schematics, and diagrams showing conditions of plant structures and systems down to the component level and in-plant locations of these systems.

Discussion (for issue "e" for WBN, BFN and BLN; issue "f" for SQN per Attachment B): The above two NUREG documents provide NRC guidance on meeting requirements for emergency response capability (ERC). The evaluation of TVA compliance with these regulatory documents is beyond the scope of this report.

4.2 Summary of Subcategory Findings

The classified findings are summarized in Table 1. Class A and B findings indicate there was no actual problem and that corrective action was not required. Class C, D, and E findings required corrective actions. The corrective action class, defined in the Glossary Supplement, is identified in the table by the numeral combined with the finding class. For example, the designation D2 in Table 1 indicates that the evaluated issue was found to be valid (finding Class D) and that a corrective action involving a procedure revision is required (corrective action Class 2) as the result of the ECTG investigation.

The findings are summarized by classification in Table 2. Of the 21 findings identified in Table 1, none requires physical changes to the plant and four require no corrective action. Of the remaining 17 findings, six had corrective actions initiated before the ECTG evaluation, seven had new corrective actions identified, and four were peripheral findings uncovered during the ECTG evaluation which require corrective action.

5. CORRECTIVE ACTIONS

As noted in Section 4 of this report, Table 2 identifies a total of 17 findings that require corrective action. The corrective actions, along with their finding/corrective action classifications, are summarized in Table 3. The corrective action descriptions in the table are a condensation of the

detailed corrective action information in Attachment B. A single corrective action may resolve several individual findings. The table indicates the plant or plants to which a corrective action is applicable by the Corrective Action Tracking Document (CATD) column where the applicable plant is identified by the CATD number.

From the Finding/Corrective Action Classification column of Table 3, it can be seen that of the five corrective actions identified, all require some type of documentation remedy. A potential for documentation changes exists as the result of the additional peripheral finding regarding TVA compliance with specific NUREGs (Refs. 3 and 4). Time limits for updating drawings are addressed in detail in Section 7.

TVA has committed in the Nuclear Performance Plans (NPPs) to replace its two-drawing system ("as-designed" and "as-constructed") with a single drawing system under the control of the Division of Nuclear Engineering (DNE) at each of its nuclear plant sites. This change is intended to prevent the recurrence of problems TVA has had in the past with discrepancies between drawings and actual plant configuration. TVA has developed and committed to implement Design Baseline and Verification Programs (DBVP) at SQN, WBN, and BFN to ensure that drawings for safety systems within the scope of the respective programs reflect the actual plant configuration and reconcile the actual system configurations with the design basis and licensing commitments. The plant construction has not been completed at BLN, thus the implementation of a single drawing system is intended to maintain control of plant configuration and compliance with the design basis and licensing commitments.

The DBVPs at SQN (Ref. 39) and BFN (Ref. 35) are being implemented to revise a defined scope of drawings to match the actual plant configuration and to reconcile these drawings to related engineering documentation in a two-phase program, i.e., prerestart and postrestart for each unit. In this program, The flow diagrams, electrical single line diagrams, schematics, and control diagrams used in the control room (control room drawings) depicting the systems, or portions of systems, required to mitigate design basis events and to provide for safe shutdown of the plant will be updated in the PRERESTART phase. The POSTRESTART phase will include implementation of the modifications not required for restart, completion and revision of the design criteria documentation, completion of other safety systems evaluations not required for restart, and implementation of corrective actions to the other safety systems, as required, and formal revision of control room drawings (i.e., configuration control drawings).

The DBVP at WBN (Ref. 40) is being implemented to verify that the WBN unit 1 construction satisfies licensing commitments and that unit 1 is ready for power operation. The former "as-designed" and "as-constructed" drawings will be merged into baseline drawings for nuclear safety-related systems. A similar program is to be followed for WBN unit 2.

TVA has committed to revise applicable procedures at each of the four nuclear plant sites to impose a time limit between the completion of a physical modification to a CSSC system, as authorized by engineering change control documents, and the formal revision of the applicable configuration control drawings to reflect that change.

TVA has also committed to evaluate the SQN ERCW system changes for effects on the analysis and revise drawings to reflect as-built condition.

The Design Basis Program for TVA Nuclear Plants of March 28, 1986 (Ref. 34) developed "a method for defining, establishing and maintaining a design basis program for all TVA nuclear plants."

"Design Basis

A design basis (1) identifies and interprets generic upper tier design input documents which are applicable to a specific plant, (2) identifies and evokes commitments made by TVA in licensing documents, (3) defines the general design requirements for the plant as required to satisfy the plant safety analysis, and (4) establishes any other general design input which may be dictated by TVA policy.

"Design Basis Document (DBD)

A DBD consists, as a minimum, of those general design criteria for site, plant, structures, and systems which constitute the upper tier plant-specific design input. It may also include those detailed design criteria, system descriptions, and design input drawings, discretionary engineering decisions and rationale, analysis results, and engineering parameters and associated margins for detailed design.

There is general agreement that a design basis for all of the TVA nuclear plants exists; however, this design basis is not always readily retrievable in a verified form. A need exists for a verified, controlled DBD to be maintained throughout the plant life. Such a document should be used to evaluate and control design changes, to respond to abnormal operations and events, to evaluate [licensing change order] (LCOs), in performing safety reviews (e.g., [unreviewed safety question determination] (USQDs), [probabilistic risk assessment] (PRAs), etc.), to assess conditions adverse to quality, to assess operating experience reports, and to provide an interface with outside agencies. The design basis document would be used by design engineers, plant engineers, shift technical advisers, and auditors and regulators."

The TVA Design Change Process Improvement Program (07/86) (Ref. 33) was:

". . . written to establish a uniform and coordinated approach in making significant changes to the TVA Design Change Process. The revised process as provided herein and entitled DNE's Design Change Process Improvement Program was developed to correct weaknesses in the existing design change process. These weaknesses can be summarized as follows:

1. Weaknesses in the quality and documentation of engineering reviews for modifications.
2. Weakness in maintaining an effective relationship between "as-configured" and "as-designed" documents.

"Division of Nuclear Engineering (DNE) Management has concluded that basic changes to the program for controlling design modifications are required.

"This Improvement Program Plan was developed to accomplish the following:

1. Define authority, responsibility, and accountability for performance of design functions to ensure that effective actions are taken to correct adverse conditions.
2. Centralize direction and control of design functions to ensure that design integrity is maintained during the plant modification process.
3. Put in effect design modification methods which provide the coordination among various [Office of Nuclear Power] (ONP) groups to ensure accurate and sufficient documentation of plant configuration and effective safety evaluations.
4. Provide a standard system for accomplishing design modification work on all nuclear projects.

"This program provides for: (1) improving the effectiveness of the engineering organization (see Attachment 1), (2) developing and implementing a transitional (short-duration) design change process, and (3) developing and implementing a permanent (long-range) improved design change process."

Configuration control is addressed in the following sections of the corporate and respective plant-specific NPPs. There is no plant-specific NPP for BLN.

<u>Corporate (Volume 1)</u>	<u>Sequoyah (Volume 2)</u>	<u>Browns Ferry (Volume 3)</u>	<u>Watts Bar (Volume 4)</u>
VI.E.4	II.3.0	III.2.0	V.7

TVA has acknowledged problems in the area of configuration control in its nuclear performance plans, and has committed to procedure revisions at both the corporate and plant-site levels to reflect TVA's new organization, to correct documented deficiencies, and to reflect installed plant modifications.

The corrective action plans received for WBN, SQN, BFN, and BLN are acceptable to the evaluation team to resolve the negative findings.

6. CAUSES

Table 3 also identifies one or more causes for each negative finding requiring corrective action. Table 3 has 17 column headings (e.g., "Lack of Management Attention," "Inadequate Procedures," etc.) which address possible causes. The problems covered in this report resulted from a combination of causes, each of which is identified. Whenever direct evidence linked a cause with a problem requiring corrective action, such evidence was considered in preparing the data in the table.

The following paragraphs address causes resulting from "Lack of Management Attention."

The most frequently identified cause is procedural deficiencies (e.g., "Inadequate Procedures") that did not ensure correlation between issued drawings and actual plant configuration because they permitted the peaceful (though sometimes warlike) coexistence of two sets of drawings depicting the same systems. This cause applies to four of the five findings for which corrective actions are listed.

"Inadequate Communication" between the engineering and site organizations responsible for maintaining the drawings and TVA's fragmented organizational structure permitted the existence, at the same time, of two sets of drawings for the same systems. One set was maintained by Engineering as the "as-designed" drawings and the other was maintained by Construction or Operations as the "as-constructed" drawings. These two sets of drawings were sometimes in disagreement, and, in some cases, neither set accurately reflected the actual plant configuration.

Certain existing procedures were not followed at Sequoyah, with the result that stress analysis was not kept current to include physical material changes made to the ERCW system.

These causes are in the broader Table 3 classification of weaknesses in "Management Effectiveness."

"Lack of Management Attention" also permitted the continuation of a situation wherein procedures did not impose a time limit between a physical plant change authorized by engineering (DCRs, FCRs, and ECNs) and formal revision and issuance of the applicable engineering drawings to reflect the change.

7. COLLECTIVE SIGNIFICANCE

The last three columns of Table 3 indicate the evaluation team's judgment of the significance of the specific corrective actions. Four of the five problems for which corrective actions are listed require changes to documentation. Three of the four problems also have the potential for changes to hardware and design margins. The fifth problem has the potential for documentation changes.

The causes identified are in the broad classification of "Management Effectiveness," which is an indication of deficiencies in TVA's nuclear program management as it relates to as-built drawings and configuration control.

Because the drawings did not accurately represent the plant configuration, incorrect operational decisions could have been made by control room operators in responding to abnormal operating conditions and in safely operating, shutting down, or maintaining the plants in a safe shutdown condition. TVA has initiated programs such as the DBVP, DBD, and Design Change Process Improvement Program at the corporate level and at the nuclear plant sites which, when fully implemented, should correct the configuration control problems that have been identified and should prevent future recurrence.

The lack of consistent direction and proper communication could also result in drawings which are part of the FSAR not reflecting the actual plant configuration and, therefore, jeopardize the licensing status of the plant.

Engineering was not always fully aware of actual plant configuration and the degree to which design changes had actually been implemented in the plant. This sometimes resulted in inaccuracies in subsequent design changes issued by Engineering and in site problems with implementing those design changes.

Because there were no time limits between a plant configuration change authorized by engineering (DCRs, FCRs, and ECNs) and a formal drawing revision to show that change, unlimited physical plant changes could accumulate before the engineering drawings are revised to show those changes. Thus, engineering drawings depicting systems where physical plant changes had been made could either become difficult to read because of excessive markups, or might not reflect physical plant configurations accurately. Either situation could lead to difficulties in plant operation and in the implementation of future plant modifications. Also, the lack of accurate as-built drawings and feedback to engineering could affect the nature and adequacy of design changes issued by engineering, design margins, and unreviewed safety question determinations. TVA has committed to procedural changes at SQN, WBN, BFN, and BLN to impose time limits for drawing updates.

TVA has developed a series of nuclear performance plans (NPPs) to correct programmatic and management deficiencies that have contributed to the continued poor direction and control of TVA's nuclear activities. Volume 1 of

the NPP describes the measures that TVA has taken and currently intends to take to improve the corporate-level management of its nuclear activities and to correct the problems that have occurred in this area. Volumes 2, 3, and 4 address, respectively, Sequoyah, Browns Ferry, and Watts Bar. There is currently no plant-specific NPP for Bellefonte. TVA has committed to specific corrective actions, as delineated in Attachment B, to address the negative findings noted herein. In addition, the three plant-specific nuclear performance plans describe the actions TVA is taking to improve its nuclear program at those sites. These measures, when completely implemented, should resolve the identified problem areas and prevent recurrence.

Progress is being made in these areas. For example, at Sequoyah, the evaluation team has verified the completion of corrective action plans that:

- o Revised procedures to impose a time limit between a physical change made to a CSSC system and the updating of as-built drawings to reflect that change and
- o Evaluated ERCW material changes for effects on the stress analysis

The results of this subcategory evaluation are being combined with the other subcategory reports and reassessed for the Engineering category evaluation.

TABLE 1

CLASSIFICATION OF FINDINGS AND CORRECTIVE ACTIONS

Element	Issue/ Finding**	Finding/Corrective Action Class*			
		SQN	WBN	BFN	BLN
206.1 As-Built Inaccuracies	a	C2	C2	C2	C2
	b	C2	C2	C2	C2
	c	D2	D2	D2	D2
	d	D5	A	A	A
	e	A	E3	E3	E3
	f	E3	-	-	-

*Classification of Findings and Corrective Actions

- | | |
|--|------------------|
| A. Issue not valid.
No corrective action required. | 1. Hardware |
| B. Issue valid but consequences acceptable.
No corrective action required. | 2. Procedure |
| C. Issue valid. Corrective action
initiated before ECTG evaluation. | 3. Documentation |
| D. Issue valid. Corrective action
taken as a result of ECTG evaluation. | 4. Training |
| E. Peripheral issue uncovered during ECTG
evaluation. Corrective action required. | 5. Analysis |
| | 6. Evaluation |
| | 7. Other |

** Defined in Attachment B. Issues/Findings may be different from plant to plant.

TABLE 2
FINDINGS SUMMARY

<u>Classification of Findings</u>	<u>Plant</u>				<u>Total</u>
	<u>SQL</u>	<u>WBN</u>	<u>BFN</u>	<u>BLN</u>	
A. Issue not valid. No corrective action required.	1	1	1	1	4
B. Issue valid but consequences acceptable. No corrective action required.	0	0	0	0	0
C. Issue valid. Corrective action initiated before ECTG evaluation.	2	2	2	2	8
D. Issue valid. Corrective action taken as a result of ECTG evaluation.	2	1	1	1	5
E. Peripheral issue uncovered during ECTG evaluation. Corrective action required.	1	1	1	1	4
Totals	6	5	5	5	21

GLOSSARY SUPPLEMENT
FOR THE ENGINEERING CATEGORY

Causes of Negative Findings - the causes for findings that require corrective action are categorized as follows:

1. Fragmented organization - Lines of authority, responsibility, and accountability were not clearly defined.
2. Inadequate quality (Q) training - Personnel were not fully trained in the procedures established for design process control and in the maintenance of design documents, including audits.
3. Inadequate procedures - Design and modification control methods and procedures were deficient in establishing requirements and did not ensure an effective design control program in some areas.
4. Procedures not followed - Existing procedures controlling the design process were not fully adhered to.
5. Inadequate communications - Communication, coordination, and cooperation were not fully effective in supplying needed information within plants, between plants and organizations (e.g., Engineering, Construction, Licensing, and Operations), and between interorganizational disciplines and departments.
6. Untimely resolution of issues - Problems were not resolved in a timely manner, and their resolution was not aggressively pursued.
7. Lack of management attention - There was a lack of management attention in ensuring that programs required for an effective design process were established and implemented.
8. Inadequate design bases - Design bases were lacking, vague, or incomplete for design execution and verification and for design change evaluation.
9. Inadequate calculations - Design calculations were incomplete, used incorrect input or assumptions, or otherwise failed to fully demonstrate compliance with design requirements or support design output documents.
10. Inadequate as-built reconciliation - Reconciliation of design and licensing documents with plant as-built condition was lacking or incomplete.
11. Lack of design detail - Detail in design output documents was insufficient to ensure compliance with design requirements.

GLOSSARY SUPPLEMENT (Cont'd)

12. Failure to document engineering judgments - Documentation justifying engineering judgments used in the design process was lacking or incomplete.
13. Design criteria/commitments not met - Design criteria or licensing commitments were not met.
14. Insufficient verification documentation - Documentation (Q) was insufficient to audit the adequacy of design and installation.
15. Standards not followed - Code or industry standards and practices were not complied with.
16. Engineering error - There were errors or oversights in the assumptions, methodology, or judgments used in the design process.
17. Vendor error - Vendor design or supplied items were deficient for the intended purpose.

Classification of Corrective Actions - corrective actions are classified as belonging to one or more of the following groups:

1. Hardware - physical plant changes
2. Procedure - changed or generated a procedure
3. Documentation - affected QA records
4. Training - required personnel education
5. Analysis - required design calculations, etc., to resolve
6. Evaluation - initial corrective action plan indicated a need to evaluate the issue before a definitive plan could be established. Therefore, all hardware, procedure, etc., changes are not yet known
7. Other - items not listed above

Peripheral Finding (Issue) - A negative finding that does not result directly from an employee concern but that was uncovered during the process of evaluating an employee concern. By definition, peripheral findings (issues) require corrective action.

GLOSSARY SUPPLEMENT (Cont'd)

Significance of Corrective Actions - The evaluation team's judgment as to the significance of the corrective actions listed in Table 3 is indicated in the last three columns of the table. Significance is rated in accordance with the type or types of changes that may be expected to result from the corrective action. Changes are categorized as:

- o Documentation change (D) - This is a change to any design input or output document (e.g. drawing, specification, calculation, or procedure) that does not result in a significant reduction in design margin.
- o Change in design margin (M) - This is a change in design interpretation (minimum requirement vs actual capability) that results in a significant (outside normal limits of expected accuracy) change in the design margin. All designs include margins to allow for error and unforeseeable events. Changes in design margins are a normal and acceptable part of the design and construction process as long as the final design margins satisfy regulatory requirements and applicable codes and standards.
- o Change of hardware (H) - This is a physical change to an existing plant structure or component that results from a change in the design basis, or that is required to correct an initially inadequate design or design error.

If the change resulting from the corrective action is judged to be significant, either an "A" for actual or "P" for potential is entered into the appropriate column of Table 3. Actual is distinguished from potential because corrective actions are not complete and, consequently, the scope of required changes may not be known. Corrective actions are judged to be significant if the resultant changes affect the overall quality, performance, or margin of a safety-related structure, system, or component.

ATTACHMENT A

EMPLOYEE CONCERNS
FOR SUBCATEGORY 20600

Attachment A -- lists, by element, each employee concern evaluated in the subcategory. The concern number is given along with notation of any other subcategory with which the concern is shared and the plant sites to which it could be applicable. The concern is quoted as received by TVA and is characterized as safety related, not safety related, or safety significant.

ATTACHMENT A

EMPLOYEE CONCERNS FOR SUBCATEGORY 20600

REVISION NUMBER: 3
PAGE A-2 OF 3

ELEMENT	CONCERN NUMBER	PLANT LOCATION	APPLICABILITY				CONCERN DESCRIPTION*
			SQJ	WBN	BFN	BLN	
206.1	KX-85-070-001	SQJ	X	X	X	X	"Sequoyah: Units 1 & 2 numerous documents contain a high percent of errors and drawings do not reflect the installations in many instances. (Names/Dept./Details to the specific case are known to QTC and withheld to maintain confidentiality). CI has no further information. Nuclear Power Dept. concern." (SS)
	KX-85-077-002	SQJ	X	X	X	X	"Sequoyah - Unit 1 & 2: Numerous design drawings are inaccurate and do not reflect as built condition. Several FCR's were written but not reflected on the design drawings. CI has no further information. Construction Department concern." (SS)
	WI-85-100-045	WBN	X	X	X	X	"As-built drawings and documents are nonexistent or in poor condition in many cases. CI has no further information. Anonymous concern via letter." (SR)
	IN-85-152-001	WBN	X	X	X	X	"Interviewee expressed concern that certain drawings (perhaps as-built drawings) might not be up-to-date because they had not been 'checked'. Interviewee had mentioned this to another person (but not to his supervisor) and was told that drawings do not require 'checking' until they are approved ('signed off'). Many drawings are not 'approved' although the hardware is already installed." (SR)
	KX-85-062-003 (shared with 30700)	NPS	X	X	X	X	"Sequoyah, Browns Ferry: CI was unofficially informed that the drawings, in many instances, are not a true representation of the installation. Nuclear Power concern. CI has no further information." (SS)
	KX-85-070-003 (shared with 20400 and 30700)	SQJ	X	X	X	X	"Sequoyah: work plans contain inaccurate data. Majority of the DCR's taken care [of] but not documented right and drawings do not reflect the as-built conditions. Details withheld to maintain confidentiality. Nuc Power concern. C/I has no further information." (SS)
	I-85-128-NPS (shared with 24500, 20400, 24600, 80300, and 80500)	BFN	X	X	X	X	"An individual from BFN wrote NSRS expressing his concern that the control and quality of UE's design effort is inadequate. The CI sent several roughly written pages detailing and summarizing his evaluation and conclusion of three major areas: (1) Design Calculations (2) NCR's, and (3) Management Policies." (SS)

* SR/NU/SS indicates safety related, not safety related, or safety significant per determination criteria in the ECTG Program manual and applied by TVA before evaluations.

ATTACHMENT A

EMPLOYEE CONCERNS FOR SUBCATEGORY 20600

REVISION NUMBER: 3
PAGE A-3 OF 3

ELEMENT	CONCERN NUMBER	PLANT LOCATION	APPLICABILITY				CONCERN DESCRIPTION*
			SQM	MMN	OPN	BLN	
206.1 (Cont'd)	NI-85-094-N02	SQM	X				<p>"The as-built condition of the plant does not match the design drawings.</p> <p>"The ERCW is having its carbon steel piping changed to stainless steel, the work has been divided into many workplans which are being installed piecemeal at various outages. There is a good chance that Sequoyah has been operating the plant in an unanalyzed condition since it is doubtful that the stress analyst has analyzed all piping configurations that have been installed during operation." (SR)</p>

* SR/NO/SS indicates safety related, not safety related, or safety significant per determination criteria in the ECTG Program manual and applied by TWA before evaluations.

ATTACHMENT B

SUMMARY OF ISSUES, FINDINGS, AND
CORRECTIVE ACTIONS FOR
SUBCATEGORY 20600

Attachment B -- contains a summary of the element-level evaluations. Each issue is listed, by element number and plant, along with its corresponding findings and corrective actions. The reader may trace a concern from Attachment A to an issue in Attachment B by using the element number and applicable plant. The reader may relate a corrective action description in Attachment B to causes and significance in Table 3 by using the CATD number which appears in Attachment B in parentheses at the end of the corrective action description.

The term "Peripheral finding" in the issue column refers to a finding that occurred during the course of evaluating a concern but did not stem directly from a employee concern. These are classified as "E" in Tables 1 and 2 of this report.

ATTACHMENT B
SUMMARY OF ISSUES, FINDINGS, AND CORRECTIVE ACTIONS
FOR SUBCATEGORY 20600

REVISION NUMBER: 3
Page B-2 of 11

Issues	Findings	Corrective Actions*
***** Element 206.1 - As-Built Inaccuracies *****		
SQM	SQM	SQM
a. In many instances, the as-built documents and drawings are nonexistent, are in poor condition, contain many errors, and are not a true representation of installation.	a. TVA and Gilbert/Commonwealth Investigations and reports indicate deficiencies in as-built drawings and configuration control. The evaluation team found this evidence sufficiently conclusive to obviate the need for performing a separate confirming audit. The findings of the report expressed concern that there was no list of which drawings must be updated before startup to reflect the as-built configuration of the plant. Also expressed was the concern that procedures and governing documents do not impose a time limit between the time a physical change is made to a CSSC system and engineering drawings are issued to reflect that change.	a. The CAP identifies a TVA memorandum which transmits the list of Primary Control Room drawings which will be red-lined to show the as-constructed configuration of the plant until the formal revision of each affected drawing is issued to incorporate the red-lining. Red-lining will be done before restart of Unit 2 and maintained thereafter to reflect as-constructed configuration of the plant. The CAP also identifies the procedure which will be revised to contain that list. The CAP also states that before the implementation of the permanent Plant Modification Package (PMP) system, applicable Sequoyah project procedures and/or nuclear engineering procedures will be revised to impose an appropriate time limit (not to exceed 90 days) between the time a physical change is authorized by engineering is made to a CSSC plant system and the time the engineering drawing is formally revised to reflect that change. The evaluation team concurs with the corrective action plan. (CATD 206 01 SQM 01)
b. There is inadequate management of design change control procedures covering plant change documentation (FCRs, UCRs, etc.), and inconsistent control over plant change practices resulting in unapproved plant changes and improper documentation.	b. TVA investigations and reports also indicate some deficiencies in the management and control of plant change and plant change documentation (FCRs, ECNs, etc.).	b. The CAP states: "There is direct evidence as shown in the Sequoyah Nuclear Performance Plan (Volume II, Section II) of management attention to the concerns indicated by CATD. No. 206.1-SQM-2. The plan

* Most corrective actions identified herein have not yet been completed and/or verified as having been completed. Those that have been verified as having been completed are noted.

ATTACHMENT B
SUMMARY OF ISSUES, FINDINGS, AND CORRECTIVE ACTIONS
FOR SUBCATEGORY 20600

REVISION NUMBER: 3
Page B-3 of 11

Issues

Findings

Corrective Actions*

Element 206.1 - SQM (Continued)

The finding of the reports and the CATD expressed concern about insufficient management attention to engineering practices and to the Quality Assurance function of assuring that procedures for controlling plant changes and plant change documentation are adequate and that they are being followed. This inattention has resulted in extensive inaccuracies in as-built documentation.

Includes organizational changes, program changes, evaluation of modifications made since issuance of the operating license, and with UNQA monitoring these actions and the implementation of all programs.

The required changes and corrective actions needed for restart have been implemented or are being implemented. The changes and corrective actions needed for post-restart will be implemented at a later date."

The evaluation team is of the opinion that the actions stated in the SQM NPP, if followed, will provide the means to control plant changes and plant change documentation and should minimize the occurrence of as-built inaccuracies.
(CATD 206 01 SQM 02)

c. Changes are made to the plant configuration often by FCRs, and drawings are not changed in a timely manner.

c. The evaluation team found that none of the procedures or corrective actions (SQM NPP) reviewed define the time limit allowed between a physical change made to a Critical Structures, Systems and Components (CSSC) system and the updating of as-built drawings reflecting that change.

c. See corrective action for Finding "c."
(CATD 206 01 SQM 01)

The evaluation team found no definition or listing in the DBVP, Drawing Control Instructions, or plant restart documents of which Control Room Drawings, before plant restart, would be updated to reflect "as-constructed" status.

ATTACHMENT B
SUMMARY OF ISSUES, FINDINGS, AND CORRECTIVE ACTIONS
FOR SUBCATEGORY 20600

REVISION NUMBER: 3
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Issues

Findings

Corrective Actions*

Element 206.1 - SQM (Continued)

However, a List of Primary Control Room drawings does exist as noted in TVA Memo of 02/03/87 (Ref. 69) and as specified in TVA's response to NRC dated 12/12/86 (Ref. 70). The drawings listed are those required for safe operation, safe shutdown, and maintenance of safe shutdown conditions. The evaluation team has been advised by TVA personnel that at the time of restart of SQM Unit 2 these drawings will reflect the as-constructed configuration of the plant. These drawings shall be maintained during the life of the plant to reflect the as-constructed configuration of the plant.

Additionally, the evaluation team found no upper limit to the amount of red-lining permitted before a drawing must be redrafted as the next revision.

d. The ERCW piping is being changed from carbon steel to stainless steel in a piecemeal fashion, and all installed piping changes may not have been stress analyzed.

d. The findings of the report expressed concern that changing the Essential Raw Cooling Water (ERCW) piping from carbon steel to stainless steel was made in a piecemeal fashion, was never completed, and resulted in piping being put into operation without qualifying analysis having been completed. Additionally, the piping changes and the analysis documentation were not completed in accordance with TVA Quality Assurance requirements.

TVA has stated that there is no guarantee that every past configuration of ERCW piping had a design calculation on file demonstrating the qualification of the piping in such configuration before actually being placed in service.

The evaluation team found that the identification of ERCW stainless steel piping transmitted to the Rigorous Analysis Group was not made in accordance with standard quality assurance procedures and practices.

d. The CAP states that the ERCW analysis documentation reflecting the present as-built status will be resubmitted as Quality Information for reanalysis. Differences between the previous submittal and the new submittal will be evaluated for effects on the analysis based on the actual piping configuration as shown in ECM L5009. This will be done before plant restart.

The CAP also states the ERCW design drawings will be reissued to reflect the as-built condition. This will be a postrestart activity.

The CAP identifies the governing QA approved procedure (SQEP-13) that is being implemented to prevent problems of this nature during the transitional change period. It also identifies which procedures will be in effect at the time of implementation of the PMP program (NEP-6.4 and/or a revised version of SQEP-13) to control design and plant changes.

ATTACHMENT B
SUMMARY OF ISSUES, FINDINGS, AND CORRECTIVE ACTIONS
FOR SUBCATEGORY 20600

REVISION NUMBER: 3
Page B-5 of 11

Issues	Findings	Corrective Actions ^a
Element 206.1 - SQM (Continued)		
e. Certain drawings (perhaps as-built drawings) might not be up-to-date because they had not been checked.	e. The evaluation team reviewed an appropriate sample of drawings of various types and found no evidence of unchecked drawings and thus no as-built difficulties caused by unchecked drawings.	The evaluation team concurs with the above corrective action plan, and has verified its completion. (CATU 206 01 SQM U3)
f. Not defined - Peripheral issue not expressed in concern.	f. As an additional finding, it appears to the evaluation team that the Primary and Critical drawings listed in the Drawing Control Instructions do not meet the as-built drawing criteria of NUREG 0737 Supplement 1 or of NUREG 0696. This was based on the experience of the evaluation team and the listing of drawings in SQEP A1-25. The above two NUREG documents provide NRC guidance on meeting requirements for Emergency Response Capability. The evaluation of the SQM plant compliance with these regulatory documents is beyond the scope of this element report.	e. None required. f. The NRC has issued a confirmatory order to TVA regarding TVA's commitments on emergency response capability. TVA will track the responses to commitments to the NRC via the Corporate Commitment Tracking System (CCTS).

ATTACHMENT B
SUMMARY OF ISSUES, FINDINGS, AND CORRECTIVE ACTIONS
FOR SUBCATEGORY 20600

REVISION NUMBER: 3
Page 8-6 of 11

Issues	Findings	Corrective Actions*
Element 206.1 - MBN	MBN	MBN
<p>a. In many instances, the as-constructed documents and drawings are nonexistent, are in poor condition, contain many errors, and are not a true representation of installation.</p>	<p>a. TVA and other investigations indicate deficiencies in as-built drawings and configuration control. The evaluation team found this evidence sufficiently conclusive to obviate the need for performing a separate confirming audit.</p> <p>SCR 62975 was written to address an apparent adverse trend related to as-constructed drawing discrepancies based on a series of construction nonconformance reports (NCRs). An evaluation of these NCRs and the associated work control procedures has been performed to determine whether the apparent adverse trend is valid, and to determine any action needed to correct or strengthen the MBN as-constructed drawing program. The preliminary evaluation results confirmed a previously identified problem with tagging of equipment, identified several areas in which procedural improvements are needed, and provided recommendations for these improvements. The evaluation did not identify a significant breakdown in the MBN as-constructed drawing program. The results of the evaluation, including specific action assignments and schedules, were scheduled to be completed by June 1987.</p>	<p>a. TVA's corrective action plan addresses Findings "a," "b," and "c."</p> <p>The disposition of SCR 62975 will be updated to reflect the results of evaluations.</p> <p>The MBN configuration and change control programs will be updated before Unit 1 fuel loading as a part of the MBN Design Baseline and Verification Program (DBVP). Planned improvements include baselining Unit 1 functional/operational drawings, and development and implementation of project procedures for an improved change control process, the plant modification package (PMP) process.</p> <p>The MBN site process and procedures for the development and maintenance of baselined control room drawings as defined by the Nuclear Performance Plan is being developed as part of the Design Baseline and Verification Program (DBVP [formerly ECAP]). This program will include the identification, baselining, and issuance of drawings required by the Unit 1 control room operators before fuel loading.</p> <p>The PMP process will be based on the single baselined drawing system rather than the current TVA as-designed and as-constructed drawing system. The PMP process will specify time frames for updating affected drawings at the completion of each modification, as authorized by engineering, to reflect the as-built configuration.</p>

ATTACHMENT B
SUMMARY OF ISSUES, FINDINGS, AND CORRECTIVE ACTIONS
FOR SUBCATEGORY 20600

REVISION NUMBER: J
Page B-7 of 11

Issues	Findings	Corrective Actions*
Element 206.1 - WBN	WBN	
b. There is inadequate management of design change control procedures covering plant change documentation (FCRs, DCRs, etc.), and inconsistent control over plant change practices resulting in unapproved plant changes and improper documentation.	b. TVA investigations and reports also indicate some deficiencies in the management and control of plant change and plant change documentation (FCRs, ECNs, etc.). This has been acknowledged by TVA in the Corporate Nuclear Performance Plan.	The schedule for completion of the corrective action is as noted above for SCR 62975, before fuel load for Unit 1 and before fuel load for Unit 2.
c. Changes are made to the plant configuration often by FCRs, and drawings are not changed in a timely manner.	c. The evaluation team did not find that any of the procedures or corrective actions reviewed define the time limit allowed between a physical change made to a critical structures, systems, and components (CSSC) system and the updating of as-built drawings reflecting that change.	The evaluation team reviewed and concurs with the TVA corrective action plan described above. (CATU 206 01 WBN 01, 02, 03)
d. Certain drawings (perhaps as-built drawings) might not be up to date because they had not been checked.	The evaluation team found no definition or listing in the Design Baseline and Verification Program (DBVP) manual of which control room drawings would be updated to reflect "as-built" status before fuel load. This list is necessary so that the persons updating the drawings will know when the effort is complete.	b. See corrective action for Finding "a." (CATU 206 01 WBN 02)
	The evaluation team found no upper limit to the amount of red-lining permitted before a drawing must be redrafted as the next revision.	c. See corrective action for Finding "a," which addresses CATUs 206 01 WBN 01, 02, and 03. (CATU 206 01 WBN 03)
	d. The evaluation team reviewed an appropriate sample of drawings of various types and found no evidence of unchecked drawings, and thus no as-built difficulties caused by unchecked drawings.	d. None required.

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SUMMARY OF ISSUES, FINDINGS, AND CORRECTIVE ACTIONS
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Issues

Findings

Corrective Actions*

Element 206.1 - WBN (Continued)

- e. Undefined - Peripheral issue not expressed in concern.

- e. As an additional finding, it appears to the evaluation team, based on its experience, that the Primary and Critical drawings listed in the Drawing Control Instructions do not meet the as-built drawing criteria of NUREG-0737, Supplement 1 or of NUREG-0696, which require drawings, schematics, and diagrams showing conditions of plant structures and systems down to the component level and in-plant locations of these systems.

The above two NUREG documents provide NRC guidance on meeting requirements for emergency response capability (ERC). The evaluation of WBN compliance with these regulatory documents is beyond the scope of this element report.

- e. There is ongoing correspondence between TVA and the NRC regarding TVA's commitments on emergency response capability. TVA will track the responses to commitments to the NRC via the CCTS.

BFN

- a. In many instances, the as-built documents and drawings are nonexistent, are in poor condition, contain many errors, and are not a true representation of installation.

BFN

- a. TVA and other investigations indicate deficiencies in as-built drawings and configuration control. The evaluation team found this evidence sufficiently conclusive to obviate the need for performing a separate confirming audit.

The evaluation team found no definition or listing in the DBVP, Drawing Control Instructions, or plant restart documents of which control room drawings would be updated to reflect "as-built" status before plant restart. This list is necessary so that those persons updating the drawings will know when the effort is complete.

The DBVP (Ref. 34) Attachment A lists the systems, or portions of systems, required to mitigate FSAR Chapter 14 design basis accidents, safely shut down the plant, and maintain safe shutdown conditions. BF 2.5 (Ref. 17) Attachment A lists 59 critical drawing categories to be used in a radiological emergency to analyze problems and make recommendations for the mitigation of the consequences of an accident. In the evaluation team's experience, it was not apparent that the drawings listed were sufficient in number to depict the system scope defined in the BFN DBVP. The DBVP, as part of the pre-restart phase, commits to walkdown of the listed systems and revision of the control room drawings depicting these systems. There does not appear to be a list of the specific drawings that corresponds to the systems in Attachment A of the DBVP included in the scope of the pre-restart phase.

BFN

- a. Attachment A of the Design Baseline and Verification Program Plan (R1) and Table III-3a of the Nuclear Performance Plan list the systems or portions of systems that are being reviewed to re-establish the design basis and evaluate plant configuration. A complete list of drawings can be found in the Drawing Management System. The issuance of these "Key Plant Drawings" is part of the output products from the Baseline program.

The evaluation team reviewed and concurs with the TVA corrective action plan described above.
(CATD 206 01 BFN 01)

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Issues	Findings	Corrective Actions*
Element 206.1 - BFN (Continued)		
b. There is inadequate management of design change control procedures covering plant change documentation (FCRs, DCRs, etc.), and inconsistent control over plant change practices resulting in unapproved plant changes and improper documentation.	b. TVA investigations and reports also indicate some deficiencies in the area of the management and control of plant change and plant change documentation (FCRs, ECNs, etc.). The evaluation team found no upper limit to the amount of red-lining permitted before a drawing must be redrafted as the next revision.	b. The scope of work for the Design Baseline Program is to verify functional adequacy of the plant configuration, ensure that the configuration of certain systems is supported by engineering analysis and documentation, and provide confidence that plant configuration complies with licensing commitments. Procedure P187-41 (Handling Modifications Using Design Change Notices) is being drafted to keep the drawings current after baseline is complete; this procedure states that the CCD shall be completed within 60 days from the time DNE receives the completed workplans for the modification. The evaluation team reviewed and concurs with the TVA corrective action described above. (CATD 206 01 BFN 02)
c. Changes are made to the plant configuration often by FCRs, and drawings are not changed in a timely manner.	c. The evaluation team did not find that any of the procedures or corrective actions (BFNPP) define the time limit allowed between a physical change made to a critical structures, systems and components (CSSC) system and the updating of as-built drawings reflecting that change.	c. Procedure BFEP PI 86-03 (Prep. and Control of ECN Modification Package; and Draft Procedure BFEP PI 87-41 (Handling Modifications using Design Change Notices) will state the time frame required to update drawings as a result of plant changes, as authorized by engineering. The 59 drawing categories listed in BF-2.5 represent the critical drawings for use in a radiological emergency which may or may not be a part of the baseline effort. A list of configuration control drawings which will be updated prior to restart can be obtained from the Drawing Management (DMS) for systems listed on Attachment A of the Design Baseline Verification Program Plan. Note: Some drawings may only have a small portion of the design baseline on them. The evaluation team review and concurs with the TVA corrective action plan described above. (CATD 206 01 BFN 03)

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Issues	Findings	Corrective Actions*
Element 206.1 - BFN (Continued)		
d. Certain drawings (perhaps as-built drawings) might not be up-to-date because they had not been checked.	d. The evaluation team reviewed an appropriate sample of drawings of various types and found no evidence of unchecked drawings, and thus no as-built difficulties caused by unchecked drawings.	d. None required.
e. Not defined - Peripheral issue not expressed in concern.	e. As an additional finding not related to the issues, a review of the drawings in the Technical Support Center indicated to the evaluation team, on the basis of its experience, that these drawings should be replaced with the new configuration control drawings as they become available. NUREG-0696 and NURG-0737, Supplement 1 provide NRC guidance on meeting requirements for emergency response capability (ERC). The evaluation of BFN compliance with these regulatory documents is beyond the scope of this element report.	e. The NRC issued orders confirming TVA's commitments on emergency response capability. TVA will track the responses to commitments to the NRC via CCTS.
BLN		
a. In many instances, the as-built documents and drawings are nonexistent, are in poor condition, contain many errors, and are not a true representation of installation.	a. TVA and other investigations indicate deficiencies in as-built drawings and configuration control. The evaluation team found this evidence sufficiently conclusive to obviate the need for performing a separate confirming audit. The evaluation team found no definition or listing in the Drawing Control Instructions of which control room drawings would be updated to reflect "as-built" status before fuel load. This list is necessary so that those persons updating the drawings will know when the effort is complete.	a. The commitments in Item VI.C.1 of Appendix 8 of the Corporate Nuclear Performance Plan (CNPP) require the existing nuclear procedures at each plant site to be revised to correct documented deficiencies, reflect the new organization, and reflect installed plant modifications. These commitments will be tracked by Corporate Commitment Tracking System (CCTS) item number NCO-86-0156-074. The successful completion of this action should correct the identified problems.

ATTACHMENT B
SUMMARY OF ISSUES, FINDINGS, AND CORRECTIVE ACTIONS
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Issues	Findings	Corrective Actions*
Element 206.1 - BLN (Continued)		
d. There is inadequate management of design change control procedures covering plant change documentation (FCRs, DCRs, etc.), and inconsistent control over plant change practices resulting in unapproved plant changes and improper documentation.	b. TVA investigations and reports also indicate some deficiencies in the area of the management and control of plan. change and plant change documentation (FCRs, ECNs, etc.). The evaluation team found no upper limit to the amount of mark-ups permitted before a drawing must be redrafted as the next revision.	b. See corrective action for Finding "a."
c. Changes are made to the plant configuration often by FCRs, and drawings are not changed in a timely manner.	c. The evaluation team did not find that any of the procedures or corrective actions define the time limit allowed between a physical change made to a critical structures, systems and components (CSSC) system and the updating of as-built drawings reflecting that change.	c. BLEP will establish a timeframe for updating configuration control drawings to reflect the as-built condition. This requirement will be included in the project procedure for configuration control (tentatively called BEI 7.1-1). The procedure will be revised to incorporate this requirement prior to fuel load, unit 1. (CATD 206 01 BLN 01)
d. Certain drawings (perhaps as-built drawings) might not be up-to-date because they had not been checked.	d. The evaluation team reviewed an appropriate sample of drawings of various types and found no evidence of unchecked drawings, and, thus, no as-built difficulties caused by unchecked drawings.	d. None required.
e. Undefined - Peripheral issue not expressed in concern.	e. As an additional finding not related to the issues, the evaluation team found no list of which drawings will be maintained as configuration control drawings in the control room and technical support center. NUREG-0737, Supplement 1 and NUREG-0696 provide NRC guidance on meeting requirements for emergency response capability. They require drawings, schematics, and diagrams showing conditions of plant structures and systems down to the component level and in-plant locations of these systems. This was based on the experience of the evaluation team. The evaluation of BLN compliance with these regulatory documents is beyond the scope of this element report.	e. The NRC has not yet responded to TVA's commitments on emergency response capability. TVA will track the responses to commitments to the NRC via CCTS.

ATTACHMENT C

REFERENCES

1. Title 10 of the Code of Federal Regulations, Part 50 (10 CFR 50), Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," (as amended 01/75) Section VI, "Document Control"
2. 10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants," Design Criterion 5, "Records Requirements"
3. NRC OIE NUREG-0696, "Functional Criteria for Emergency Response Facilities," Final Report, (02/81)
4. NRC OIE NUREG-0737, Supplement 1, "Clarification of TMI Action Plan Requirements," (01/83)
5. NRC OIE, IE Information Notice No. 85-66, "Discrepancies between As-Built Construction Drawings and Equipment Installations," (08/07/85)
6. ANSI N45-2.11-1974, "Quality Assurance Requirements for the Design of Nuclear Power Plants," Section 7, "Document Control," and Section 8, "Design Change Control"
7. Safety Analysis Reports (SARs):
 - Sequoyah Final Analysis Report (FSAR) updated through Amendment 3 (04/86)
 - Watts Bar Final Safety Analysis Report (FSAR) updated through Amendment 55 (04/15/85)
 - Browns Ferry Final Safety Analysis Report (FSAR) Amendment 31, and Updated FSAR (UFSAR), through Amendment 4, (08/86)
 - Bellefonte Final Safety Analysis Report (FSAR) updated through Amendment 27 (06/20/86)
8. TVA Topical Report, TVA-TR75-1A, "Quality Assurance Program Description for the Design, Construction, and Operation of the TVA Nuclear Power Plant", Rev. 9 (04/17/86)
9. TVA NQAM Part V, Section 6.1 (ID-QAP-6.1), "Configuration Drawing Control," Rev. 0, (12/31/84)
10. TVA NQAM, Part II, Section 3.2, "Plant Modifications: After Licensing," Rev. 10, (10/28/85)

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11. TVA NQAM, Part V, Section 2.4 (ID-QAP-2.4) "Control of Modifications," Rev. 1, (07/10/85)
 12. Letter from Darrell G. Eisenhut, NRC, To All Licensees of Operating Reactors ... "Supplement 1 To NUREG-0737-Requirements for Emergency Response Capability (Generic Letter No. 82-33)" and its attachment "Supplement 1 to NUREG-0737" (12/17/82)
 13. TVA Division of Engineering Design (EN DES) Engineering Procedures Manual:
 - EP 4.16, Rev. 5 "Configuration Control by Use of Drawings and Drawing Lists," (11/10/82) and Drawing List (11/10/82) - —
 - EP 4.01, Rev. 10 "Signatures/Initials for Preparation, Review, and Approval of EN DES Drawings," (04/25/85)
 - EP 4.21, Rev. 3 "Revising and Voiding EN DES Engineering Drawings," (10/18/83)
 14. TVA Division of Nuclear Engineering (DNE) Procedures Manual:
 - NEP-1.3, Rev. 0 "Records Control," (07/01/86)
 - NEP-5.1, Rev. 0 "Design Output," (07/01/86)
 - NEP-6.1, Rev. 0 "Change Control," (07/01/86)
 - NEP-9.1, Rev. 1 "Corrective Action," (02/20/87)
 15. SQN Site Procedures:
 - SQEP-08, "Packaging and Controlling of Walkdown/Test Documentation," Rev. 3, (06/27/86)
 - SQEP-11, "Procedure for Identifying and Assembling Change Documentation," Rev. 2, (06/16/86)
 - SQEP-12, "Procedure for Evaluating Engineering Change Notice and Field Change Notice Documents," Rev. 2, (07/14/86)
 - SQEP-13, "Procedure for Transitional Design Change Control," Rev. 0, (07/24/86)
 - SQEP-15, "Procedure DNE Interface with Change Control Board (CCB)," Rev. 0, (07/31/86)

SQEP-16, "Procedures for Systems Evaluation and Development of Systems Evaluation Report," Rev. 0, (06/21/86)

SQEP-17, "Procedure for Origination and Categorization of Configuration Control Drawings (CCDS)," Rev. 0, (06/01/86)

SQEP-18, "Procedure for Identifying Commitments and Requirements as Source Information for Sequoyah Design Criteria Development," Rev. 1, (07/08/86)

SQEP-19, "Comparison of Control Room As-Constructed Drawings to As-Designed Drawings," Rev. 0, (05/23/86)

SQEP-29, "Procedure for Preparing the Design Basis Document for Sequoyah Nuclear Plant," Rev. 1, (07/18/86)

SQEP-30, "Control of As-Constructed Drawings," Rev. 0, (08/29/86)

SQN-AI-19 (Part III), "Plant Modifications: Modification Requests," Rev. 13, (06/03/86)

SQN-AI-19 (Part IV), "Plant Modification After Licensing," Rev. 18, (07/07/87)

SQN-AI-25 (Part I), "Drawing Control After Unit Licensing," R14, (05/08/86)

SQN-AI-25 (Part II), "Revision of As-Constructed Drawings," Rev. 0, (10/25/86)

16. WBN Site Procedures:

Watts Bar Engineering Project, Project Manual, Rev. 1, (01/09/86)

Watts Bar Engineering Project (WBEP), Engineering Procedure (EP)

WBEP-EP 43.02, "Engineering Change Notices," Rev. 0, (09/27/85)

WBEP-EP 43.03, "Field Change Requests," Rev. 0, (09/27/85)

WBEP-EP 43.05, "N-5 Data Report Forms," Rev. 0, (09/27/85)

17. BFN Site Procedures:

Browns Ferry Engineering Project (BFEP) - Project Manual, Rev. 4:

BFEP-PI-86-03, R1, "Preparation and Control of Engineering Change Notice (ECN) Modification Package, [B22 870318 301], (03/18/87)

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- BFEP-PI-86-20, Rev. 0 "Identification and Assembling of Change Documentation (Design Baseline Program)," [B22 861022 303], (10/16/86)
 - BFEP-PI-86-38, Rev. 0 "Control of Equipment Information System (EQIS) Engineering Data Fields (Design Baseline Program), [B22 861201 301], (11/18/86)
 - BFEP-PI 86-46, Rev. 0 "Design Baseline and Verification Program Walkdown Interface Procedure," [B22 870123 303], (11/26/86)
 - BFEP-PI 86-47, Rev. 0 "Packaging and Handling of System Walkdown Documentation," [B22 870220 301], (02/13/87)
 - BFEP-PI 87-24, Rev. 0 "Procedure for Sorting Engineering Change Notice, Temporary Alteration Control Forms, and Local Design Change Requests," [B22 870211 301], (02/06/87)

Browns Ferry (BF) Site Director Standard Practice (SDSP)

BF 2.5, Rev. 0 "Drawing Control," (03/19/86)

BF-SDSP 8.1, Rev. 2 "Plant Modifications/Design Change Approval," (01/06/87)

BF-SDSP 8.2, Rev. 4 "Implementation of Plant Modifications," (01/07/87)

BF 8.3, Rev. 4 "Plant Modifications," (07/02/86)

BF-SDSP 9.1, Rev. 2 "Processing Drawing Discrepancies," (09/22/86)

BF-SDSP 9.2, Rev. 1 "Configuration Control Drawings," (05/09/86)

BF-SDSP 9.6, Rev. 3 "Mechanical and Instrument and Controls System Walkdown," (01/23/87)

18. BLN Site Procedures:

Bellefonte Nuclear Plant Standard Practice:

BLA 5.9, Rev. 19, "Drawing Control Before Receipt of an Operating License," (03/06/87)

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- BLA 7.1, Rev. 3, "OE-NUC PR-OC Interfaces and Responsibilities During and Following Transition from Design and Construction to Operation," (06/11/85)
- BLA 7.2, Rev. 4, "Transfer to Responsibility for the Plant from OE and OC to NUC PR," (03/27/86)
- BLA 12.1, Rev. 6, "Initiation of Requests for Modifications," (05/18/87)
- BLA 12.2, Rev. 19, "Performance of Modifications Before Licensing," (11/19/85)
- BLA 16.5, Rev. 1, "Methods to Report Drawing/Equipment Discrepancies," (05/22/86)
19. TVA Nuclear Performance Plans (NPP):
- Corporate NPP, Volume 1, Rev. 4 (03/87)
 - Sequoyah NPP, Volume 2, Rev. 2 (03/87)
 - Browns Ferry NPP, Volume 3, Rev. 0 (08/86)
 - Watts Bar NPP, Volume 4, Draft (03/87)
20. Letter from D. Vassallo, NRC, to H. Parris, TVA, " Issuance of Orders Confirming Licensee Commitments on Emergency Response Capability," [A02 840620 003], (06/12/84)
21. NRC Policy Issue from Victor Stello to NRC Commissioners, "TVA Preliminary Lessons Learned," [B45 870108 826], (11/12/86)
22. Letter from B. J. Youngblood, NRC, to S. A. White, TVA, "Concerns Regarding TVA Nuclear Program," [A02 860224 020], (02/18/86)
23. Letter from B. J. Youngblood, NRC, to S. A. White, TVA, with the attached transcript of the investigative interview conducted by the NRC on 02/21/86 at the First Tennessee Bank Building in Knoxville, TN, [B45 860714 832], (06/23/86)
24. Letter from B. J. Youngblood, NRC, to S. A. White, TVA, with the attached transcript of the investigative interview conducted by the NRC on 02/21/86 at the First Tennessee Bank Building in Knoxville, TN, [B45 860714 832], (06/23/86)
25. Letter from L. Mills, TVA, to H. Denton, NRC, "In the Matter of Tennessee Valley Authority," [A27 810602 018], (06/02/81)

26. Letter from L. M. Mills, NRC, to E. Adensam (TVA), "Issuance of Orders Confirming Licensee Commitments on Emergency Response Capability," [A02 840620 001] (06/15/84)
27. Letter from L. M. Mills, TVA, to Harold R. Denton, NRC, Re: "...information pertaining to Radiological Emergency Preparedness for Sequoyah Nuclear Plants Units 1 and 2," [A27 810416 019], (04/16/81)
28. Letter from L. M. Mills, TVA, to E. Adensam, NRC, "In the Matter of the Applicability of Tennessee Valley Authority," [A27 830415 015], (04/15/83)
29. Letter from L. Mills, TVA, to H. Denton, NRC, "In the Matter of Tennessee Valley Authority," [A27 810602 018], (06/02/81)
30. Letter from L. M. Mills, TVA, to E. Adensam, NRC, "In the Matter of the Application of Tennessee Valley Authority," [A27 830415 013], (04/15/83)
31. INPO Good Practices document, DE-101 "Configuration Management," Preliminary, (03/86)
32. Significant Condition Report (SCR) 6297-S, R0, (02/06/86)
33. TVA Division of Nuclear Engineering, "Design Change Process Improvement Program," [B01 860801 001], (08/01/86)
34. TVA memo, W. C. Drotleff to Those Listed, "Design Basis Program for TVA Nuclear Plants," [B44 860402 007], (04/08/86)
35. TVA memo from J. P. Stapleton to Those Listed, "Browns Ferry Nuclear Plant - Baseline Program Plan, Revision 0, July 7, 1986," [B22 860714 017] (07/14/86)
36. TVA memorandum from S. A. White to Those Listed, "Policy Establishing the Nuclear Procedures System," [L02 860709 859], (07/10/86)
37. TVA memo from J. A. Coffey to Those Listed, "Modification Control," [L68 830628 800], (06/30/83)
38. TVA memo from J. R. Parrish to Those Listed (W. C. Adkins et al.), "Browns Ferry Nuclear Plant - Quality Assurance Program," (located in OEDC-QPM-3-73, R1), [no RIMS number], (06/20/72)
39. Sequoyah Nuclear Plant, "Design Baseline and Verification Program," Rev. 0, [B25 860506 020], (05/06/86)
40. Design Baseline and Verification Program (DBVP), Watts Bar Nuclear Plant

41. Letter from R. Gridley, TVA, to J. Nelson Grace, NRC, "Sequoyah Nuclear Plant Unit 2 - Restart Program for Drawing Update," [L44 861212 806], (12/12/86).
42. TVA memorandum from G. W. Curtis to Watts Bar Design Baseline and Licensing Verification Program (DB & LVP) Management Staff, Watts Bar Nuclear Plant, [B26 861023 024], (10/23/86)
43. TVA memo from J. A. Kirkebo to Those Listed, "DNE Interim Order - Supplement to NEP-6.1," [B35 861015 500], (10/15/86)
44. TVA memorandum from J. W. Coan to G. F. Dilworth, "Watts Bar Engineering Project - Office of Engineering Procedures (OEPs) - Request for Variance [B26 850910 149], (09/10/85)
45. TVA Corporate Commitment Tracking System (CCTS)
46. Letter from R. Gridley, TVA, to J. Nelson Grace, NRC, Re: "Sequoyah Nuclear Plant Unit 2 - Restart Program for Drawing Update," [L44 861212 806], (12/12/86)
47. INPO Evaluation of Browns Ferry Nuclear Plant during weeks of January 20 and 27, 1986
48. TVA NSRS Investigation Report I-85-473-NPS "Configuration Control at SQN, BFN and OE," (10/02-11/04/85)
49. Office of Nuclear Power (ONP), "Configuration Control Task Force (CCTF) Final Report," [R25 860626 833], (06/30/86)
50. TVA Report, "Assessment of Engineering Design Control for the Browns Ferry Nuclear Plant," M. Bender et al., (09/85) (TTB 142)
51. NSRS Investigation Report I-85-637-SQN, "Work Plan Processing," (10-12/86)
52. TVA memo from E. G. Beasley to W. R. Beasley, "Quality Management Staff (QMS) Surveillance S85-06, Assessment of the Browns Ferry Nuclear Plant As-Constructed Drawing Procedural Outline," [B05 851022 002], (10/22/85)
53. TVA memo from L. L. Jackson to Those Listed, "Institute of Nuclear Power Operations (INPO) Corporate Evaluation Responses," [A02 870813 012], (08/14/86)
54. TVA memo from R. W. Cantrell to Those Listed, "Browns Ferry Nuclear Plant - Independent Survey Team - Design Control," [B05 850909 007], (09/09/85)
55. Gilbert/Commonwealth, Inc. Report No. 2600, "Assessment of the Design Control Program for the Sequoyah Nuclear Plant," (10/85)

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41. Letter from R. Gridley, TVA, to J. Nelson Grace, NRC, "Sequoyah Nuclear Plant Unit 2 - Restart Program for Drawing Update," [L44 861212 806], (12/12/86).
42. TVA memorandum from G. W. Curtis to Watts Bar Design Baseline and Licensing Verification Program (DB & LVP) Management Staff, Watts Bar Nuclear Plant, [B26 861023 024], (10/23/86)
43. TVA memo from J. A. Kirkebo to Those Listed, "DNE Interim Order - Supplement to NEP-6.1," [B35 861015 500], (10/15/86)
44. TVA memorandum from J. W. Coan to G. F. Dilworth, "Watts Bar Engineering Project - Office of Engineering Procedures (OEPs) - Request for Variance [B26 850910 149], (09/10/85)
45. TVA Corporate Commitment Tracking System (CCTS)
46. Letter from R. Gridley, TVA, to J. Nelson Grace, NRC, Re: "Sequoyah Nuclear Plant Unit 2 - Restart Program for Drawing Update," [L44 861212 806], (12/12/86)
47. INPO Evaluation of Browns Ferry Nuclear Plant during weeks of January 20 and 27, 1986
48. TVA NSRS Investigation Report I-85-473-NPS "Configuration Control at SQN, BFN and OE," (10/02-11/04/85)
49. Office of Nuclear Power (ONP), "Configuration Control Task Force (CCTF) Final Report," [R25 860626 833], (06/30/86)
50. TVA Report, "Assessment of Engineering Design Control for the Browns Ferry Nuclear Plant," M. Bender et al., (09/85) (TTB 142)
51. NSRS Investigation Report I-85-637-SQN, "Work Plan Processing," (10-12/86)
52. TVA memo from E. G. Beasley to W. R. Beasley, "Quality Management Staff (QMS) Surveillance S85-06, Assessment of the Browns Ferry Nuclear Plant As-Constructed Drawing Procedural Outline," [B05 851022 002], (10/22/85)
53. TVA memo from L. L. Jackson to Those Listed, "Institute of Nuclear Power Operations (INPO) Corporate Evaluation Responses," [A02 870813 012], (08/14/86)
54. TVA memo from R. W. Cantrell to Those Listed, "Browns Ferry Nuclear Plant - Independent Survey Team - Design Control," [B05 850909 007], (09/09/85)
55. Gilbert/Commonwealth, Inc. Report No. 2600, "Assessment of the Design Control Program for the Sequoyah Nuclear Plant," (10/85)