ENCLOSURE 1

Browns Ferry Nuclear Plant (BFN)
System Preoperability Checklist and System Plant Acceptance
Evaluation Program

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TENNESSEE VALLEY AUTHORITY

NUCLEAR QUALITY ASSURANCE

JOINT AUDIT REPORT NO. BFK88901

SYSTEM PREOPERABILITY CHECKLIST AND
SYSTEM PLANT ACCEPTANCE EVALUATION PROGRAMS

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1.0 INTRODUCTION

This report provides the results of the joint Nuclear Quality Assurance (NQA) and Engineering Assurance (EA) audit of the System Plant Acceptance Evaluation (SPAE) and System Preoperability Checklist (SPOC) processes being implemented at the Browns Ferry Nuclear Plant (BFN).

1.1 Background

The SPOC process is conducted in accordance with Site Director Standard Practice (SDSP) 12.7. The process is designed to identify all open work items necessary to be completed in order to declare a system operable for a given plant milestone. The Browns Ferry Engineering Project (BFEP) developed PI 88-07, the SPAE program, to define the engineering portions of the SPOC process. The SPAE process includes an evaluation of the system and all open engineering work including major ongoing corrective action programs to determine status and completion requirements of all outstanding work or potential work. The work is then identified as being required for a specific milestone such as fuel load, restart, or postrestart.

Prior to this audit in the early stages of the SPAE process, EA reviewed the first system to come out of the process and one other that was among the first few. These were the fuel oil and reactor building closed cooling water systems. The results of this EA review indicated the need for more project work, audit follow-up, and review of additional systems. The results of the initial review of the SPAE program are also included in this report for completeness.

An independent review of the SPOC process was performed to develop confidence that the process, including the engineering SPAE process, demonstrates that plant systems will meet technical specification operability. Two basic review areas constitute the joint EA and NQA audit:

- EA review of the SPAE process, including system boundary definitions, configuration control, outstanding work on systems, and the assumptions and conclusions in the system safety evaluations which support "technical specification" operability as defined by the BFN technical specifications.
- NQA review of the SPOC process, including adequacy of documentation for deferred items consistent with the technical specification and FSAR Appendix G, fuel load requirements, completed items, system status, and the supporting documentation.

At commencement of the audit (early October), meetings were held with BFEP including key contractors, plant manager and his staff, and NRC residents to discuss the purpose, scope, and approach of the audit. During the course of the audit, daily meetings were held to present concerns as they arose and to initiate resolution to the concerns. A postaudit conference with plant and BFEP management was held on November 1, 1988, to discuss the results of the joint EA and NQA audit of the SPAE and SPOC processes.

2.0 PURPOSE AND SCOPE

2.1 Purpose

The purpose of the audit was to determine if the SPOC and SPAE processes are effective in identifying outstanding work that is necessary to be complete prior to declaring a system "technical specification" operable for fuel load or restart.

2.1.1 Consistent with the objectives of the audit, EA reviewed the SPAE process and key inputs to determine if:

- The upgraded primary drawings provided an accurate reflection of the functional configuration based on as-constructed information and walkdown data. Further, that these drawings are acceptable for use in the SPAE process and in the control room by operations.
- Open change documents applicable to the selected systems have been identified, properly evaluated, and dispositioned. Where appropriate, unimplemented design item evaluations (UDIEs) or safety evaluations per 10CFR50.59 were prepared, reviewed, and/or revised.
- Appropriate boundaries were determined; outstanding work items (Design Baseline and Verification Program [DBVP] punchlist items, unit 2 cycle 5 ECNs, CAQs, etc.) were evaluated and assigned to the appropriate milestone; complete and appropriate system safety evaluations had been performed; and appropriate document updates had been initiated or were completed as required (e.g., design criteria, FSAR, and technical specifications).
- The conclusions in the SPAE regarding technical issues were properly documented and supported.
- The methods used in technical specification surveillance testing provide the required assurance of system operability.
- Appropriate corrective action were taken to resolve conditions identified by EA during an earlier review of the SPAE process.

2.1.2 The NQA review of the SPOC process included the following:

- An evaluation of compliance with the SPOC process as defined by SDSP 12.7
- An evaluation of the adequacy of SDSP 12.7 in providing a systematic method to ensure that all open work items and outstanding programmatic items affecting system operability are completed or resolved prior to recommending that a system be declared operable.
- A review of the implementation of the SPOC process for the selected systems with regard to: testing and test exceptions; temporary alteration identification, tracking, and processing; maintenance scheduling and completion; identification, tracking and resolution of commitments, CAQRs, issues, etc. that affect operability; updating plant documents (e.g., operating instructions and Surveillance Instructions) as required to be consistent with the primary and critical drawings; and system configuration control.
- An evaluation of the adequacy of the operability item deferral process with respect to compliance with established guidelines, completeness, and documentation.
- An evaluation of the QA Monitoring program for SPOC process implementation including the results from QA monitoring of system walkdown, valve line up and SI performance.
- A review of the training of appropriate plant personnel to new or revised operating instructions and surveillance instructions.

2.2 Scope

2.2.1 The following systems formed the basis of the review of the SPAE process:

125 VDC Electrical	System 57-1
Reactor Water Cleanup	System 69
Core Spray	System 75

In addition to the above systems, EA had previously reviewed two systems during the EA oversight of the DBVP. This audit included a review of the action taken to resolve concerns identified in the previous reviews. Also, the effectiveness of those actions were assessed during the reviews of the above systems as part of this audit. The two systems previously reviewed were:

Fuel Oil	System 18
Reactor Building Closed Cooling Water	System 70

Systems 18 and 70 were selected because they were the first systems through the SPAE process and the previous review evaluated these packages as they were prepared and issued. System 57-1 was selected because it was a support system associated with the diesel generators and was predominantly electrical.

System 69 was selected as it is a representative balance of plant system which performed safety-related functions and the SPAE package was developed by EBASCO. The system also performed a refueling support function in establishing and maintaining water quality. System 75 was selected because it is an EQCS, NSSS system and the SPAE package was developed by GE, the only other contractor preparing these packages. This system also had a number of associated fuel load technical specification requirements.

This selection provided a representative sample of systems which would allow a sound basis for the conclusions to be drawn in the summary results and conclusions.

2.2.2 The following systems were selected as the basis for the review of the SPOC process:

125 VDC Electrical	System 57-1
Reactor Water Cleanup	System 69

These systems were selected to allow a coordinated EA-NQA review of SPAE and SPOC implementation on two systems. The rationale based on the representative nature of these two systems is discussed above. The audit team concluded that these two systems were sufficient to provide a satisfactory level of confidence in the SPOC process. This conclusion is based on the audit results, i.e., the SPOC process is sound and being implemented. The conclusion is also supported by the demonstrated effectiveness of the QA monitoring effort being applied to all systems subjected to the SPOC process.

3.0 TEAM ORGANIZATION

The overall review was managed by TVA. The team members were selected from TVA and non-TVA personnel who were independent of the SPOC and SPAE processes. Personnel selection was based on the individuals' past work history (i.e., technical experience) and their experience in performing similar reviews.

The team consisted of the following personnel:

Thomas E. Burdette - Independent Review Manager

EA Review Team:

David L. Malone - EA Review Manager
Technical Audit and Surveillance Manager
David V. Kehoe - Team Leader
Erik G. Horlbeck - Mechanical Team Member
Narender S. Bains - I&C Team Member
Vinay K. Jain - Civil Team Member
Gary F. Weston - Operations Team Member
George T. Shell - Operations Team Member
Jerry W. Semore - Electrical Team Member

NQA Review Team:

Jerry T. Barnes - Team Leader
John R. Bearden - Operations Team Member
R. Curtis Crumpler - Operations Team Member
Michael R. Snodgrass - Operations Team Member
Omar S. Mazzoni - Electrical Team Member
Gary J. Overbeck - Mechanical Team Member (part-time)

4.0 SUMMARY RESULTS AND CONCLUSIONS

Based upon the samples selected, the reviews performed, and the corrective and preventive actions taken during the course of the audit, the audit results indicate that:

(1) The upgraded primary drawings provide an accurate representation of the configuration as determined from as-constructed and walkdown information. While there were concerns regarding the documentation of engineering justification for some changes, they do not significantly impact the quality of the upgraded primary drawings. The upgraded primary drawings constitute an acceptable input to the SPAE process and are adequate for use in the control room for plant operations.

(2) Presently, the identification, determination of status, evaluation, and dispositioning of open change documents are adequate. The initial reviews of this area noted that evaluations were not always being performed in a timely manner and there were inconsistencies in the identification and status of open change documents. The project's action to establish the configuration management information system (CMIS) has resolved the noted inconsistencies and improved coordination between participating groups. This improved coordination has also resulted in an improvement in the timeliness of the evaluations. The review of the core spray system indicates that the corrective actions have also been effective regarding subsequent work.

(3) The review of the UDIEs and the unreviewed safety question determinations (USQDs) associated with ECNs revealed that conclusions reached were technically sound. Some wording and documentation concerns were observed, but these did not adversely impact the technical conclusions.

(4) Boundaries of the evaluation are clearly described, properly reviewed, and appropriate to the analysis being performed. The reviews of the RWCU and 125 VDC systems did note concerns with the incomplete documentation of boundaries, and engineering review, and document control of operational and fuel load boundary drawings and the incomplete documentation of an engineering basis for determining the boundaries. BFEP took appropriate immediate corrective measures to resolve these concerns. The review of the core spray system revealed that the actions taken were effective on subsequent work.

(5) The system safety evaluations are now an effective evaluation of the capability of the system's functional configuration to perform the required safety functions. The early reviews did indicate that the function of the system safety evaluation was unclear, and consequently they varied considerably. However, BFEP assembled technical specialists from the Nuclear Technology Branch (NTB) and appropriate corrective actions were put in place including an in-line review by NTB. Review of the revised system safety evaluation for RWCU and the core spray system confirmed the effectiveness of this corrective action.

(6) There were several concerns with the completeness of the documentation of the SPAE package. For example, the identification of ECNs impacting the design that were reviewed was incomplete. While BFEP has taken immediate corrective action in each instance, this area requires continued EA oversight review.

(7) Documents requiring updating based on the SPAE process reviews, such as FSAR, design criteria, technical specifications, are generally being updated or punchlisted for later updating.

(8) The conclusions in the SPAE package regarding technical issues were not always properly documented and, in some cases, were not supported by the respective technical impact program findings. Also, in some cases, there were deficiencies noted in the supporting technical documents. While BFEP is taking corrective action, continued EA oversight review in this area is considered necessary.

(9) BFEP's corrective actions for the concerns identified in the review of the fuel oil and reactor building closed cooling water systems were not timely or in all cases effective. However, subsequent to the reviews of the 125 VDC and RWCU systems, there has been a significant improvement in the timeliness and adequacy of corrective actions taken.

(10) The SPOC process defined by SDSP 12.7 is a sound approach that provides a systematic method to ensure all open work items and programmatic issues that affect system operability are completed or dispositioned before a system is declared operable. The procedure provides satisfactory controls for deferring, excepting, tracking, and dispositioning incomplete issues and items that affect fuel load or subsequent restart milestones. Two programmatic areas for improvement were identified to enhance the process and reduce the potential for detracting from the soundness. These pertained to the Site Master Punchlist (SMPL).

(11) The SPOC process contains appropriate and thorough interfaces with the System Plant Acceptance Evaluation (SPAE) program being conducted by Nuclear Engineering (NE).

(12) Restart testing and postmodification testing is being appropriately interrelated with and controlled by the SPOC process. Test exceptions are properly evaluated and dispositioned or appropriately deferred and tracked by the SPOC process.

(13) Modifications and temporary alterations are being identified, evaluated for effects on system operability, completed, or tracked under the appropriate milestone.

(14) All preventive maintenance was identified, completed, or scheduled, and was current. Open maintenance requests (MRs) were properly evaluated for effects on system operability, closed out, or tracked on the SMPL.

(15) Operating Instructions (OIs) and Surveillance Instructions (SIs) have been upgraded and reflect the current plant configuration. SIs have been identified, scheduled and were within periodicity. Further, review of the SIs confirmed that the methods used are appropriate to verify "technical specification" operability. One area for improvement was identified pertaining to the inclusion of a check for air-operated valves in 2-OI-69.

(16) System status files and clearance logs were in order and control room drawings were legible and controlled. No verification of current system configuration was made because of an open CAQR which addressed a backlog of over 3500 Drawing Discrepancies (DDs) that had not been processed.

(17) Operability item deferrals and SPOC exceptions were adequately described, justified, and meet criteria.

(18) Initiatives are being taken to ensure training and retraining programs, including simulator and Shift Technical Advisor (STA) training, recognize and address the unique needs of a plant that has been in extended outage, and undergone extensive modifications.

(19) The QA Monitoring program is well organized and is applying extensive, systematic coverage and validation of the SPOC process and completed SPOC packages. An area for improvement was noted in regard to lack of sufficient detail on surveillance reports.

In general, the SPOC and SPAE processes are sound and are effective at identifying that work which must be completed prior to declaring a system operable for fuel load and restart. However, there were certain aspects of the program that require improvement and continued evaluation. In addition, verification of backfit corrective action is required. Fourteen CAQs were identified during the audit (see section 6) and six areas of improvement were noted.

Due to the rigorous schedule, critical nature of this program, and identified concerns, EA has established an oversight team to perform continued evaluations of specific aspects of the SPAE process and its inputs and outputs. These aspects are:

- Technical issues
- Documentation of the SPAE package
- System safety evaluations

The EA oversight will provide timely identification and resolution of problems which should result in an improved product. The EA oversight team will also perform corrective action follow-up on the specific concerns noted during this audit.

3.0 DETAILED RESULTS

This section provides additional information regarding the scope, review, in-process corrective actions taken by the project, and results of the audit.

5.1 SPAE Process

5.1.1 Primary Drawing Upgrade

The primary drawing upgrade process involved new configuration control drawings (CCDs) and restored as-constructed (AC) drawings from the existing primary drawing. This included a "scrub" of the drawing to clear up notes, drawing continuations, and in-function/out-of-function inconsistencies. Also included was the incorporation of walkdown information as shown on drawing discrepancies (DDs) and for CCDs, a reconciliation of the differences between the AC and as-designed (AD) drawings.

The system flow, control, and single-line drawings from the selected systems were reviewed to evaluate the process by assessing the clarity and completeness. Also, the drawings were evaluated for technical content. For example, the flow diagrams were reviewed to determine the adequacy of the flow path design, correct pressure and temperature extremes, proper sequencing of system modes, and pressure boundary protection. The previous review of the fuel oil and reactor building closed cooling water systems revealed the following concerns (also see CAQRs BFE880681 and BFE880682 and PRD BFE880759P):

- Drawing differences were being inappropriately justified by using exception categories from NEP-6.1 rather than evaluating the source documentation for the difference.
- Needle valves (FIC 18-45, -46, -47, and -48) initially deleted as a result of a plant walkdown were inappropriately added back onto drawing CCD 0-47E610-18-1 revision 3.
- A DCN (W1820A) had been revised, but the revision had not been entered into the quality records system (RIMS).
- Drawing CCD 0-47E840-1 contained differences that were not properly identified. Drawing differences were not always back circled as required.
- Operational boundaries were not consistently identified on the required drawings (e.g., CCD 2-47E822-1 and CCD 0-47E840-1 did not have boundaries marked up on the drawings as required).
- The reconciliation checklist was not completed, and the reconciliation form section E had not been signed by the responsible lead engineer for CCD 2-45N779-8 revision 0.

During the review of the flow diagram for the RWCU system, it appeared that some walkdown information was missing and that other discrepancies existed, such as missing reducers, line sizes, and some mark number conflicts (see PRD BFE880848P). Discussion with the project indicated that subsequent walkdown DDs had changed the walkdown data in the areas of question and EA concerns were not valid. The review of the flow diagram for the core spray system (2-47E814-1), which included the original walkdown DDs and the subsequent walkdown DDs, indicated the project's assessment was correct.

During the review of core spray flow diagram 47E814-1 revision 3, it was observed that the manual valves upstream of flow solenoid valves (FSV) 75-71 and 75-22 were shown normally closed, thus negating the benefit of the FSVs. Also, these valves were shown open on the control drawing CCD 47E610-75-1 revision 4. Additionally, the PSC head tank pump and associated piping exhibited conflicting pressure ratings (see PRD BFE880937P).

With the exception of some inconsistencies, the upgraded primary drawings provide an accurate reflection of the system functional configuration and are acceptable for use by the SPAE process and in the control room. The results of this audit indicate that the preventive actions taken for the previous review have been effective.

5.1.2 Change Document Closure

This program was established to identify all change documents (e.g., ECNs and DCNs), determine their status (i.e., open, closed, cancelled, implemented, not implemented, or partially implemented), evaluate the change, and disposition the change (i.e., determine whether it is required to be implemented). Additionally, USQDs were reviewed to determine whether they were technically valid and updated as necessary.

Several independent data bases of change documents were reviewed to determine if the change document closure data base, configuration management information system (CMIS) was complete. Samples of ECNs and DCNs from each category (implemented, partially implemented, and not to be implemented) were reviewed to determine if the classifications were appropriate. The USQDs and UDIEs were independently reviewed for adequacy. This review also included a comparison to the design requirements and licensing commitments found in the FSAR, technical specification, and design criteria.

The previous reviews of the fuel oil and reactor building closed cooling water systems revealed the following:

- UDIEs for ECNs P2168, 2169, 2170, and 2171 were not complete as the return to service group had been informed.
- For both systems, inconsistencies were observed between the ECN information provided to the return to service group and that available from the ECN closure group.

The reviews of the core spray, 125 VDC, and RWCU systems revealed that improved interface controls had generally resolved the types of concerns noted above. One case was observed during corrective action follow-up where there was an inconsistency between the data and the SPAE process report for system 70; however, this was immediately corrected. A review of all other completed SPAE process packages revealed one additional occurrence, and this was also corrected. No other inconsistencies in the later reviewed SPAE process packages were observed.

Part of the resolution of the inconsistency was the establishment of CMIS which collected all ECNs and DCNs under one data base. The review of this data base identified about 400 ECNs and DCNs which were designated as "000" or "???" in the system field (i.e., not tied to a specific system). A review of several ECNs revealed that they would in some cases be readily identifiable to a system. The project performed an immediate review of all ECNs with a system identifier of "000" or "???" and assigned appropriate system identifiers.

The USQD performed by the project was reviewed by EA by independently evaluating the USQDs and screening reviews associated with a sample of ECNs and DCNs from the selected systems. Although the documents were not fully standalone, the technical conclusions were sound and supported by technically adequate documentation and updated as necessary.

The change document closure process is considered to be technically adequate.

3.1.3 Technical Inputs

The SPAE process package contains a section that reports on the status of other major engineering programs (e.g., 79-14/02, Appendix R, Environmental Qualification (EQ), design calculations) as it relates to the specific system.

Technical inputs from the mechanical essential calculations, electrical technical issues (i.e., AC/DC essential calculations, fuse program, and cable separation) and 79-14/02 were evaluated.

- Mechanical Essential Calculations

  Five key mechanical essential calculations were reviewed to determine if the calculations conclusion supported the core spray functional design configuration for fuel load and restart. Two of the calculations, orifice sizing for core spray pump bypass and full flow test lines, referenced documents with inconsistent information. The calculations referenced the physical drawings and the flow diagram. The flow diagram showed an 11/16-inch orifice in the pump bypass lines and 3.375-inch orifice in the full flow test lines; the physical drawings showed 15/16 inch and 7.25 inches respectively. The calculation determined that 15/16 inch and 5.18 inches were required and concluded that the existing design configuration was adequate based on the physical drawings. However, the calculation failed to reconcile the difference between the walkdown CCD and the physical drawings (CAQR BFE880936). Additionally, all calculations stated in the abstract section that the calculation was based on the configuration that would exist subsequent to the completion of all ECNs noted in an attachment to the calculation. It was not clear how the partially completed ECNs were evaluated when using the calculation for declaring a system operable at an intermediate milestone.

- Electrical Technical Issues

  The electrical technical issues presented in the SPAE process packages for the 125 VDC, RWCU, and core spray systems were reviewed. This review was performed to determine the adequacy and completeness of the electrical technical issues resolutions as presented in memoranda dated September 2, 1988 (B22 880902 032) and September 28, 1988 (B22 880928 001), and their impact on the 125 VDC, RWCU, and core spray systems.

Review of the 125 VDC system indicated, in general, that the basis for the SPAE process package conclusions of no impact of technical issues was not adequately documented. In addition, some electrical issues were still in the discovery phase (e.g., cable separation), thus the conclusions drawn could only be preliminary. It was noted that DCN W0902A which replaces fuses to provide proper coordination protection was not addressed in the calculation program assessment and was in conflict with the statement of impact for the system (CAQR BFE880855).

Five of the AC/DC calculations for the 125 VDC system were reviewed. It was noted that two of these calculations (ED-Q2000-870047 R0 and ED-Q2255-88085 R0) did not support the current configuration, DG booster pump and fuel pump motors have an indeterminate minimum voltage, and existing breakers and fuses fail to coordinate and/or provide protection. Further, some of these calculations have unverified assumptions which had not been evaluated for impact on fuel load.

The SPAE process for the RWCU system indicated that there were no AC/DC calculations that impacted the RWCU system; however, calculations 2TS-069-029J and 2TS-069-030A were identified which were required.

The SPAE process package indicated that the cable separation program had been evaluated for impact against the 125 VDC and RWCU systems and was determined to have no impact. As the cable separation program is still in the discovery phase and the design criteria contains portions on hold, the conclusions cannot be supported. (See CAQR BFE880855).

The core spray system was reviewed for the same features as described above. The core spray SPAE process was completed after the above concerns were identified on the 125 VDC and RWCU system SPAE packages. The review of the core spray system identified no concerns similar to that noted above. The core spray system SPAE process package electrical technical issues portion was adequate indicating appropriate preventive actions had been taken.

In summary, the conclusions regarding technical issues are not always complete or fully supported by the backup documentation. While some improvements have been observed, continued EA oversight in this area is required.

- I&E Bulletin 79-14/02 Piping Stress and Support Analysis

  Inputs from the 79-14/02 program were reviewed to determine if the conclusions documented in the SPAE process packages for system 69 (RWCU) are supported by the program results. The review revealed that the analyses performed are 50 percent inside the drywell and 50 percent outside the drywell. The problems reviewed were representative and in this regard fully support the SPAE process conclusions. However, the summary in the SPAE process package and the position statements failed to address the impact of the change in methodology for developing Amplified Response Spectra (ARS) curves (single stick versus multistick) and the change in earthquake basis. This was satisfactorily corrected by the issuance of a position statement that adequately documents TVA's position.

5.1.4 System Boundaries

To facilitate the performance of the SPAE process, a set of restart and fuel load boundaries were established. Part of establishing the system boundaries included an input from the plant in the form of marked-up drawings. For the systems identified as required for restart and/or fuel load, the system boundaries for engineering were the entire unit 2 primary drawings and that portion of the unit 1 and 3 primary drawings that was within the marked-up boundaries.

The boundary definitions used by the project were reviewed to confirm that all required systems or portions of systems required for restart or an earlier milestone (e.g., fuel load) were being evaluated. Some concerns regarding the documentation of these boundaries on CCDs are discussed in section 5.1.1. EA reviewed the functions of the systems that were required against the boundaries and found no inconsistencies. However, two additional concerns were identified. First, the drawings documenting the operational and fuel load boundaries from operations were not properly controlled in that there was no unique identifier for these documents. Second, the fuel load boundary drawings which are used as a basis for determining whether punchlisted work must be completed prior to fuel load show no documented engineering review (CAQR BFE880854).

The project instituted immediate action to define a basis for a fuel load boundary, to document the engineering review of that boundary to that basis, and to RIMS the drawings to provide a permanent traceable record of the drawings. As a result of this action, the boundaries are considered to now be properly defined, evaluated, and controlled.

5.1.5 System Plant Acceptance Evaluation (SPAE) Process Package

The SPAE process package assembles all information regarding a particular system to identify the restart configuration. This configuration is evaluated against the system requirements as defined in the FSAR, technical specifications, design criteria, and other source documents to determine whether the functional configuration will perform the required functions. Also, the SPAE process package provides a status of all outstanding work including major engineering programs (civil issues, electrical issues, design basis calculations, etc.), ECNs and DCNs, CAQs, TACFs, and DDs.

The SPAE process packages for the systems selected were evaluated to confirm the SPAE process conclusions, assess the adequacy of the documentation, and determine if the system safety evaluation was complete and technically adequate. The initial reviews of the fuel oil and reactor building closed cooling water (RBCCW) systems identified the following concerns (CAQR BFE880682 and PRD BFE880760P):

- The system safety evaluation was limited to the safety-related portions of the system and did not review the impact of the nonsafety-related portions of the system on the safety functions.

- The SPAE process package for the fuel oil system concluded that the fuel oil transfer pump could be used for fuel load if an operator were stationed at the pump. However, the system safety evaluation stated that it was not necessary to implement DCNs H0147A and H0148A which would allow normal operation of the fuel oil transfer pump and did not require the use of operators or a special requirement.

- The SPAE process checklist was signed indicating all UDIEs were complete. However, UDIEs for ECNs P2168-P2171 had not been approved.

During the review of the SPAE process package for the RWCU system it was not clear what the signoffs for postmodification test, restart test, and test exceptions meant when the testing was not complete. The basis for deferring work past fuel load was not clear. Immediate corrective action was instituted to clarify the meaning of the signoffs and to more clearly define the basis for deferring work past fuel load. Due to the number of inconsistencies with the SPAE process package and its inputs

and discussions with the responsible discipline engineers, it is not clear who was responsible for performing a second party review of the SPAE process package (PRDs BFE880837P and BFE880852P).

A review of the system safety evaluation for the RWCU system revealed that appropriate corrective and preventive actions from the earlier reviews had not been taken and that the application of 10CFR50.59 to the system safety evaluation was inappropriate (CAQR BFE880853). The project brought in specialists to determine an appropriate system safety evaluation and decided to use NEP-6.6, 10CFR50.59 Safety Evaluations, for format only.

The review of the core spray system SPAE process package which was completed subsequent to the implementation of these corrective actions found these areas to be significantly improved. However, this review also identified inconsistencies in the listing of ECNs impacting the design and in the listing of open DDs reviewed (PRD BFE880938P).

While improvement in the documentation of the SPAE process packages and the associated system safety evaluations were observed, continued attention in this area is required.

5.1.6 EA reviewed the SIs for verifying "technical specification" operability for the reactor water cleanup and core spray systems. The review was performed to determine if the SI method and approach would properly verify all pertinent safety functions of the system required to be operable. No concerns were noted.

5.2 SPOC Process

5.2.1 Programmatic Adequacy

The adequacy of Site Director Standard Practice, SDSP 12.7, "System Preoperability Checklist," is directly related to the procedure's effectiveness in providing a systematic method to ensure all open work items and programmatic issues that affect system operability are completed or dispositioned before a system is declared operable. The audit team evaluated this effectiveness primarily by correlating the various sources of open items and issues with those addressed in SDSP 12.7, by analyzing the methods used by SDSP 12.7, and by verifying implementation of the procedure for selected systems. The adequacy of SDSP 12.7 was also determined by evaluating the implementation of regulatory requirements and commitments; however, such requirements are limited because of the uniqueness of the circumstances, i.e., extended outage with fuel unloaded for several years while undergoing extensive modification.

The audit team concluded that the SPOC process in SDSP 12.7 is a sound approach that thoroughly addresses outstanding issues and open work items. The procedure also provides satisfactory controls for deferring, tracking, and dispositioning incomplete issues/items that affect fuel load milestone or subsequent restart milestones. The relatively brief requirements contained in the Nuclear Quality Assurance Manual (NQAM) (Part II, Section 3.2) are being met. The Browns Ferry Nuclear Plant (BFN) Nuclear Performance Plan (NPP), Volume III, has no SPOC requirements per se; however, some commitments correlate with and are being implemented by, or are evident in the SPOC process. Some of these are:

- A system engineering section has been staffed and is directly involved with the SPOC and involved with the Unit 2 restart test program.
- The SPOC process requires signoffs that ensure NPP commitments are met, e.g., postmodification test requirements related to ECN/DCNs.
- The SPOC process requires review/upgrade of Surveillance Instructions (SIs) and Operating Instructions (OIs).
- Correlation of unimplemented and partially implemented design change documents against the design basis relative to restart requirements.

Additional observations that support the adequacy of SDSP 12.7 in accomplishing the stated purpose are provided below.

a. The heavy emphasis in the SPOC process that has been placed on the involvement and signoffs by licensed senior reactor operators and licensed shift operations supervisors is considered a strong point.

b. The SPOC contains appropriate and thorough interfaces with the System Plant Acceptance Evaluation (SPAE) program being conducted by Nuclear Engineering (NE). The SPOC and SPAE processes appear to be an integrated program.

c. SDSP 12.7 was being promptly revised and improved as experience dictated.

d. Responsibilities within the Technical Support Services (TSS) and Operations (OPS) organizations were appropriately assigned by SDSP 12.7.

The audit team identified one provision in SDSP 12.7 that has the potential for detracting from the soundness of the process. The note after paragraph 6.2 states, "The signing of the SPOC indicates the individual has reviewed the SMPL for correctness and/or has provided a list indicating the current status of affected items." This note does not appear consistent with SPOC signoff statements which are a positive affirmation that open items have been closed out. For example, SPOC item III.3 states, "All maintenance requests required for system operability have been closed out in accordance with SDSP 7.6 (including proper postmaintenance testing)." TSS management indicated the note after paragraph 6.2 was intended to taken in a context of "in addition to" the SPOC signoffs rather than a dilution of the positive affirmation. The audit team recommends the note after paragraph 6.2 be revised and has included this recommendation as Area For Improvement BFK880I01901.

The audit team has also identified another Area for Improvement, BFK880I02901, pertaining to a facet of the SPOC that could detract from the soundness of the process. This Area for Improvement concerns the Site Master Punchlist (SMPL) and is discussed below under paragraph 5.2.2.i.

5.2.2 SPOC Implementation

a. The adequacy of the SPOC process was further evaluated by verifying implementation on two systems. These were the Reactor Water Cleanup (RWCU), System 69, and 125 VDC Electrical System 57-1. The SPOC for the RWCU system signoffs were partially completed at the time of the audit. The following paragraphs discuss the NQA results and conclusions related to implementation of SDSP 12.7.

b. Testing and Test Exceptions

1) Restart Testing

Restart test package 2-BFN-RTP-069 had not been reviewed and approved by the Joint Test Group, therefore, an Operability Item Deferral form had been completed which listed the RTP as a test exception. The audit team compared this test exception to the Safety Evaluation (SE) contained in the SPAE for System 69 (SER No. SEBFRTS880082, Rev 2 - RIMS No. B22881017018). The test exception evaluation implied that only three SIs are needed to meet system

operability for fuel load. The evaluation stated, "No other parts of 2-BFN-RTP-069 affect anything in the RWCU system required for Fuel Load ...." Included in the SE for the RWCU system, but not included in the three SIs is the need to isolate the RWCU suction isolation valves upon Standby Liquid Control System (SLCS) initiation. This capability had been confirmed by Section 5.5 of 2-BFN-RTP-069 which required performance of SI 4.4.A-2 to verify that valves 2-FCV-69-1 and 2-FCV-69-2 will automatically close upon SLCS initiation. The audit team was concerned that a documentation trail did not exist to assure that safety functions and design features identified and addressed in the SE were tied directly to a restart test section, or an SI performed as part of systems operability, or tests/SIs from other SPOC systems. This was discussed with the TSS Superintendent who directed the Operability Item Deferral form to be annotated to address this concern. This change was reviewed and was acceptable. No other problems with RWCU SPOC test exceptions were noted.

Restart test package 2-BFN-RTP-057-1 for the 125 VDC Power System contained nine test exceptions, TE-1 through TE-9. These test exceptions were reviewed and evaluated by the audit team. Exceptions TE-3 through TE-9 were accepted by the auditors with no questions. Acceptance of TE-1 and TE-2 required further investigation. These exceptions had been initially documented because the battery chargers could not meet 2% maximum ripple and because of an undue current limiting condition. Exceptions TE-1 and TE-2 were dispositioned when the RTP was revised to perform the tests with the battery connected. Initially, the auditors questioned the acceptability of the RTP revision and the lack of a Unreviewed Safety Question Determination (USQD) being performed to evaluate the change. After reviewing the revised Baseline Test Requirements document and researching applicable IEEE Standards, the auditors located NEMA Standard PE 5-1985. This standard supported the acceptability of the RTP revision to perform charger tests with the battery connected. Consequently, the audit team concurs with the disposition of TE-1 and TE-2 and agrees that a USQD was not required. However, the screening review documented on form SDSP 147 did not clearly provide the basis for a "no" answer to the USQD required question. The auditors believe the basis for "No" should have been stated or reference made to a document containing the basis.

3) Postmodification Testing (PMT)

Audit team review of the SMPL and contacts with MODS personnel revealed no open PMTs on System 57-1 and one open PMT on System 69. The open PMT was No. 155-B which is required to be conducted on RWCU pump A after Modifications performed under ECN P5429. This ECN and open PMT were being tracked on the SMPL and was documented as a SPOC exception item on Attachment C of SDSP 12.7 because of vibration problems encountered with pump A.

After discussion with the TSS superintendent, the auditors concluded the exception was acceptable because the RWCU pumps have no technical specification function and because the system can be placed in service with one pump to meet fuel load operability needs.

c. Modifications

1) Completion and Tracking of ECN/DCNs

At the time of the audit, no RWCU system signoffs on SPOC had been made regarding ECN/DCN closure and modification completion. The audit team performed partial verification by selecting nine work packages listed on Appendix G of restart test 2-BFN-RTP-069 for review. The work packages were associated with ECNs P7026, P7030, and P7032, and seven were completed and closed indicating that the ECNs were being worked for the fuel load milestone. Further review showed the ECNs were properly tracked and statused on the System 69 SMPL, but the two open work plans were not identified. This identification should be added.

Review of the completed SPOC package for the 125 VDC Electrical System (57-1) showed that a listing of closed modifications which affect operability had not been included as required by SPOC item II.1.b. Attachment F of the System 57-1 package listed design changes but was missing descriptive information, status, and fuel load impact. The audit team recommends this type information be included. Discussions with the TSS Superintendent revealed that, subsequent to the completion of the System 57-1 SPOC, further instructions had been given to system engineers addressing SPOC package contents and arrangement.

2) Temporary Alteration Control Forms (TACFs)

The auditors reviewed the TACF file for systems 57-1 and 69 that is maintained in the shift operations supervisor's office. None were identified on System 57-1, and one was noted on System 69. TACF 2-84-104-069 was reflected in the system status file and was being tracked in SPAE as a fuel load item for the RWCU System. No problems were noted.

d. Maintenance

1) Preventive Maintenance (PM)

Electrical and mechanical preventive maintenance schedules and completion status for systems 57-1 and 69 were reviewed. All tasks were complete, scheduled, and current except for those associated with RWCU pumps. Of 130 I&C tasks, 113 are complete, 11 were scheduled for October, and 6 were non-CSSC PMs that were incomplete or past due. No problems with CSSC PM for these two systems were noted.

2) Maintenance Request (MR) Closure/Tracking

The auditor reviewed printouts of open MRs and verified that those which appeared to affect operability for Systems 57-1 and 69 were included on the Site Master Punchlist (SMPL). No problems with MRs were noted. However two open Condition Adverse to Quality Reports (CAQRs) related to maintenance that could affect operability were noted. These CAQRs are BFP880509 and BFP880068. The former will be discussed under postmaintenance testing below. The latter CAQR was issued as a result of a failed QC holdpoint in MR 818016, which was written to rework a damaged cable in valve 2-FCV-69-12. The CAQR was issued to document bent cable connector lugs in limitorque valves and was declared generic by Nuclear Engineering (NE). NE has provided a corrective action plan to inspect and rework all valve operators as necessary. This CAQR was not specifically listed on the SMPL as affecting System 69. CAQR BFP880509 was not listed as affecting Systems 57-1 or 69. However, both CAQRs were listed on the SMPL without specific system coding. This situation was questioned by the audit team. Subsequent discussions revealed that such CAQRs are handled as generic open items until determinations are made that specific system operability for fuel load is affected.

The auditor also reviewed open inspection reports related to MR holdpoints to determine if any failed inspections existed which could impact operability of systems 57-1 and 69. None were noted.

3) Postmaintenance Testing (PMT)

Printouts of closed MRs which involved PMT were reviewed. No open PMT was found for Systems 57-1 and 69; however, an open CAQR involving PMT was noted. CAQR BFP880509, which was issued during Safety System Functional Inspection (SSFI) audit BFA88811, describes a condition where plant equipment was placed in service after maintenance without PMT being performed. The condition was declared generic and could impact Systems 57-1 and 69. The CAQR was listed on the SMPL but was not coded as affecting these systems. (See paragraph above for comments on this situation.)

e. Commitment Tracking/Resolution

The audit team did not discover any open NRC commitments, NRC IE inspection items, NSRS, NMRG, NSRB, ISEG, and INPO items, that affect operability for Systems 57-1 and 69, that were incomplete or not tracked. However, NQA had previously identified an Area for Improvement, BFA880I03814, under Correction of Deficiencies audit BFA88814. This finding noted that the Plant Operations Review Staff (PORS) had not entered some NMRG findings into Tracking and Reporting of Open Items (TROI) system. Since TROI is used to track such open items, the potential exists for items affecting operability to be overlooked. This Area of Improvement should be evaluated in that regard.

f. Operating Instructions and Surveillance Instructions

1) Periodic Review and Upgrade

OI 2-OI-69, Rev 3, was reviewed to evaluate the adequacy of periodic review and the upgrade program. Lineup and inspection checklists on Attachments 1 through 4 of this OI were compared to applicable drawings to ensure a complete checklist had been provided. This review produced two conditions that were pursued. On pages 85 through 87, two differential pressure transmitters were listed twice. This was discussed with the site procedures staff; since it does not affect system operability, it will

be corrected on the next revision. The second condition involves the failure of the OI checklists to include an inservice check for air-operated valves. The audit team believes this check should be made including verifying the integrity of the components that make up the air-operated valve. This finding was documented as Area for Improvement BFK880I05901. The audit team recommends that plant management evaluate this and other OIs for acceptability of this omission.

The audit team concluded that 2-OI-69 reflects the current plant configuration and was written in the upgraded format.

A review of 2-OI-57A and 0-OI-82 was performed to verify adequacy of OIs for the 125 VDC Electrical System. No instructional guidance was given for switching from the normal to the alternate charger. This was brought to the attention of the site procedures staff and Operations Superintendent. Due to the simplicity of the operation, i.e., open one breaker and close another, they deemed additional written instructions unnecessary. Since this decision appears to be within procedural requirements governing OIs, the auditors accepted it.

2) SI Performance and Scheduling

System 57-1 SIs 0-SI-4.9.A.2.a, 0-SI-4.9.A.2.b, and 0-SI-4.9.A.2.c were verified to have been performed and scheduled within their required periodicity. SIs for System 69, 2-SI-4.7.D.1.b-1, 2-SI-4.2.A.39, and 2-SI-4.2.A-24B were not performed under restart test package 2-BFN-RTP-069 due to deferral of that package. However, the SIs were scheduled within required periodicity.

Based on these verifications, the auditors concluded the SPOC signoffs for systems 57-1 and 69 in regard to SI performance and scheduling were valid.

g. System Configuration

1) General

Members of the audit team conducted a tour of the Unit 2 Control Room to evaluate system status files, controlled drawings, and operator understanding of the SPOC process. Licensed operators appear to have a procedural understanding of SDSP 12.7 and showed a positive attitude toward the SPOC process.

2) System Status Files

System status files for systems 57-1 and 69 were up to date and maintained in accordance with OSIL-43.

3) Clearance Logs

No problems were noted with clearances that would affect operability for systems 57-1 and 69.

4) Control Room Drawings

Six configuration control drawings (CCDs) (800 Series) for the RWCU System in the Unit 2 Control Room were reviewed and found legible and controlled. The audit team had intended to verify if the drawings reflected current system configuration, but did not because of a recently issued audit CAQR (BFA880774814) which cited the Drawing Discrepancy (DD) process for noncompliance with SDSP 9.1 and identified a backlog of over 3500 DDs that had not been processed.

5) Plant Component Labeling

This function has recently been assumed by Operations Special Project (OPS) Section. SDSPs 12.3 and 12.6 provide an adequate program. Labeling of components to some panels and equipment was backlogged in some areas although priority is being given to systems as they are subjected to the SPOC process. The audit team performed a partial walkdown of System 57-1 and found no labeling problems. Labeling for System 69 was not verified because of the backlog and incomplete status of the system at the time of the audit. Assistant Unit Operators (AUOs) performing labeling brought one concern to the auditors' attention. The Master Equipment List (MEL) prepared by the U&ID group of NE is not a fully useable document in that it does not give the location of new or modified components.

During review of OPS activities, the auditors noted 24 controlled drawings used for labeling activities were out of date. The Plant Information Center (PIC) was requested to perform a special drawing audit. This was done, the out of date drawings were corrected, and no others were found. This condition was documented by the audit team as a corrected on the spot (COTS) item.

6) PMI 12.12 - Conduct of Operation

The audit team reviewed PMI 12.12 for additional logs that will be required upon system operability. No additional logs are required beyond those presently used. During this review, Attachment 29, "Battery Charger Checklist," of PMI 12.12 was evaluated for its ability to ensure proper operation of the 125 VDC System. This checklist gives a DC voltage range of 130 to 145 volts. However, Restart Design Criteria No. BFN-50-7083, "Standby Diesel Generator System - Unit 2," Rev 1, Section 3.6.2.3 states the principal mode of operation shall be in the "battery float mode" with battery voltage 133.5 $\pm$ 1.5 VDC and states the voltage at the battery shall not exceed 140 VDC for battery equalize. Because of the potential problems posed by this divergence between checklist and design criteria, the auditors recommend that this condition be investigated and resolved. All operating ranges in PMI 12.12 should be evaluated against design criteria and appropriate action taken. This condition and recommendation are documented under Area for Improvement BFK880I04901. In the event the BFN investigation of Attachment 29 data reveals a hardware CAQ, the audit team notes that CAQR BFP880466 already exists to correct a condition where relays and contacts in the 125 VDC system may be underrated.

7) Walkdown

The audit team performed a partial walkdown of the RWCU System to assess visual readiness and look for TACF or hold tags that were not documented. This walkdown included the valve room, control panel, and demineralizer area. No adverse conditions were observed.

The audit team also performed a walkdown and visual inspection of the following portions of the 125 VDC Electrical System and found no problems:

- Internal components for diesel generator A and D normal charger, alternate charger, and DC distribution cabinet.
- Internal components of diesel generator "B" DC distribution cabinets.
- Batteries for diesel generator A, B, and D, including battery post connections, electrolyte level, battery plate condition, and casing temperature (touch).

h. Operability Item Deferrals and SPOC Exceptions

Operability Item Deferral Forms (Attachment B, SDSP 12.7) for the RWCU System SPOC were reviewed. Descriptions are adequate and justifications appear acceptable. The justification for deferral of restart test 2-BFN-RTP-069-1 was annotated to address auditor concerns (see paragraph 5.2.2.b.(1) above for details). SPOC Exception Item Forms (Attachment C, SDSP 12.7) for the RWCU System were also reviewed. These exceptions appear to meet the criteria, i.e., the system can be recommended for status and configuration control with the exceptions.

No Operability Item Deferrals and SPOC Exceptions were required for the 125 VDC System. Restart test exceptions had been acceptably dispositioned. No other sources of deferrals or exceptions were discovered by the audit team.

i. Site Master Punchlist (SMPL)

The SMPL is a computer based program used by persons on a plant-wide basis to identify/track open work items and issues relative to fuel load and subsequent milestones. Initially, the SMPL was developed for system engineers to identify completion milestones for all items on a system basis. SMPL instructions were issued by System Engineering in May 1988 under the title, "System Return to Service Evaluation Instructions." Since that time it has been revised several times, e.g., Addendum F was issued August 6, 1988. Neither the original instructions nor the addenda have been issued as a controlled document. The audit team noted that a number of other data bases, e.g., TROI, MRs, CCTS, and TACFs, are programmed to download into SMPL. These data bases must have items properly coded, e.g., TROI code is priority "Z", in order for SMPL to pick up the item.

Based on the above discussion and the effect the SMPL has upon the accuracy/completeness of open item tracking, plus recognition of problems noted by QA Monitoring and the CAQR Coordination Group, the audit team recommends that consideration be given to issuing the SMPL instructions as a controlled document. It is apparent that the SMPL has become a site-wide tool rather than a systems engineering tool. Therefore , this recommendation has been documented as Area for Improvement BFK880103901.

j. Training

At the request of the Plant Manager, the audit team reviewed and evaluated the status and adequacy of training/retraining needed to ensure that plant modifications and other training motivations unique to current BFN restart needs are appropriately addressed in training programs.

To date the majority of training for plant modifications and procedure revisions is accomplished by Required Reading notices. Recently Nuclear Training (NT) has built in "reading time" during requalification for operators with an instructor guided review at the end of the week. Additionally, NT is planning to provide training on plant modifications to various departments based on departmental needs. The audit team endorses this initiative.

Shift Technical Advisors (STAs) do not presently receive training on revised procedures other than a quarterly review of a percentage of procedures to ensure a 100% review every two years. Because of extensive plant modifications and procedure changes during this outage the audit team believed additional STA training was needed. Discussions with STA supervision and the TSS Superintendent revealed that a training program, "STA Readiness Preparations for Fuel Load and Startup" had been devised. This program was endorsed by the Plant Manager on the day following the postaudit meeting. It has been reviewed by the auditor and is an adequate program, provided implementation is timely.

The current methodology for notifying NT of training needs and simulator modifications resulting from plant modifications is by use of Impact Review Sheets and Modification Training Notices (SDSP 8.10, forms SDSP 243, 244, 245, 246, and 112). Personnel who may not be fully cognizant of the intricacies of INPO training accreditation programs, i.e., job task/training matrix and simulator computer modeling, and NRC simulator validation requirements; are completing these forms. The audit team recommends that SDSP 8.10 and related procedures be revised to place Nuclear Training in the front end review of ECN/DCNs to ensure that INPO accreditation is maintained and NRC simulator validation is obtained and maintained. This recommendation is identified under Area for Improvement BFK880I06901.

k. Special Operating Conditions

No special operating conditions (form SDSP 270, SDSP 12.7) had been identified for Systems 57-1 and 69. During review of system status files and OSIL-43, the auditors noted that SDSP 270 is not recognized in the OSIL, which only addresses abnormal status sheets. These sheets were the subject of QA Monitoring Report QBF-S-88-1440 which recommended that OSIL-43 be revised to provide more explicit details for their use. The auditors concur with this recommendation and also recommend that OSIL-43 be revised to recognize SDSP 270.

l. QA Monitoring Program

The overall plan for QA Monitoring of SPOC packages was reviewed. The plan addresses all 31 systems undergoing the SPOC process. Eight systems are being 100% monitored and 23 are receiving 10% coverage. The plan for selection of systems for 100% or 10% coverage appears to be a good plan that allows flexibility in focussing attention toward SPOC problem areas. The overall program is well organized and involves the majority of the site QA Surveillance organization. Qualified personnel with diverse experience are used including QA Evaluators with operations experience and SRO license.

The audit team selected and reviewed monitoring files for Systems 25 and 76. The plan for statusing and record keeping is well organized and performed by a designated, qualified individual with good operations experience. Surveillance reports that document monitoring results are generally acceptable. One instance was noted, report no. QBF-S-88-1347, where detail was not sufficient to provide assurance that the SPOC signoffs had been validated as accurate. This report addressed SPOC Section III, Maintenance for the Containment Inerting System (76) SPOC and stated with regard to item (attribute) 3, "The SMPL contained 64 items in this category." The report also stated, "The SMPL was verified to contain those items that must be addressed prior to system return-to-service/ operability that were within the scope of this survey." Discussions with the QA monitor revealed that his focus was on the note after paragraph 6.2 of SDSP 12.7 rather than on validation of specific affirmations made when the SPOC signoffs are made. This concentration on the paragraph 6.2 note appears to support Area for Improvement BFK880I01901, discussed under paragraph 5.2.1

of this audit report. Therefore, the condition noted in the surveillance report listed above was documented as Area for Improvement BFK880I02901. The audit team recommends that further instruction be provided to QA Surveillance personnel.

6.0 CONDITIONS ADVERSE TO QUALITY

The following CAQRs and PRDs were issued as a result of this audit:

Number	System	Subject
CAQR BFE880681*	18	Configuration Control Drawings
CAQR BFE880682*	18	System Plant Acceptance Evaluation
PRD BFE880759P*	70	Configuration Control Drawings
PRD BFE880760P*	70	System Plant Acceptance Evaluation
PRD BFE880837P+	69 and 57-1	Work Differal Past Fuel Load
PRD BFE880848P+	69	Drawing Discrepancies Not Incorporated
PRD BFE880851P	57-1 and 82	Standby Diesel-Generator Design Criteria
PRD BFE880852P+	69 and 57-1	System Plant Acceptance Evaluation
CAQR BFE880853+	Various	Inappropriate Use of 10CFR50.59 Safety Evaluation
CAQR BFE880854+	Various	Boundary Drawings Not Controlled or Reviewed
CAQR BFE880855+	57-1 and 69	Inconsistencies Regarding Technical Issues
CAQR BFE880936	75	Mechanical Calculation Deficiencies
PRD BFE880937P	75	CCD Inconsistencies
PRD BFE880938P	75	SPAE Documentation Inconsistencies

*Corrective action plan submitted to EA
+Interim corrective action plan documented in memorandum from R. Sauer to Those listed (B22 881026 100)

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ENCLOSURE 2

Browns Ferry Nuclear Plant (BFN)
EA Oversight of System Plant Acceptance Evaluation (SPAE)

EA continued to oversee the SPAE process after completion of the audit. The EA oversight team concentrated on those aspects that exhibited weaknesses during the audit: inputs to the SPAE package, clarity and completeness of SPAE package documentation, and system safety evaluations.

During the EA oversight, SPAE packages associated with the following systems were evaluated:

Control rod drive system
Feedwater system
120-V AC system

The results indicate a definite improvement in the accuracy, completeness, and clarity of the SPAE packages. The improvement in the SPAE packages indicates that actions taken to prevent recurrence have, generally, been effective.

During the oversight, EA identified discrepancies in inputs to the SPAE process, and specifically with calculations, that need further evaluation. A CAQR was generated to address the discrepancies. In addition, EA intends to immediately begin its planned audit of BFN essential calculations to provide additional feedback in this area.

ENCLOSURE 3

Browns Ferry Nuclear Plant (BFN)
System Preoperability Checklist (SPOC) and System
Plant Acceptance Evaluation (SPAE) Surveillance Information

As of November 10, 1988, a total of 26 systems have been monitored by Quality Surveillance. The percentages of the monitored systems are as follows:

8 systems - 100 percent monitored
1 system - 90 percent monitored
1 system - 70 percent monitored
3 systems - 40 percent monitored
8 systems - 30 percent monitored
5 systems - 20 percent monitored

Utilizing the graded approach concept, the remaining 14 systems will be monitored in ranges from 10 percent to 100 percent.

Currently, approximately 200 monitoring reports requiring 2956 manhours of work have been generated by QS in the monitoring of the 26 systems. The following synopsis of this effort and cumulative results are:

Total: 7 CAQRs 70 Corrected on the spot (COTS) items

Breakdown: (1) Testing: 0 CAQRs - 1 COTS

(2) Modifications: 3 CAQRs - 12 COTS

(3) Maintenance: 4 CAQRs - 3 COTS

(4) Licensing: 0 CAQRs - 0 COTS

(5) Procedures:
a. Programmatic Issues: 0 CAQRs - 0 COTS
b. Design: 0 CAQRs - 0 COTS * (Does not include EA generated CAQRs)
c. Open Documentation: 0 CAQRs - 0 COTS
d. System Configuration: 0 CAQRs - 54 COTS

* The EA generated CAQRs are BFE 88-0853 and BFE 88-0682. Both deal with inappropriate safety evaluation process use for evaluating system configuration.