ENCLOSURE 3

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1

RESPONSE TO REQUEST FOR INFORMATION REGARDING ADEQUACY AND AVAILABILITY OF DESIGN BASES INFORMATION

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TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

Page

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

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RESPONSE TO REQUEST FOR INFORMATION REGARDING ADEQUACY AND AVAILABILITY OF DESIGN BASES INFORMATION

I. EXECUTIVE SUMMARY

This enclosure provides TVA's response to the October 9, 1996, request for information regarding the adequacy and availability of design basis information for Watts Bar Nuclear Plant (WBN). As reflected below, TVA has confidence and reasonable assurance that WBN is operated and maintained within its design basis. TVA is also confident that any deviations from the design basis are identified and resolved in a timely manner. Because WBN was recently licensed to operate by NRC (i.e., on November 9, 1995), the bases for reasonable assurance in this area are twofold. First, prior to fuel load, WBN undertook extensive, detailed efforts to clearly establish the WBN design basis and then to maintain conformance with the design basis through procedures and in the configuration of plant systems and components. Second, after fuel load, oversight of plant operations has confirmed that there is reasonable assurance that the design basis, as reflected in plant procedures and configuration, has been effectively maintained at WBN. Key initiatives implemented at WBN, both before and after fuel load, are summarized below.

1. <u>Preoperational Design Basis Initiatives:</u> As part of its efforts to resolve identified TVA management issues and construction quality issues at WBN Unit 1, including design basis questions, TVA submitted to NRC an outline of the actions planned to address programmatic issues within its nuclear organization in 1986,[1] and a WBN specific plan in 1989.[2] These plans, Volume 1 and Volume 4 of the Nuclear Performance Plan (NPP), encompassed the actions that TVA believed were necessary to address TVA management issues and complete the WBN licensing process; i.e., to ensure that the plant was designed and constructed in accordance with NRC requirements and TVA commitments, and was operationally ready. NRC accepted Volume 1 and Volume 4 of the NPP in

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1 TVA's letter to NRC dated March 10, 1986, Nuclear Performance Plan Volume 1 (Revised).

2 TVA's letter to NRC dated May 22, 1989, Nuclear Performance Plan. Volume 4 as revised by letter dated September 6, 1991, Revision 1.

Safety Evaluation Reports (SERs), NUREG 1232 Volume 1 (1987), and NUREG 1232 Volume 4 (1989), respectively.

The actions set forth in Volume 4 of the NPP were based on investigations which identified a group of design-related issues that varied in frequency and significance between disciplines and within specific design areas. After considering the nature of the issues, TVA determined that the appropriate mechanism for resolving them was to develop a series of recovery programs referred to as Corrective Action Plans (CAPs) and Special Programs (SPs). Broad scope, generic, or programmatic issues formed the basis for CAPs (e.g., Welding, Cable Issues, Civil/Seismic Issues). SPs were corrective action programs for issues that were significant but not as broadly based as those addressed by CAPs.

In general, the methodology underlying the CAPs and SPs was to clearly establish the design basis for the issue and perform field inspections to confirm compliance, or identify and resolve discrepancies. A complete listing of the CAPs/SPs and key documents associated with each are listed in the Attachment to this Enclosure. In addition, a brief description of the 18 CAPs and 11 SPs is provided in Section 1.9 of WBN's Final Safety Analysis Report (FSAR).

One of the CAPs, the Design Baseline and Verification Program (DBVP), was developed to serve as an integrated means by which to establish the design basis and confirm conformance to the design basis. A process was developed to coordinate the output of the other CAPs and SPs with the DBVP for integration of inputs and outputs, completeness, and control of the WBN design and configuration. In summary, the DBVP CAP reviewed the adequacy of the design of the systems required to mitigate a design basis event, established an enhanced design control process, confirmed implementation of licensing basis commitments, and established a baseline set of essential calculations.[3] This program is more fully discussed in WBN's responses to Requests (b) and (c).

The DBVP, along with detailed verification activities, established the foundation for reasonable assurance that the design of WBN was adequate, properly documented, and consistent with the physical plant prior to fuel load. Verification activities supporting this conclusion included the Program for Assurance of Completion and Assurance of Quality (PAC/AQ),[4] corrective action documents, and the preoperational test program. Additional programs were

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[3] TVA's letter to NRC dated March 8, 1994, Revision 7 of the DBVP CAP.

[4] TVA's letter to NRC dated April 30, 1992, PAC/AQ.

performed for key plant systems which included the System Plant Acceptance Evaluation (SPAE) process to confirm design completion on a system turnover basis, and the System Preoperability Checklist (SPOC) process to ensure system open items had been resolved, including procedures.

In summary, the actions taken by TVA for the initial licensing of WBN Unit 1 established reasonable assurance that the plant's design and licensing bases are properly documented. A complete overview of the scope of the reviews and the structures, systems, and components (SSCs) impacted by the reviews was provided in a detailed document prepared as part of the Unit 1 licensing effort. This document, the Reasonable Assurance Assessment Report (RAAR), was developed to provide information to assist TVA Senior Management in certification of the plant's readiness to load fuel.[5] The report was submitted to NRC on June 28, 1995, and will be referred to extensively in the responses to NRC's Requests (a) through (e) below.

2. **Post-Licensing Rationale:** Once the design basis was clearly established and confirmed to be functionally consistent with the as-built plant at the time of licensing, WBN implemented programs to ensure that the design basis was maintained throughout the operations phase. These post-licensing initiatives serve as the second basis underlying TVA's reasonable assurance that WBN is operated and maintained within its design basis. The thorough and comprehensive design control process established under the DBVP, the Design Change Notice (DCN) process, is one of the primary processes used to ensure plant configuration remains in compliance with the design basis and other requirements of 10 CFR Part 50, Appendix B. Other programs which ensure compliance with regulatory requirements include a change request process for core components, a process for control of temporary alterations, operator implemented processes for control of equipment status, and processes for control of plant maintenance and modifications. Each of these programs is discussed in WBN's response to Requests (a) and (d).

As explained in the response to Request (b), the programmatic activities defined in the scope of the CAPs and SPs, along with the control of changes to the plant design through the DCN process, also provide assurance that pertinent design parameters are translated into plant procedures and that procedures are maintained consistent with the design basis. These activities, coupled with a program for overall procedure enhancement, that verified licensing basis commitments are properly captured and controlled in WBN implementing documents, were successful in preparing plant procedures for operations. They have and

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5 TVA's letter to NRC dated June 28, 1995, RAAR.

will continue to ensure procedure fidelity with design basis requirements throughout the term of WBN operations.

TVA's confidence in the design area at WBN has been affirmed through various oversight and assessment activities that post-date receipt of the license on November 9, 1995. Specific activities, such as organizational self-assessments, internal TVA audits and assessments, aggressive use of the corrective action program, and oversight by TVA management and review groups, provide TVA with a high degree of confidence that the plant design basis have been properly maintained during the first 14 months of operation. As explained in the response to Request (e), a limited number of nonprogrammatic findings regarding maintenance of the design basis have been identified and addressed in a timely manner through the WBN Corrective Action Program. TVA has concluded that these findings do not challenge the effectiveness of WBN's design control processes on a programmatic level. Continued use of these processes, along with the implementation of a planned confirmatory vertical slice review, which is currently in progress, will ensure that proper emphasis is maintained on design control during future operation of the plant.

3. Conclusion: Based on the findings regarding the adequacy of plant design and configuration that supported the recent issuance of the WBN operating license, as well as preoperational and post-licensing programs and oversight results, TVA is confident that:

- Design basis requirements are translated into operating, maintenance, and testing procedures at WBN.
- SSC configuration and performance at WBN are consistent with the design basis.
- Current processes and programs (including those used to identify problems, implement corrective actions, determine the extent of condition, prevent recurrence, and report to NRC) ensure that WBN configuration is consistent with the design basis.

Thus, TVA concludes that no further design reviews or reconstitution programs are warranted at WBN in response to NRC's request. Nevertheless, as explained in Section F of this response, TVA is performing a licensing basis assessment at WBN to provide additional confidence that changes to the licensing basis are adequately reflected in the applicable design basis. This assessment is tailored to evaluate WBN programs that identify and control commitments which affect the licensing basis. This effort is responsive to ongoing industry initiatives, and also serves as an added measure of effectiveness in the design basis arena. Also discussed in Section F are TVA's plans to review the WBN FSAR to confirm its accuracy in conjunction with the first update of the FSAR. This action, along with the continuing resolution of discrepancies through the corrective action program, provide an appropriate means to further improve the content of the FSAR.

II. TVA RESPONSE FOR WBN UNIT 1

1. __Introduction:__ The WBN response to the 10 CFR 50.54(f) letter is based on two bodies of data: (1) TVA activities undertaken during WBN's preoperational phase; and (2) TVA actions implemented after the plant was licensed on November 9, 1995. The design basis was clearly established and confirmed to be consistent with the functional configuration of the plant by TVA during the preoperational phase. Since receipt of its operating license, WBN has taken aggressive action to ensure that the design basis and plant configuration are maintained.

TVA has not relied on NRC reviews and inspections to determine whether plant configuration and operation are consistent with the design basis. Rather, we have used the results of such reviews to provide an independent assessment of TVA's pre- and post-licensing activities, as well as additional assurance that TVA's processes and programs are effective in ensuring that plant configuration is consistent with the design basis.

2. __Background:__ WBN Unit 1 is a 1160 megawatt electric (MWe) Westinghouse pressurized water reactor (PWR) designed with an ice condenser containment. TVA served as its own architect-engineer-constructor and obtained a Construction Permit from NRC for WBN in January 1973. Initially, TVA certified completion of construction of WBN Unit 1 and operational readiness in February 1985. However, in light of a series of employee concerns and problems with overall TVA nuclear performance, NRC issued a 10 CFR 50.54(f) letter in September 1985 requesting that TVA address the effectiveness and comprehensiveness of WBN Quality Assurance during construction, as well as the state of the nuclear program as a whole.

Major efforts were undertaken to respond to the 1985 10 CFR 50.54(f) letter. TVA conducted a comprehensive evaluation of its corporate and site problems between 1986 and 1989. TVA's efforts included a comprehensive review of nuclear program management and a Systematic Evaluation of WBN. The results of TVA's evaluations related to WBN are contained, principally, in Volume 4 of the Nuclear Performance Plan (NPP), which NRC accepted in a January 1990 Safety Evaluation Report (SER), NUREG 1232, Volume 4.

The actions set forth in the NPP provided assurance that upon their completion, WBN would be designed and constructed in accordance with applicable regulatory requirements and TVA commitments, and that the plant would be operationally ready for fuel load and power operation. Many of these actions were based on investigations which identified a group of design-related issues that varied in frequency and significance between disciplines and within specific design areas.

After considering the nature of the identified design-related issues, TVA determined that it was appropriate to resolve them through a series of recovery programs, referred to as Corrective Action Plans (CAPs) and Special Programs (SPs). Broad scope, generic, or programmatic issues formed the basis for the CAPs (e.g., Welding, Cable Issues, Civil/Seismic Issues). SPs were corrective action programs for issues that were significant but not as broadly-based as those addressed by CAPs. In general, the methodology underlying the CAPs and SPs was to clearly establish the design basis for the issue and to perform field inspections to confirm compliance, or identify and resolve discrepancies. A listing of the CAPs/SPs and key documents associated with each is provided in the Attachment to this Enclosure.

One of the CAPs, the Design Baseline and Verification Program (DBVP), was developed to serve as an integrated means by which to establish the WBN design basis. As explained more fully in WBN's response to Requests (b) and (c), the DBVP reviewed the adequacy of the design of the systems required to mitigate a design basis event, established an enhanced design control process, confirmed implementation of licensing basis commitments, upgraded the configuration control process, and established a baseline set of essential calculations.[6] The output of the other CAPs and SPs was coordinated with the DBVP to ensure proper integration of inputs and outputs, completeness, and control of the WBN design and configuration.

These preoperational initiatives, along with associated verification activities, established the foundation for reasonable assurance that the design of WBN was adequate and properly documented, and consistent with the physical plant. Key verification activities supporting this conclusion included the Program for Assurance of Completion and Assurance of Quality (PAC/AQ), the System Plant Acceptance Evaluation (SPAE) process to confirm design completion on a system turnover basis, the System Preoperability Checklist (SPOC) process to ensure resolution of system open items, including procedures and corrective action documents, and the preoperational test program.

The actions taken by TVA prior to issuance of the WBN Unit 1 operating license to establish reasonable assurance that the plant's design and licensing bases are properly documented

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6 TVA's letter to NRC dated March 8, 1994, Revision 7 of the DBVP CAP.

were extensive and diverse. A complete overview of the scope of the reviews and the SSCs impacted by the reviews was provided in the RAAR which was prepared as part of the Unit 1 licensing effort. This document was developed to provide information to assist TVA Senior Management in certification of the plant's readiness to load fuel. The report was submitted to NRC on June 26, 1995, and will be referred to extensively and incorporated by reference in the responses to NRC's requests.

WBN Unit 1 was issued its operating license on November 9, 1995. Since that time, WBN has effectively implemented the engineering design and configuration control processes described in the response to Request (a), as well as the problem identification/corrective action processes described in the response to Request (d).

III. SPECIFIC NRC REQUESTED INFORMATION

A. Request (a)

Description of engineering design and configuration control processes, including those that implement 10 CFR 50.59, 10 CFR 50.71(e), and Appendix B to 10 CFR Part 50.

TVA Response to Request (a)

TVA has several interconnecting design and configuration control programs and processes which address 10 CFR 50.59, 10 CFR 50.71(e), and Appendix B to 10 CFR Part 50. These programs and processes include or are augmented with training, self-checking, and line and independent organization reviews. The programs at all sites contain, at a minimum, the essential elements described in this response, but there are minor implementation differences between the sites to address specific issues.

Additionally, although these programs have evolved with time, the same basic program features have been in use since completion of the Design Baseline and Verification Program (DBVP) in 1995. Use of these programs, coupled with various oversight activities and other programmatic controls that are described later in this response, provides TVA confidence that the WBN design basis has been properly maintained since initial fuel load.

1. Design and Configuration Control: TVA's configuration management program is an integrated process designed to ensure that plant structures, systems, and components (SSCs) conform to approved design requirements, including design bases, and that the plant's functional characteristics are accurately reflected in design bases and other plant documents. Plant configuration is controlled throughout the life of the plant by the identification and documentation of design requirements and through procedures which ensure that the design is implemented properly. Three primary processes are used, as applicable, to implement configuration management as applied to changes to SSCs. These processes are:

- The plant modifications and design control process, which is the responsibility of the Site Engineering and Materials Manager;

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7 Nuclear Power Standard 9.3, Plant Modifications and Design Change Control.

- The nuclear fuel/core component design change control process, which is the responsibility of the Corporate Nuclear Fuels Manager;[8] and

- The temporary alterations control program, which is also the responsibility of the Site Engineering and Materials Manager.[9]

Plant modifications are implemented using the design change control process, which, in general, is as follows:

a. <u>Design Change Control Process:</u> A Design Change Notice (DCN) package must be developed. This not only includes design changes to safety-related SSCs, but is also used for design changes to the appropriate nonsafety-related SSCs.[10] DCN packages are required for design changes that involve plant modifications, document-only changes, generic system/component changes, or other changes to an operating nuclear power plant that also involve a design output document change. DCN packages may be used to update design basis documents. The DCN package provides a basis for the change including references to supporting analyses with new or revised calculations that support the change. DCN packages are developed from a range of inputs including Technical Specifications, design criteria, applicable regulatory requirements, industry and TVA codes and standards, and other similar design considerations in accordance with administrative procedures. DCN packages include 10 CFR 50.59 reviews as required. Other key DCN process features include the following:

- Implementation of DCNs (e.g., using work orders [WOs]) includes installation instructions or references to those instructions. DCN packages also specify the required post-modification testing necessary to ensure design basis requirements are met. The preparation and approval of these packages includes appropriate multidiscipline and independent reviews and reviews by affected organizations, as required. For example:

  ⇒ An authorized Nuclear Inspector/Authorized Nuclear Inservice Inspector (ANI/ANII) reviews WOs which

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8 Nuclear Power Standard 9.2, Nuclear Fuel/Core Component Design Change Control.

9 Nuclear Power Standard 12.4, Temporary Alterations Control Program.

10 An exclusion list may be established to identify site features that are not subject to configuration management control. The list can include only SSCs that are not quality related and are not described in the FSAR. The list must be approved by the site Vice President.

contain work steps affecting ASME Section XI components and/or systems;

⇒ RADCON reviews DCNs which involve work within the Radiologically Controlled Area.

⇒ A Technical Reviewer then reviews the WO prior to its issuance for implementation.

- The DCN process also includes a Return to Service evaluation that is required to be completed before the turnover of a modified SSC to plant operations. This process ensures that required operations, maintenance, and testing procedures have been updated; that training required to support operability has been completed; and that control room drawings have been revised.

- The DCN process includes the updating of the design basis documents that were validated by the DBVP (i.e., design criteria, critical drawings, and supporting calculations), and any required UFSAR changes. The package is archived for future reference.

- TVA has established a controlled database which contains information relating to the design and operational characteristics of certain as-installed plant components. Processes are in place which update, maintain, and control the key data to track components in the plant by location, unique identifier, description, type, manufacturer, etc. As plant design changes occur and components are replaced, the design control process requires that the database be updated to reflect the change. In addition, efforts are planned at each site to enhance completeness and correctness of this key data.

Each of these major points in the DCN process discussed above includes coordination between affected organizations, documentation of the activities performed as well as documentation of the overall change being made. Management involvement is also a part of these activities. This includes approval of the request for a change, approval of the engineering work provided in the DCN package, and approval to implement the change. The work packages provide detailed instructions with self-checking sign-offs in the installation process. Further, the work package also specifies Quality Control hold points for inspection of critical activities before installation can proceed.

TVA ensures the DCN process is followed and is effective. Engineering personnel who independently perform or technically review safety- and quality-related design change activities are required to receive indoctrination and training based on INPO Academy 91-017 guidelines. This training is routinely updated to reflect lessons learned.

b. Fuel/Core Component Change Control: TVA controls nuclear fuel/core component design using a similar process. Generally:

- A Core Component Design Change Request (CCDCR) package must be developed for modifications to nuclear fuel assemblies and other core components. This package includes 10 CFR 50.59 reviews, as required.

- CCDCRs are reviewed by each affected plant organization. This review includes the Plant Operations Review Committee (PORC).

- Modifications made onsite to core components are completed via the processes used for other plant changes described above. This includes detailed installation instructions, where applicable, and preparation of WOs. In addition, the Plant Manager's approval is required before beginning work at the site.

- The CCDCR closure process includes, as applicable, the updating of the design basis documents, maintenance, testing and operating procedures, and the UFSAR. The CCDCR documentation is archived for future reference.

c. Temporary Alteration Control: Temporary plant alterations is the third process used to implement changes under the configuration management system. A temporary alteration is normally used to maintain equipment in service using an approved, alternate means until the equipment can be returned to its permanent configuration. It should be noted that alterations may be made without using the temporary plant alteration process when the components or systems are taken out-of-service (blocked, tagged, or otherwise inhibited or tripped) for troubleshooting, calibration, modification, or maintenance using an approved procedure and the operability of the affected component or system will be verified by testing prior to returning it to service. Additionally, temporary plant alterations may be made in accordance with approved plant procedures. If this is done, and the temporary conditions are required to remain in place after closure of the approved procedure, the temporary plant alteration process is required to be followed. The general process for implementing a temporary alteration is as follows:

- A Temporary Alteration Control Form (TACF) is developed. The TACF describes the alteration (e.g., wire lifts, jumpers, inhibits, and temporary connections), its effect on equipment, functions, procedures, drawings, and its location. Additionally, a Safety Assessment (SA) and, as necessary, a Safety Evaluation (SE) is performed as required by TVA's 10 CFR 50.59 process (described below). TVA requires verification of both the installation and removal of the temporary alteration.

- The Plant Manager approves temporary alterations. Depending on the activity performed, the TACF must be approved by the Shift Manager or Unit Supervisor on the affected unit. In addition, PORC reviews temporary alterations on quality-related components.

- Affected procedures and control room drawings are modified, as required, to reflect temporary alterations.

- When a unit startup is in progress, an Operations representative (Senior Reactor Operator [SRO], Shift Manager, or Unit Supervisor) is required to review outstanding TACFs on the unit to determine if the TACF has any restriction with respect to mode changes and power changes.

- When a unit is in operation, a periodic review of TACFs is performed to determine continued need and to identify any administrative errors in the TACF records.

- The original TACFs, associated 10 CFR 50.59 review, and attached reference drawings for temporary alterations that are installed in the plant are maintained by the Shift Manager. The closed out TACFs are subsequently archived for future reference.

The list of open temporary alterations and the schedule for their resolution is reviewed routinely by senior management.

4. Design Process Performance Monitoring: Site Engineering routinely monitors indicators of the health of the design control process. Monthly, and in some cases weekly, data is reviewed to track status and cycle time for various engineering deliverables. Items tracked include DCN closures, drawing updates, open corrective action program documents, and open TACF's. Managers use this performance monitoring information to focus on and improve process or performance weaknesses.

2. Activities That Maintain Design Configuration: TVA has several layers of administratively controlled programs

and practices to ensure that the plant configuration, which is primarily controlled by the three programs/processes described above, is maintained in accordance with the design basis established in the design criteria, calculations, and critical drawings. Examples of programs and practices that maintain plant configuration during operations and after maintenance or modification activities are described below.

a. **System Line-up Controls:** System line-up is controlled through the use of Equipment Alignment Checklists. Control is initially established through a thorough documented walkdown and alignment of system components in the proper configuration. Verifications of this type take place in situations such as when major evolutions are performed that involve several manipulations to a system's configuration. The Unit Supervisor/SRO ensures that system line-ups are maintained by controlling required changes to the system configuration. Approved changes in system configuration/status are documented within an approved site administrative process (i.e., WOs, equipment clearance programs,[11] etc.). Through these same administrative processes the Unit Supervisor/SRO ensures restoration of the configuration/status of affected components or systems are appropriate for plant operational conditions.

Quality Assurance periodically verifies that system configurations are controlled in accordance with procedures through assessments, reviews, and routine observations.

b. **Overall Control of the Operation of Plant Equipment:** During operations, the overall operation of the plant is directed by the Shift Manager.[12] The Unit Operator, Unit Supervisor, and the Shift Manager are informed and aware of significant activities affecting plant equipment. However, activities that are unlikely to affect safety, regulatory requirements, or operating capability (e.g., pumping sumps) may be performed without informing the control room. These activities are coordinated by Operations personnel outside the control room. Additionally, some sample and instrument loop isolation valves are configured by other plant organizations and controlled by appropriate procedures. Operator tours are conducted by a non-licensed operator and reviewed by a licensed operator supervisor each shift to maintain cognizance of equipment status. Equipment deficiencies are documented and assessed to determine if compensatory actions are required by Operations personnel. These compensatory actions required by Operations personnel are commonly referred to as "operator workarounds." The Operations

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11 Nuclear Power Standard 12.3, Equipment Clearance Program.

12 Nuclear Power Standard 12.1, Conduct of Operations.

Superintendent or his designee evaluates the aggregate impact of these identified "workarounds" to ensure that safety and overall operational efficiency is not compromised. Short- and long-term corrective actions are prioritized, scheduled, and resolution of these workarounds is coordinated with Operations management and supporting organizations.

c. __Control of Equipment During Maintenance and Modifications:__ Administrative controls are in place for initiating, planning, performing, completing, and tracking work necessary for both the resolution of operator workarounds that do not involve a design change and performing preventative and corrective maintenance.[13,14] These administrative controls require that WRs or WOs be prepared and that any necessary short-term configuration changes (e.g., jumpers, wire lifts, temporary instrument settings, unbolting flanges, temporary connections) and status control changes (e.g., repositioning of valves, breakers, or switches) be listed in a configuration log or approved procedures. Equipment clearances are required before any maintenance is performed on equipment where the unexpected energizing, startup, or release of stored energy could cause injury or equipment damage.[15] Within the work scheduling process, a Work Week Manager develops a detailed work schedule that integrates the activities for each week. Licensed Operators, System Engineers and others participate in this schedule development to evaluate the impact on plant operations and ensure proper coordination.

Operations is notified before the start of maintenance or modification activities for evaluation of planned configuration changes and so that control of the status of the equipment can be transferred to the maintenance or modifications personnel. Signatures are required to document that each of the individual configuration and status control changes are made and another signature is required to document when the individual configuration and status control changes are returned to their original position. A complete system status verification may be performed when major evolutions involving several manipulations are performed.

Operations is notified of the completion of the maintenance task or modification activities and status control of the equipment is returned to them.

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13 Nuclear Power Standard 6.2, Maintenance Management System.

14 TVA allows certain minor maintenance activities that are commensurate with craft qualifications and require little coordination to be performed under less restrictive controls than those described in this section.

15 Nuclear Power Standard 12.3, Equipment Clearance Procedure.

d. **Post-modification/Post-maintenance Testing:** Post-modification tests, which are specified as part of the configuration control process, or post-maintenance tests, which are specified as part of the maintenance control processes, are conducted to ensure that:[16,17]

- Equipment performs its intended function following maintenance or modification activities;

- The original deficiency (if any) has been corrected; and

- A new deficiency has not been created by the maintenance or modification activity.

Quality Assurance periodically evaluates the implementation of the post-modification/maintenance test (PMT) program through audits and assessments. These verifications ensure that the plant PMT program includes appropriate plant equipment and verifies equipment will perform its intended function. Some PMTs are verified through Quality Control inspections, such as piping systems that are verified through hydrostatic testing.

e. **Control of Replacement Parts During Maintenance:** Configuration control is maintained during the maintenance process when worn or damaged equipment requires replacement. When replacement parts are required, the requester must provide sufficient information to determine the necessary technical and quality requirements for the requested items.[18]

Replacement quality-related materials receive a receipt inspection.[19] In addition to verifying the specified technical and quality requirements are met, specific guidance is provided for identification of transport damage, counterfeit and substandard parts. Requirements for the handling and storage of spare parts are provided to ensure that these items are handled, stored, and shipped in a manner to prevent deterioration, contamination, damage, or loss of identification.[20,21]

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16 Nuclear Power Standard 6.1, Conduct of Maintenance.

17 Nuclear Power Standard 6.2, Maintenance Management System.

18 Nuclear Power Standard 10.1, Procurement of Material and Services.

19 Nuclear Power Standard 10.2, Material Receipt and Inspection.

20 Nuclear Power Standard 10.3, Handling and Storage of Materials and Spare Parts.

21 Nuclear Power Standard 10.4, Material Issue, Control and Return.

Quality Assurance performs regularly scheduled audits of the replacements parts programs to verify that these programs are being adequately implemented. Programs audited include procurement, receipt inspection, storage, handling, shipping, and issue and return. In addition, audits of suppliers quality programs are performed on a three-year frequency to ensure these programs are being adequately implemented.

f. __Independent/Second-Party Verification:__ In addition to these configuration controls, the Operations Manager is responsible for designating those systems and/or components requiring independent or second-party verification.[22] These types of verification requirements are reflected in site operations, maintenance, and testing procedures; instructions; and work documents. For example, breakers, valves, and other components in designated systems are required to be independently or second-party verified to be in their correct position or condition after they are manipulated for operation, maintenance, modification, or testing activities. This provides additional assurance that the plant configuration is maintained in accordance with the design documents.

g. __Access to Design and Licensing Basis Information:__ The Nuclear Quality Assurance (NQA) Plan[23] requires that for activities affecting quality, measures shall be established to ensure that documents which prescribe the activity are made available to personnel performing the activity. The TVA Document Control and Records Management (DCRM) program defines the process for the control of and access to drawings, specifications, design criteria, and other documents related to design bases. Access to principal elements of plant licensing bases, such as the FSAR, Technical Specifications, and correspondence submitted to NRC is also controlled through this program.

Design and licensing bases documents are controlled to ensure that the latest version is used in performing safety-related activities.

3. __10 CFR 50.59 Safety Assessments/Safety Evaluations:__ The 10 CFR 50.59 process is controlled by a Nuclear Power administrative procedure.[24] The procedure addresses changes to the facility or procedures described in the Safety

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22 Nuclear Power Standard 12.6, Verification Program.

23 TVA letter to NRC dated August 31, 1995, TVA Nuclear Quality Assurance (NQA) Plan (TVA-NQA-PLN-89-A) Update - Revision 6.

24 Nuclear Power Standard 12.13, 10 CFR 50.59 Evaluations of Changes, Tests and Experiments.

Analysis Report (SAR)[25] or tests or experiments not described in the SAR to determine if an unreviewed safety question exists.[26] The process includes a SA which consists of a determination of the acceptability of a proposed change from a nuclear safety standpoint, and a screening review to determine if the activity would result in 1) a technical specification change, 2) a change (other than administrative or editorial) to the information presented in the SAR, or 3) if a test or experiment is not described in the SAR. If the SA indicates that the proposed activity might not be safe, the activity must be modified or canceled. If the activity is determined to be safe, the process continues to evaluate whether a Technical Specification or SAR change is involved.

If a Technical Specification change is found to be necessary, a license amendment is submitted to NRC for approval. If it is determined that a change (other than administrative or editorial) is being made to the information presented in the SAR or a proposed test or experiment is not described in the SAR, a SE addressing the questions in 10 CFR 50.59 is prepared. If it is determined that the proposed change, test, or experiment involves an unreviewed safety question, then the proposed action must be revised, canceled, or reviewed by the NRC prior to implementation. The SA and, if it is required, the SE are prepared as part of the design control or procedure change processes prior to the implementation of the change or initiation of testing.

The program requires that only qualified personnel prepare and technically review SAs and SEs. Preparers and reviewers must be formally trained before working on SAs and SEs and they must receive retraining at two-year intervals. Typically, the initial training for 10 CFR 50.59 involves a two-day classroom instruction with an examination and a practical exercise in which an actual SA or SE is prepared. Required retraining consists of classroom training on topics related to the SE process.

Line managers are responsible for assigning trained and qualified preparers and reviewers for SAs and SEs consistent with the complexity and scope of the proposed activity. Preparers are required to obtain technical assistance outside their immediate area of expertise and responsibility, when it is needed to complete the SA or SE. Preparers also ensure that the SA and/or SE is consistent with the UFSAR or FSAR (including the "living FSAR"), NRC

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25 This includes the latest updated FSAR, FSAR changes not yet incorporated in the controlled FSAR and any licensing basis commitments not yet incorporated in the controlled FSAR.

26 For changes to commitments not within the scope of 10 CFR 50.59, TVA has a commitment change process, which is described later in this response.

operating license amendment Safety Evaluation Reports (SERs)(including supplements), major restart program SERs, and plant Technical Specifications. PORC reviews selected SEs as an oversight function of the 10 CFR 50.59 activities. The Nuclear Safety Review Board (NSRB) provides oversight of the SA/SE process and periodically assesses the adequacy of the 10 CFR 50.59 Program.

TVA's 10 CFR 50.59 program has evolved and will continue to evolve, in consideration of industry and regulatory practices as well as to address performance issues identified by TVA. As an example, a substantial change to the program was made when NSAC 125 was issued. Other changes were made to provide appropriate program guidance when new issues have arisen such as evaluating analog to digital control system changes or if internal or external assessments indicate that the program should be enhanced.

4. Updated Final Safety Analysis Report [10 CFR 50.71(e)]: TVA administratively controls the FSAR, including how this document is revised and updated, in accordance with 10 CFR 50.71(e).[27] Changes to the FSAR are identified during the performance of the SA/SE process (required to comply with 10 CFR 50.59), and during the preparation of design changes or procedural revisions. In addition, not only can an individual identify the need for a change to the FSAR, they also have the responsibility to identify any known errors within the FSAR.

Changes to the FSAR must be made in accordance with the administratively controlled process, which is coordinated by the Nuclear Assurance and Licensing (NA&L) Department. The procedural requirements for submitting a change to the FSAR include:

- A FSAR change form must be completed, which includes specific references to the pages, figures, tables, that require revision.

- The preparer must provide annotated pages, figures, tables, or replacement pages that clearly indicate the requested change.

- Identification of the date that the activity addressed by the FSAR Change Request was implemented (field complete and plant approved). This date is used to ensure that the FSAR is up-to-date as of a maximum of six months prior to the date of filing the amendment in accordance with 10 CFR 50.71 (e)(4).

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[27] Nuclear Power Standard 4.2, Management of the Final Safety Analysis Report (FSAR).

- The preparer must also provide the supporting justification for the change. This normally consists of the SAs/SEs performed in accordance with 10 CFR 50.59. However, the justification may also be in the form of an NRC SER that addresses the subject of the change request, such as the SER from an NRC approved operating license amendment, or justification that the FSAR Change Request is an administrative change.

In accordance with the administrative controls for the FSAR change process, NA&L logs and tracks FSAR changes and ensures that the organization assigned primary technical responsibility for the affected FSAR section evaluates proposed FSAR changes. Approved changes are incorporated into the Living FSAR, so that there is access to the latest FSAR material. The living FSAR is a document that compiles each approved FSAR change that has not yet been incorporated into a FSAR amendment package.

In order to prepare a UFSAR amendment, NA&L consolidates individual changes that have been implemented prior to the UFSAR amendment cutoff date. NA&L coordinates a multidiscipline review of the UFSAR amendment submittal to NRC with appropriate concurrence in accordance with the administrative controls established for written communications between TVA and NRC.[28] Once the UFSAR amendment is approved for submittal to NRC, the controlled copies of the UFSAR are updated in accordance with the administrative controls.

5. <u>Implementation of Appendix B to 10 CFR Part 50:</u> The TVA NQA Plan describes the Quality Assurance (QA) Program as required in 10 CFR 50.34, "Contents of Applications; Technical Information" and 10 CFR 50.54, "Conditions of Licenses." The QA Program described in the NQA Plan provides control over activities affecting the quality of identified SSCs to the extent consistent with their importance to safety. The NQA Plan is referenced in each TVA nuclear plant's SAR and has been accepted by the NRC as meeting the requirements of 10 CFR 50, Appendix B.

The NQA Plan places responsibilities on identified sponsors to develop specific elements of the QA Program, addressing requirements of source requirement documents such as NRC Regulatory Guides and ANSI Standards. This is accomplished through administrative procedures (e.g., Nuclear Power Standards [STDs], Site Standard Practices [SSPs], Standard Programs and Processes [SPPs]) that are normally sponsored by managers who are responsible for designated functional

[28] Nuclear Power Business Practice, BP-213, Managing TVA's Interface with NRC.

areas. STDs and SPPs are procedures that define overall program requirements. Each STD/SPP sponsor is responsible for incorporating into STDs/SPPs, QA and other regulatory requirements applicable to the functional area. Site and corporate organizations implement STDs either directly or through lower-level documented procedures or instructions such as SSPs. SPPs are directly implemented at the sites.

The engineering design and configuration control processes described above also incorporate the relevant requirements of Appendix B to 10 CFR Part 50. For example, the three processes used to modify the plant's configuration satisfy Criterion III, Design Control, and incorporate requirements necessary to ensure that instruction, procedures and drawings are revised prior to closure in accordance with Criterion V, Instructions, Procedures, and Drawings. Procurement requirements necessary to ensure adequate quality of the requested items are specified in order to satisfy Criteria IV, Procurement Document Control; VII, Control of Purchased Material, Equipment, and Services; and VIII, Identification and Control of Materials, Parts, and Components.

The Corporate QA organization performs audits to assess the adequacy and effectiveness of the TVA Nuclear QA program. These audits are performed in accordance with written procedures or checklists by qualified and certified personnel who have no direct responsibility in the areas being audited. Audits evaluate a number of quality-related attributes, including:

- Compliance with Technical Specifications and license conditions.

- Performance, training, and qualifications of the plant staff.

- Effectiveness of actions taken to correct problems with equipment, SSCs, or method of operation that affect nuclear safety.

- The performance of activities required to meet the criteria of Appendix B to 10 CFR 50.

The QA organization audits both TVA Nuclear organizations and contractors and suppliers who provide safety-related services or materials.

Additionally, independent technical reviews are performed by Site NA&L to assess activities such as modifications, maintenance, and engineering to verify that these activities are performed safely and correctly.

6. __Commitment Management:__ A commitment management and tracking process is in place to provide a formal method for identifying and tracking commitments made to NRC.[29] This process also includes a process for revising commitments which are not controlled by 10 CFR 50.59 or other regulatory processes. This process incorporates the Nuclear Energy Institute (NEI) "Guidelines for Managing NRC commitments."[30] Sources of commitments include Licensee Event Reports and responses to Notices of Violation or other docketed submittals. NA&L maintains a commitment tracking system that includes a description of the commitment, responsible organization, and due date. Changes in the scope or completion date specified in a commitment must be justified. As necessary, such changes are submitted to NRC by NA&L, and the commitment tracking system is updated.

NA&L reviews commitment closure documentation to confirm that actions taken conform to the original intent of the commitment and that the original concern is satisfied. NA&L may elect to have closure independently verified for any commitment.

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29 Standard Programs and Processes 3.3, NRC Commitment Management.

30 The NEI guidelines were recently included in TVA procedures. However, TVA participated in the NEI pilot project in 1994 - 1995 and has used the guidelines informally since that time.

B. **Request (b)**

Rationale for concluding that design bases requirements are translated into operating, maintenance, and testing procedures.

TVA Response to Request (b)

TVA's rationale in this area stems from programmatic initiatives that were implemented both prior to and after issuance of the WBN operating license. Prior to licensing, the programmatic activities called for by the scope of the WBN Corrective Action Plans (CAPs) and Special Programs (SPs), along with the control of the resultant changes to the plant design, provided assurance that pertinent design parameters were translated into plant procedures. Additional assurance during the preoperational phase arose from: (1) a program for overall procedure enhancement; (2) a program which verified licensing basis commitments were properly controlled in site documents; and (3) the experience from use of the procedures for completion of preoperational, hot functional, and power ascension testing.

Since licensing, implementation of a thorough and comprehensive procedure change process at WBN (with the controls of 10 CFR 50.59) provides reasonable assurance that design basis requirements are translated into operating, maintenance, and testing procedures.

1. **Preoperational Phase Rationale:**

a. **Impact of the Design Baseline and Verification Program:** One of the key activities for the translation of design parameters into procedures at WBN was the DBVP CAP. It encompassed four functional areas, each having specific objectives:

- *Licensing Verification* - This area assured that FSAR and docketed commitments were captured in a controlling document and established procedures to maintain compatibility between commitments and controlling documents.

- *Design Basis* - This area focused on establishing the safe shutdown boundary design basis document (DBD) that contains or references appropriate engineering requirements including design basis commitments. This area of the DBVP also established a design control process which included procedures to maintain the design basis consistent with changes to the plant, technical requirements, and licensing commitments.

- *Calculations* - This area assured the existence of technically adequate and retrievable essential calculations and development of a process to maintain essential calculations current with plant design changes.

- *Configuration Control* - This area developed and implemented an improved design change control system and established a single set of configuration control drawings (CCDs). Validation of the configuration control function was accomplished through plant walkdowns, evaluations, or during component and preoperational testing.

Actions taken in conjunction with two of these DBVP functional areas - configuration control and licensing verification - ensured that design basis requirements are translated into plant procedures at WBN. First, as part of the actions taken in the configuration control functional area, WBN established a design control process. This process, the Design Change Notice (DCN) process, was based on a packaged change/single drawing of record concept in which a drawing change authorization (DCA) resides in the package until it is installed and verified in the field.

Subsequent to its initial development, the DCN process at WBN was upgraded to be consistent with the design change process in use at Browns Ferry. The latter required a formal review by all organizations involved in a modification to determine the impact of a change on plant documents. As part of this review, a Design Change Implementation Package (DCIP) was developed which provided for the tracking of identified procedural, testing, or operational impacts.

Further assurance that design and licensing basis requirements were translated into procedures arose from actions taken in the Licensing Verification area of the DBVP CAP; specifically the commitment verification activities of the Program for Assurance of Completion and Assurance of Quality (PAC/AQ). Through the PAC/AQ effort, commitments made to NRC in the FSAR or the WBN docket were matched to an implementing document, including procedures. Each programmatic commitment was then reverified by a line organization to ensure it was incorporated in the document identified by PAC/AQ and appropriately referenced within the document to the commitment identifier. These actions ensured that requirements applicable to both safety and nonsafety-related systems were properly controlled.

b. **Additional Preoperational Programs for Procedural Adequacy:** Further assurance of procedural conformance with the WBN design basis was accomplished through a Procedures Upgrade Program (PUP). The purpose of the program was to ensure that plant instructions were properly developed to support startup and operation of WBN Unit 1. Its scope was defined to include procedural categories such as Surveillance Instructions; Maintenance Instructions; Technical Instructions; Operating Instructions (System Operating Instructions, Emergency Operating Procedures, Abnormal Operating Instructions); and Administrative Procedures.[31]

The procedures upgrade process required an information package to be developed for each procedure within the scope of the program. Through development of this package, the procedure writer was required to obtain design output pertinent to the procedure being upgraded for incorporation into the procedure, as was appropriate. Similar type processes were followed for review of the Technical Specifications, the Final Safety Analysis Report (FSAR), and other sources of commitments made to NRC. Overall, these measures provided adequate assurance that design basis information was translated into WBN's procedures and instructions.

Further, a System Preoperability Checklist (SPOC) process was used to ensure that work activities associated with a plant system were complete or identified prior to turnover of a system to plant Operations. In the area of procedures, SPOC required the review of System Operating Instructions (SOIs) by the system engineer to ensure the incorporation of applicable operating requirements from the design output.

Also as part of this system turnover process, Operations personnel performed a review of procedures required for operation of the systems. This review focused on procedures such as Surveillance Instructions (SIs), Technical Requirement Instructions (TRIs), Fire Operating Requirements (FORs), and Alarm Response Instructions (ARIs). It ensured the required procedures were issued and in the correct format or known outstanding issues were identified or tracked. A similar type of review was performed for preventive maintenance procedures.

The action taken by TVA for the resolution of a series of Three Mile Island (TMI) action items (NUREG 0737) resulted in the preparation and verification of the WBN Emergency Operating Instructions (EOIs) and Abnormal Operating Instructions (AOIs). These instructions are significant in

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31 PUP Program Description Procedures: I-4.2, Initial Research and Evidence Package; I-4.3, Technical Requirements Matrix; I-4.4, Incorporating Commitments.

that they direct operator actions in response to an operational event. The process for the development and revision of the EOIs ensured that design basis requirements were reflected in the EOIs. The development of EOIs for WBN, in general terms, translated design basis requirements in the following manner:

- TVA substituted WBN plant specific values for the generic values contained in the Westinghouse Owner's Group (WOG) Emergency Response Guidelines (ERGs) by reviewing the WBN design basis.

- TVA developed, from its design basis and physical plant characteristics, the technical steps required by the ERGs necessary for successful mitigation of an event. Additional steps were added as required due to unique plant characteristics.

- ERG steps which were not applicable to WBN were appropriately dispositioned.

- Verification/validation (V/V) of the initial EOIs was performed in accordance with the EOI administrative controls.[32]

TVA has a process to control revisions to the EOIs to ensure design basis requirements are maintained. This process includes checks and balances designed to verify and validate that the change is consistent with design basis requirements. This process includes a review of the change by the EOI Responsible Procedure Coordinator (RPC) to determine whether verification or validation of an EOI change is required and a verification and validation similar to that conducted in the initial EOI development process.

Collectively, the actions related to procedures implemented under the SPOC process and the emergency procedure reviews ensured that the procedures required for operation of a system were either complete or known outstanding issues were identified and tracked for resolution. Further confidence was provided by a series of inspections conducted by NRC to establish the adequacy of the WBN EOIs.[33] Through these inspections, NRC concluded that the EOIs adequately covered the broad range of accidents and equipment failures necessary for safe shutdown of the plant.

Assurance that an additional set of design requirements was properly controlled was accomplished through a verification

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32 Site Standard Practice, SSP-12.16, Emergency Operating Instruction Control.

33 NRC Inspection Reports, 390/94-86, 390/95-42, and 390/95-58.

effort similar to that performed for commitments cataloged by PAC/AQ. This effort focused on American National Standards Institute (ANSI) requirements and ensured the requirements were properly implemented and referenced in implementing documents, including procedures.

c. __Final Confirmation of Procedural Adequacy Prior to Operation:__ A final measure of design and procedural conformance at WBN was provided through the preoperational test program including the performance of two sets of hot functional tests. The adequacy and usability of the plant procedures and the correctness of design output for system operating parameters were confirmed through these tests.

Collectively, the actions implemented through the CAPs and the assurance of the adequacy of the design and procedures provided by the SPOC and the testing programs established a basis for confidence that the plant design was appropriately reflected in the procedures required for plant operation at the time of licensing. Once this confidence was established for fuel load, further confirmation of procedural adequacy was obtained during power ascension testing. This testing facilitated final grooming of the procedures prior to commercial operation.

2. __Post-Licensing Rationale:__

a. __Design Change Process__ When a design change is made, TVA's design change process requires that affected procedures be identified and created or revised to reflect the design change. The design change processes are described above in response to NRC Request (a). These processes ensure that the design is correctly reflected in the applicable operations, maintenance, and testing procedures.

b. __Procedure Generation/Revision Process:__ The administrative control processes established for the development, review, approval, and control of the TVA and WBN procedures are designed to implement upper-tier programmatic and NQA Plan requirements. These controls ensure design basis requirements are adequately reviewed for the development of, and incorporation into site technical and administrative procedures. Established controls ensure that design basis information is adequately researched by procedure authors during procedure development.[34] Programmatic controls ensure that procedures are reviewed by affected organizations (e.g., Operations, Chemistry, Engineering); a Technical Reviewer (discussed in response to [a]); QA (if required); and qualified 10 CFR 50.59

[34] Site Standard Practice, SSP 2.03, Administration of Site Procedures.

reviewers. In addition to the procedure development and review cycle, some technical procedures receive walkdown reviews and PORC reviews, as appropriate, prior to approval.

The procedures control program also addresses the revision process. These controls ensure that procedures are maintained current and reflect plant configuration control changes. Revisions to procedures are processed through the same series of controls as newly developed procedures.

These administratively controlled checks and balances ensure that design basis requirements are correctly translated into operations, testing, and maintenance procedures.

3. <u>Conclusion:</u> The combined effect of the enhanced design control process developed as part of the DBVP CAP, the commitment verification efforts of PAC/AQ, along with the overall enhancements achieved through the PUP and SPOC programs, established a basis for confidence that pertinent design parameters were translated into plant procedures prior to issuance of WBN's operating license. This was further validated by testing programs. Confidence that conformance with the design basis will be properly maintained during plant operation is provided by the proven programs which are currently in place for procedural and design control.

C. Request (c)

Rationale for concluding that structures, systems, and components configuration and performance are consistent with the design bases.

TVA Response to Request (c)

TVA's rationale for concluding that SSC configuration and performance at WBN is consistent with the design basis is based on rigorous actions taken by TVA before WBN's 1995 fuel load, and equally important, activities since fuel load. The establishment and confirmation of the WBN design basis prior to fuel load was probably the most rigorous process ever conducted for a commercial U.S. plant. As documented in the RAAR there was strong consistency between the design basis and the as-built plant at the time of licensing.[35]

Key sections of the RAAR are referenced in this response because they summarize and evaluate the extensive actions taken, principally as part of the Design Baseline and Verification Program (DBVP), by TVA prior to issuance of the WBN Unit 1 operating license to ensure that WBN SSC configuration is consistent with the design. For example, Section IV, Enclosure 1 of the RAAR entitled "Design Adequacy" addresses WBN design adequacy and the effectiveness of the current design and configuration controls. Section IV, Enclosure 2 of the RAAR entitled "Construction Adequacy" explains how SSCs needed for safe plant operation at WBN are controlled such that there is reasonable assurance that they will perform their intended safety function in accordance with design. Other sections and enclosures to the RAAR are referenced throughout this response.

Subsequent to the issuance of the WBN operating license, TVA has taken additional actions which ensure that SSC configuration and performance are consistent with the design basis. These include the processes which are described in WBN's response to Request (a). Their effectiveness has been confirmed through the oversight activities discussed in the response to Request (e) and in periodic System Status Reports.

1. Pre-Licensing Initiatives Which Confirms SSC Configuration is Consistent with WBN Design Basis:

a. Corrective Action Plans (CAPs) and Special Programs (SPs): TVA is confident that WBN SSC configuration and performance are consistent with the design basis.

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35 TVA's letter dated June 28, 1995, RAAR

Several sections of the RAAR explain why the WBN design basis and the as-built plant were consistent at the time of licensing. As indicated in the overview of this response, this aspect of the rationale is set forth in significant detail in various Enclosures to and Sections of the RAAR. That information is not repeated in this response. Summarized below, however, are key aspects of this preoperational rationale.

As set forth in the "Background" section of the WBN response, the key activity in the process of identifying problem areas and establishing corrective actions at WBN prior to issuance of an operating license was the development and implementation of the CAPs and SPs. They are listed in the Attachment to this Enclosure, "WBN CAPs and SPs." This Attachment also identifies key documents which provide details on the scope, review, and closure of CAPs and SPs. A general overview of the CAP and SP activities is set forth in Section III, "Regulatory Review of the WBNPP," of the RAAR.

As part of the investigation of outstanding issues at WBN, during the process of developing the CAPs and SPs, TVA learned that the design issues that existed at WBN varied in frequency and significance between disciplines and within specific design areas. Based on this finding, TVA concluded that the appropriate resolution mechanism was an integrated program, the DBVP CAP. A complementary strategy was developed to address other specific technical issues; i.e., through issue- or hardware-specific CAPs and SPs. These CAPs and SPs were coordinated with the DBVP to assure proper integration of inputs and outputs, completeness, and control of the WBN configuration. Thus, the CAPs and SPs were an important effort undertaken by WBN, prior to issuance of its operating license, to ensure consistency between SSCs and the design basis.

b. <u>DBVP Corrective Action Program and Program for Assurance of Completion and Assurance of Quality (PAC/AQ):</u> Together, the DBVP and the other CAPs/SPs, along with the confirmatory activities of PAC/AQ, provided a systematic framework for conducting investigations into design basis issues, as well as for scoping and managing implementation of corrective action activities. The objectives of the DBVP CAP are outlined in the preceding response to Request (b). In summary, the program ensured the plant's design and licensing bases were properly documented and established processes for their maintenance.

The PAC/AQ program, which is described in Section III of the RAAR, was developed to provide TVA Senior Management with additional assurance that commitments had been met and that WBN was designed and constructed in accordance with regulatory requirements and TVA commitments. In particular, PAC/AQ served to validate the implementation of design and licensing bases commitments through its reviews. As a whole, the PAC/AQ process was extensive, spanning a 4.5 year period and involving the expenditure of more than 50 man-years of effort.

The PAC/AQ program employed a combination of 100 percent reviews of commitments and a sample verification of their implementation. It was carried out in the following five phases:

- ***Phase I*** - Compile WBN licensing commitments, including the FSAR.
- ***Phase II*** - Match licensing commitments to WBN implementing documents.
- ***Phase III*** - Confirm the technical adequacy of implementing documentation.
- ***Phase IV*** - Confirm the results of in-line/unique processes, including plant hardware.
- ***Phase V*** - Final integrated design review and oversight of operational readiness.

The licensing commitment reviews performed as part of DBVP and PAC/AQ included both docketed submittals to NRC and the review of the FSAR. In reviewing the FSAR, sections of the document were captured and identified as a "commitment unit." The identified commitment units were individually reviewed for conformance with applicable plant design documents (i.e., Design Criteria, System Descriptions). Discrepancies between the FSAR and the documents reviewed were tracked and change packages for the FSAR were generated as appropriate.

c. <u>Oversight of CAP and Plant Activities:</u> Another basis for TVA's confidence that SSC configuration at WBN was consistent with the design basis prior to fuel load is the extensive oversight of the actions taken for the licensing Unit 1, as evidenced by numerous vertical slice reviews and assessments. These independent appraisals of system design and configuration were conducted by at least five different organizations and covered 12 different systems. Note that this includes a final confirmatory vertical slice of the Auxiliary Feedwater System, which was completed in September 1995 by Nuclear Assurance.[36]

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36 R. R. Baron's memorandum dated August 29, 1995, Nuclear Assurance Audit WBA95506, Integrated Design Inspection Technical Audit.

Extensive detailed discussion of these oversight activities and independent appraisals are provided in Section IV of the RAAR in Enclosure 1, "Design Adequacy"; Enclosure 2, "Construction Adequacy"; and Enclosure 5, "Oversight."

d. Integrated Feedback on Design Adequacy: The integration of the DBVP and other CAP products into the development of preoperational tests and procedures required for plant operation, as well as other preparations for plant operations, further support TVA's rationale in this area. These additional safeguards helped to identify and correct design discrepancies in the output of the CAPs or SPs. Three such programs were used to establish completion of system design, modification, and testing: the System Plant Acceptance Evaluation (SPAE) process; the System Preoperability Checklist (SPOC) process; and the Preoperational Test Program. They are discussed in detail in the Enclosures 1 through 5 to Section IV of the RAAR, and are summarized below. It should also be noted that procedural adequacy was further confirmed during power ascension testing.

The SPAE process was used by Nuclear Engineering to identify outstanding work on a system basis and to confirm the completion of work prior to testing or operation of the system.[37] The documentation developed as a package under the SPAE process established that all engineering work was either design complete or was tracked for completion. Through this process, WBN assured completion of design basis documents, control room drawings, system boundary reviews, calculations, and corrective action documents.

The SPOC process established the requirements for turnover of a system from the Startup and Test organization to plant Operations. Implementation of the SPOC process provided a systematic method to ensure that open work items and outstanding programmatic items affecting system operability or operational readiness of a system were completed or dispositioned before recommending that a system was functionally ready to support Unit 1 fuel load.[38] This process, along with the performance of preoperational and hot functional testing, provided a final measure of assurance that design requirements had been properly translated into pertinent procedures and instructions.

2. Activities Since Fuel Load: The processes used across the TVA nuclear sites to control and maintain plant configuration consistent with design basis are described in detail in the response to Request (a), above. Watts Bar has

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37 Engineering Administrative Instruction (EAI) 3.07, System Plant Acceptance Evaluation, Section 1.0.

38 Plant Administrative Instruction (PAI) 5.01, System Preoperability Checklist, Section 1.1.

successfully adopted these processes in an operating environment since fuel load. While there have been only a limited number of design changes in the short period of commercial operation, WBN has effectively used these processes to maintain the as-built plant consistent with the design. NRC has recognized WBN performance in this area by assigning a "superior" SALP rating to the Engineering and Maintenance areas. The response to Request (e) provides additional information on the effectiveness of these programs, as verified through oversight and assessment activities.

3. __Routine Surveillance Testing:__ Surveillance testing is an important tool to demonstrate that SSCs will perform in accordance with their design and licensing requirements and commitments (e.g., Technical Specification, the Fire Protection Report). The Surveillance Program provides the administrative controls for surveillance scheduling, testing status, surveillance procedure format, evaluation of test results, and test records.[39] Through these controls, TVA ensures that testing necessary to demonstrate performance of SSCs is executed in a rigorous fashion.

The controls in this program include:

- Plant operational modes for which the surveillance requirements are required to be current to support system/equipment operability are listed.

- Plant operational modes in which the surveillance can be performed (and therefore, by inference, the modes it cannot be performed in) are listed.

- The frequency or initiating plant condition/event for each surveillance requirement is listed.

- The implementing procedure number for each surveillance requirement is specified.

- The organization(s) responsible for performing/preparing each surveillance requirement.

4. __System Performance Monitoring:__ System performance is currently rated in a periodic System Status Report to WBN management. Sixty-three systems are included in this report, and for each, a system report card is prepared and included in the report. The report card provides specific performance data, including maintenance rule performance indicators and goals. Thus, it provides added assurance that plant performance is consistent with the design basis.

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39 Site Standard Practice, SSP-8.02, Surveillance Program.

5. Conclusion: Based on the information summarized above, referenced in the RAAR, and discussed in the WBN response to Requests (a) and (e), TVA is confident that SGC configuration and performance are consistent with the design basis at WBN.

D. Request (d)

Processes for identification of problems and implementation of corrective actions, including actions to determine the extent of problems, action to prevent recurrence, and reporting to NRC.

TVA Response to Request (d)

There are several ways in which problems are identified. These include observation by trained personnel, through equipment performance, through WBN assessment and audit activities, and through "generic" industry information. Once identified, problems are placed in TVA's corrective action program for evaluation and correction. This process is described below along with TVA's reporting processes. The programs at all sites contain, as a minimum, the essential elements described in this response, but there are minor implementation differences between the sites to address specific issues.

It is important to note that training received by personnel involved in configuration management, coupled with their experience, enhances their ability to identify problems. Engineering personnel who independently prepare or technically review safety-related and quality-related design changes are initially trained and receive periodic refresher courses. The Operations personnel responsible for configuration control include both NRC licensed and non-licensed operators who receive extensive training. Maintenance is required to be performed by individuals trained and qualified for each specific task. The administratively controlled configuration management process coupled with this training assists the involved personnel in identifying potentially adverse conditions.

In addition to TVA's corrective action program, TVA established an Employee Concerns Program (ECP) to provide an alternative problem reporting mechanism. The ECP was established to receive, investigate, and respond to concerns raised after February 1, 1986. The ECP has offices at each operational nuclear plant site and the TVA nuclear corporate office. The program name was changed to Concerns Resolution (CR) program in 1991. The program continues to encourage the prompt and effective resolution of concerns through the normal line processes while providing an alternate avenue for concerns that cannot be effectively resolved otherwise.

1. __TVA Corrective Action Program:__ TVA's Corrective Action Program contains the processes for the documentation of potential problems, the determination, tracking and implementation of corrective actions, including actions to determine the extent of problems and to prevent recurrence.

The WBN Corrective Action Program consists of processes which document and correct problems and adverse conditions. These processes are designed to address problems and adverse conditions in a manner consistent with the nature of the condition and its importance to plant safety. The corrective action program processes most applicable to design basis issues are the drawing deviation (DD), the work request/work order (WR/WO) and the Problem Evaluation Report (PER). The DD is used to document, evaluate, and disposition potential discrepancies between drawings and the WBN plant configuration. (Note that DDs have been consolidated into the PER process at TVA's other nuclear sites. A similar consolidation is planned at WBN.) The WR/WO is used to identify and correct routine hardware problems or failures on equipment, structures, spare components (i.e., replace packing, correct seat leakage, replace motor bearings, etc.). PERs are used to identify and correct non-hardware deficiencies and are also used to address the causes for nonroutine hardware deficiencies. For example, an unusual component failure that caused damage would result in initiation of both a WR/WO (to __fix__ the specific hardware problem) and a PER (to identify and correct the __cause__ of the hardware problem).

a. __DD Process:__ Potential discrepancies between drawings and the plant configuration are documented, evaluated, and dispositioned with DDs. DDs are used where the __drawing__ is in error and the plant configuration is correct; PERs are used when the plant configuration is found to be incorrect.

b. __WR/WO Process:__ Routine equipment deficiencies are corrected[40] using the WR/WO process which, in general, is as follows:

- A WR card is completed by the initiator to describe the deficiency, the equipment involved, and the location of the equipment.

- The initiator's supervisor reviews the WR card to determine if a PER is also needed. If so, a PER is initiated.

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[40] TVA allows certain minor maintenance activities that are commensurate with craft qualifications and require little coordination to be performed under less restrictive controls than those described in this section.

- The initiator or supervisor then submits the WR card to the Operations Shift Manager (or designee) for operability and reportability evaluations.

- The Operations Shift Manager (or designee) performs an operability evaluation as soon as possible. The evaluation must be performed within 24 hours of WR initiation. This evaluation ensures that Technical Specification LCOs are reviewed and applied as appropriate. The Shift Manager also determines if the deficiency is reportable to NRC or other agencies, and initiates any required actions (TVA's reporting process is described further below). Finally, the Shift Manager assigns a priority to the WR.

- The Work Control Group enters the WR into the tracking system, and if required, forwards it to the Planning Group.

- The Planning Group plans the work, producing a WO, which is subsequently used by maintenance/modification craft to correct the equipment deficiency.

- Work performed is documented on the WO, and the WO is closed. Appropriate data from the WO is entered into an equipment history database.

- The equipment history database is periodically evaluated to identify recurring equipment problems and other negative trends. PERs are generated as appropriate, and results are used in the site self-assessment process described below.

c. <u>PER Process:</u> The PER is an important part of the WBN Corrective Action Program because it is the method by which root causes, extent of condition, and recurrence control are determined for significant problems. The PER process is managed by the Nuclear Assurance and Licensing (NA&L) Department. NA&L maintains a database that tracks each individual PER, the development of corrective actions, the schedule and completion of the corrective actions, and the closure of the PER. Time limits are maintained for initiation and review of PERs, as well as development of Corrective Action Plans and verification of closures. NA&L monitors the completion of these activities and if the time limits are not met (or appropriately extended) for Level A and B PERs (PER levels are described below), NA&L escalates the matter to management. NA&L may escalate late actions on Level C PERs.

In general terms, the PER process includes the following:

- A PER may be initiated by an employee for any condition, and immediate action is taken as necessary. Immediate actions may be necessary to protect plant personnel or plant equipment, or if the condition potentially affects operability.

- After initiation, the PER undergoes supervisory and/or management review to ensure that any necessary immediate actions are taken, and to assign an organization to investigate the PER. In addition, the supervisory/management reviewers assign one of four levels of significance to the PER, based on the following definitions:

  ⇒ Level A - Significant Adverse Conditions. These include:

    A major safety-related or QA program condition that has occurred with a frequency as to indicate that past recurrance control has been lacking or ineffective.

    Confirmed significant adverse trends in quality activities identified by trend analysis.

    A programmatic breakdown which negates quality controls or places doubt on the integrity of the affected program.

    Repetitive or deliberate occurrences of procedural violations that have a direct and detrimental effect on safety or quality.

    Conditions which impact the plant's ability to mitigate design basis accidents.

  ⇒ Level B - Adverse Conditions that do not meet the Level A significance criteria but are not routine. These include:

    Quality-related deficiencies which require identification of apparent cause and action to correct the condition in accordance with the Nuclear Quality Assurance Plan.

    Human error (inappropriate actions) which could have, under different circumstances, caused a significant plant event or personnel injury.

Responses to regulatory identified issues which did not result from a Level A event.

Recurring events not classified as significant which retain the potential for causing a plant event or personnel injury.

Events or conditions which require root cause analysis to support required recurrence control. These include Licensee Event Reports, NRC violations, and audit findings.

⇒ Level C - Routine issues. These include:

Conditions which do not meet the criteria in Levels A or B but do identify a problem which warrants tracking to closure.

Conditions which do not affect operability and are not reportable.

⇒ Level D - Minor issues. These include:

Conditions which do not meet the criteria in Levels A, B, or C and immediate actions taken were sufficient to resolve the condition.

Conditions which do not affect operability, are not reportable, and are not potentially generic.

- PER conditions that are determined by the initiator or the supervisory/management reviewers to potentially affect operability or to be potentially reportable to NRC are promptly identified to the Operations Shift Manager for evaluation. The Shift Manager determines operability of the affected system or component based on a review of Technical Specification requirements. This includes evaluation of necessary attendent equipment such as instrumentation, controls, and power supplies. The ultimate decision on operability rests with the Shift Manager. However, in order to make this operability determination, the Shift Manager may call upon the various engineering resources available onsite. TVA has administrative controls for the performance of engineering evaluations in support of operability determinations.[41] These Technical Operability Evaluations (TOEs) are performed by Engineering at the request of the Shift Manager in order to obtain formal engineering input for aid in determining operability. TOEs may be initiated to evaluate a past operability

[41] Watts Bar Site Standard Practice, SSP 12.58, Engineering Evaluations for Operability Determinations.

concern for reportability purposes, a future operability concern in anticipation of an upcoming plant evolution, or for other reasons as requested by the Shift Manager. The reportability process is discussed later in this response to Request (d).

- The organization assigned to investigate the PER condition (the responsible organization) determines the cause(s) of the condition and formulates corrective actions. Root cause analyses are required for Level A PERs, when requested by the management reviewers, and for PERs written to address Licensee Event Reports, Notices of Violations, or Quality Assurance Audit Findings. The root cause analysis method may be specified by the management reviewer(s). Otherwise, it is selected by the Responsible Organization based on the nature of the condition. TVA has guidelines for performing various types of root cause analysis, including:[42]

  ⇒ Task Analysis
  ⇒ Change Analysis
  ⇒ Barrier Analysis
  ⇒ Event and Causal Factor Charting
  ⇒ Advanced Analytical Methods (e.g., Kepner-Tregoe problem solving)

- Training on root cause techniques is provided to personnel who perform root cause analyses.

- Significant events are investigated by multidisciplinary teams to facilitate comprehensive, accurate, and timely root cause analysis. Once the root cause(s) is determined, the Responsible Organization defines corrective actions to remove the cause and thereby prevent recurrence of the condition.

- Corrective actions for PERs for which root causes are not required to be determined are based on an apparent cause determination where the specific problem is corrected and data is collected and used for trend analyses. For example, a single example of a procedure error that has negligible consequences may not warrant a root cause analysis; the corrective action would be to correct the procedure. However, a series of procedure errors over a period of time discovered through trend analysis may indicate a more significant problem for which a root cause analysis should be done.

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[42] TVA Nuclear Business Practice - 236, "Event Critique and Root Cause Analysis.

* Corrective actions, whether from root or apparent cause analyses, are assigned to organizations and tracked to completion.

* During the investigation of Level A and B PER conditions, the responsible organization determines the extent of the condition. This determination uses results of the root or apparent cause analysis to identify if other plant programs, processes, or hardware are subject to the same PER condition. For example, if the PER documents a low flow condition found to be caused by a manufacturing defect in a pump impeller, the extent of condition process would determine where else in the plant that impeller type is used. Appropriate actions would then be taken to address the potentially defective parts.

* If a Level A or B condition is determined to be potentially applicable to TVA sites other than the site where it was generated, the PER will be transmitted to the other sites for review. If those reviews conclude that the condition also exists at the other sites, a new PER is generated at each affected site and is cross-referenced to the initiating PER. If review by the other sites concludes that the condition does not exist there, a justification for the conclusion is documented.

* TVA requires that significant adverse conditions be processed as Level A PERs. NA&L approves corrective action plans and verifies that corrective actions for level A PERs have been completed as described in the corrective action plan. This independent verification occurs after the responsible organization (e.g., line management) reports that all actions are complete and before the PER is closed. The responsible organization is required to resolve any problems identified during this verification.

* A subsequent effectiveness review is also performed for level A PERs. After corrective actions have been in place long enough to have removed the cause(s) of the PER condition, the responsible organization assesses whether the original corrective actions were effective. If the corrective action was not effective, a new PER will be generated.

d. __Self-Assessments:__ Self-assessments are performed to identify undesirable changes in personnel, equipment, program, and process performance over time. The self-assessments center around the development of the quarterly Level I Trend Analysis Report. The process for generation of this report involves extensive line organizational input. The report format is patterned after the management areas in the Institute for Nuclear Power Operations (INPO) 90-015 "Performance Objectives and Criteria for Operating and Near-Term Operating License Plants." Each management area is assigned a "window." Performance for the quarter is assessed by the responsible line organization. Information such as PERs, Notices of Violation, Licensee Event Reports, performance indicators, recurring equipment problems, and other pertinent data are used to determine the overall performance for each management area. The corresponding window is then assigned a color which indicates the performance in that area. The colors and corresponding performance ratings are as follows:

Color	Performance Rating	Interpretation
Red	Significant Weakness	Requires immediate management attention.
Yellow	Improvement Needed	Requires additional management attention.
White	Satisfactory Performance	Meets current standards.
Green	Significant Strength	Performance exceeding standards or expectations

The colors assigned to the windows are then reviewed through a series of site trend analysis committee (STAC) meetings with each department manager. Once complete, the total report is reviewed by a Trend Review Board (TRB), chaired by the Site Vice President or Plant Manager. Performance assessment is challenged by peer managers in this meeting, ensuring that each organization's management is self-critical and is assessing performance to the correct standards. Each site's report is then transmitted to corporate headquarters where it is compiled and reviewed by TVA senior management in the Management Trend Oversight Board (MTOB). At each stage, management reviews and challenges the performance ratings to ensure that proper performance standards are applied.

e. Operating Experience Program: TVA's Operating Experience (OE) program assures that operating information pertinent to plant safety is reviewed and distributed in a timely manner to plant personnel.[43] Information reviewed by the OE program includes NRC information notices, INPO Significant Operating Experience Reports, INPO Significant Event Reports, 10 CFR 21 reports that originate outside TVA, General Electric Services Information Letters, Westinghouse

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43 Nuclear Power Standard 4.4, Managing the Operating Experience Program.

Technical Bulletins, and TVA's NRC violation notices. The applicability of the item is assessed and organizations that could be affected by the experience information are identified. As applicable, reports are distributed for information or assigned as action items for evaluation to appropriate TVA plants and organizations. If these organizations determine that an adverse condition exists, then a PER is written and the problem is resolved within the corrective action program. If no adverse condition exists, the OE information may result in enhancements to programs, processes, hardware, etc., in order to avoid future problems. Due dates for evaluation of OE documents are established commensurate with the probability and potential impact to the plant. The action items are tracked until completion.

In addition to the systematic review of industry operating experience described above, TVA participates in various industry groups (e.g., Westinghouse Owner's Group) where common problems and initiatives are discussed and evaluated. These groups provide another mechanism for communication of industry operating experience.

f. __Event Reporting Process:__ Conditions determined to be potentially reportable are processed in accordance with an administrative procedure that details the specific reporting requirements in 10 CFR 50.72 and 50.73.[44] During the initial stages of an event, Operations either identifies or is notified of the potential problem. When time is available, the assessment of a problem against the reporting criteria routinely involves other organizations such as Licensing, Site Engineering, and other organizations that have responsibility for the system, structure, component, or process affected by the potential problem. Through this method, personnel technically experienced with this type of plant problem provide input into the reportability decision. The final reporting decision rests with the Operations Shift Manager.

The Site Licensing organization writes Licensee Event Reports (LERs) as required by 10 CFR 50.73, using guidelines contained in an administrative procedure.[45] The Licensing organization obtains information required for the LER from the corrective action program. For example, the event description, root cause, and corrective actions to prevent recurrence are generated by the PER process. The site Licensing organization also manages the reporting of defects in basic materials and failures to comply with NRC requirements in accordance with 10 CFR 21.

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44 Nuclear Power Standard 4.5, Regulatory Reporting Requirements.

45 Ibid.

g. <u>**Informal Reporting:**</u> In addition to the formal reporting mechanisms, NRC is apprised of developing plant issues through other communication channels. For example, the NRC Resident Inspector attends plant morning meetings where developing issues are discussed. Site Licensing also discusses a variety of issues with the NRC Project Manager (PM) on a periodic basis. These discussions often involve the status of ongoing issues or planned plant activities. TVA management also meets periodically with NRC Regional personnel to discuss plant status, problems, and ongoing initiatives.

E. Request (e)

The overall effectiveness of your current processes and programs in concluding that the configuration of your plant(s) is consistent with the design bases.

TVA Response to Request (e)

Prior to issuance of an operating license in November 1995, the Design Baseline and Verification Program (DBVP) CAP (discussed in the response to Requests (b) and (c)), served as the principal means for defining WBN's design and licensing bases. Development of essential Design Basis Documents (DBDs) and an enhanced design control process as part of this CAP ensured the translation of design parameters into plant and operational procedures. Also, as part of the DBVP CAP, WBN performed an initial FSAR verification.

In addition to the DBVP, the key programs discussed in the response to Requests (b) and (c), such as the System Plant Acceptance Evaluation (SPAE), the System Pre-Operability Checklist (SPOC), and the preoperational and startup testing process, served to validate the output of the DBVP CAP and the design control processes. Completion of the assessment activities associated with the development of the Reasonable Assurance Assessment Report (RAAR), along with the FSAR and Technical Specification reviews and the overall Fuel Load Certification Plan, enabled TVA to confidently certify the readiness of WBN Unit 1 to load fuel and to request an operating license on November 3, 1995.

Initial fuel load for WBN was authorized on November 9, 1995. Since that time, ongoing compliance with and maintenance of WBN's design and licensing bases have been assured through compliance with the programs described in the responses to Requests (a) and (d).

Additional assurance that current processes and programs effectively ensure that plant configuration is consistent with the design basis is provided through several means. The principal TVA activities which provide this additional assurance include organizational self-assessments, oversight and assessments by Quality Assurance (QA), internal audits, and oversight review by TVA management and review boards, such as the Nuclear Safety Review Board (NSRB). These activities, coupled with aggressive use of the TVA corrective action program with site oversight by the Management Review Committee (MRC), have ensured identified problem areas are appropriately resolved in a timely and effective manner. In addition, industry organizations assessed the adequacy of WBN's processes and controls with regard to the plant's readiness for full power operation.

Thus, this response summarizes key oversight and assessment activities which have confirmed the overall effectiveness of current WBN processes and programs in ensuring that plant configuration is consistent with the design basis. In general, the oversight and assessment activities confirm that, since initial fuel load at WBN, the actions taken to establish WBN's design and licensing bases for the licensing of Unit 1 have been maintained through the first year of operation. TVA is confident that future utilization of these or similar processes will continue to ensure that plant configuration is maintained consistent with the design basis.

1. __Organizational Self-Assessments:__ Throughout the first year of operation, WBN line organizations have implemented self-assessments to define organizational performance and identify areas for improvement. Coordinated by the site Training and Assessments Manager, this critiquing method used evaluation criteria established by the line organization that are specific to the focus area of the assessment. In addition, these self-assessments applied criteria established in documents such as Institute of Nuclear Power Operations (INPO) 90-15, "Performance Objectives and Criteria for Operating and Near-term Operating License Plants." Quality Assurance provided oversight of the assessment activities and routinely documented the results of the assessments in a monthly report.

Specific to the area of design control, the key WBN self-assessment was a two-week self-assessment performed by Site Engineering. This review began in June 1996 and focused on the areas identified below. As a result of the review, several process enhancements were identified and a small number of non-significant deficiencies were documented in the corrective action program.

Areas Reviewed	
Erosion corrosion	Drawing maintenance
ASME Section XI inservice testing	Engineering organization and administration
Appendix R/Fire Protection	Environmental qualification
Vendor Manual Program	Plant modifications
Drawing Deviation program	Reactor engineering program
Document control	Personnel performance
System performance monitoring	Procedures and documentation

Quality Assurance's evaluation of Engineering's self-assessment concluded that the assessment team consisted of a good cross-section of technically qualified personnel, including corporate personnel, and that the team was self-critical of Engineering's performance and programs.

The Training and Assessments Manager is accountable to overview and coordinate site self-assessments. Under his direction, an instruction has been developed which defines the site self-assessment criteria. This instruction formalizes the self-assessment criteria in an effort to ensure consistency in the depth and scope of the reviews and provides suggested review areas which include design interface, FSAR updating, and configuration and status control.

2. Quality Assurance (QA) Oversight and Assessments: Oversight of plant activities since fuel load is one of QA's principal responsibilities. The activities of key plant organizations, such as Site Engineering (including System Engineering), Operations, Maintenance, Chemistry, Radiological Control, Security, and Training have been included within the scope of QA's reviews. Findings from these oversight activities are documented in a monthly report which is provided to management. Deficiencies identified during a review are documented and resolved in the corrective action program.

One example of a review which provides confidence in the effectiveness of the design and configuration control processes since fuel load focused on a select number of mid-cycle outage-related design change notices (DCNs). This assessment began in September 1996, just before the beginning of the planned mid-cycle outage. The review was intended to determine whether DCNs, which were to be implemented during the outage, were technically adequate and complete and provided a clear description of the design change and required plant modifications. In addition, the review also assessed the availability of material and equipment required to implement the DCN and whether the ability to implement the planned modifications had been considered in the preparation of the DCN. From the population of DCNs reviewed, two issues were identified which required minor safety evaluation changes. They were processed through the corrective action program.

Upon completion of the planned modifications several of the selected DCNs were evaluated to establish conformance with required administrative closure requirements. This included verification of: (1) correct updating of the Document Control Change Management (DCCM) database; (2) correct incorporation of Drawing Change Authorizations (DCAs) into primary/critical drawings; (3) correct incorporation of Field Design Change Notices (F-DCNs) into parent DCNs; (4) correct updating of the Equipment Management System (EMS); (5) initiation of required FSAR changes; and (6) proper updating of the Design Basis Documents. The results of this review did not identify any deficiencies.

Another review evaluated portions of the Final Safety Analysis Report (FSAR) for consistency with design documentation and plant configuration. Initiated in April 1996, it reviewed the FSAR interface with administrative control programs to ensure the adequacy of packages initiated for the Updated FSAR (UFSAR). The scope of this review included activities that could affect WBN's UFSAR.

The assessment was initiated by reviewing a significant industry experience report regarding design basis issues at the Millstone plant[46]. Categories of items that could cause a UFSAR change at Millstone were compared to similar categories in WBN's administrative program. The categories were then reviewed to determine whether WBN's administrative programs were adequate to ensure that the FSAR will be accurately updated when necessary. The potential impact to the FSAR from use-as-is dispositions to administrative control programs was also included in this review due to its uniqueness to WBN.

To date, this review and activities of other site organizations have identified approximately 30 discrepancies in the FSAR at WBN. Examples of the nature of the discrepancies include administrative or cross-reference errors, inconsistencies between the FSAR and controlling calculations for Radiation Zone maps, and the need to clarify the monitoring capabilities of the lower containment compartment. As appropriate, the discrepancies were documented in the WBN corrective action program.

Most of these discrepancies were considered to be clarification issues with no potential to affect plant operability. However, one discrepancy did involve a hardware modification to add an alarm that was discovered to not have been installed and also involved an error in the method of operation of a gas analyzer.[47] None of the identified FSAR discrepancies have been classified as significant in the corrective action program. However, due to the nature of the identified problems, reviews of the FSAR will be undertaken in conjunction with the first update of the FSAR.

In summary, the planned FSAR reviews, along with ongoing QA oversight and line organization activities, will provide a measure of confidence that the WBN processes for maintenance of the design and licensing basis are adequate.

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[46] Northeast Utilities System, ACR 7007 - Event Response Team Report Dated February 22, 1996.

[47] TVA's letter dated January 10, 1997, Licensee Event Report 50-390/96025.

3. <u>Corrective Action Program Implementation:</u> As stated in response to Request (d), WBN has aggressively utilized the corrective action program to identify, resolve, and trend plant deficiencies at WBN. The program is structured such that it has a low threshold for problem identification. In order to confirm that there are no programmatic weakness in current design basis process and programs, WBN has reviewed identified deficiencies associated with design control processes that have occurred since plant licensing (i.e., after November 1995). The following categories of issues, documented in the corrective action program, were reviewed as part of this issue:

1. Notices of Violation, and Non-Cited Violations.

2. Licensee Event Reports.

3. Corrective action documents which:

   a. were classified as a "configuration issue," or

   b. identified a violation of a requirement of the 10 CFR 50.59 program, or

   c. identified a violation of a requirement of the FSAR update process.

The results of this review established that, since fuel load, the requirements of the corrective action program have been adhered to as measured by the scope and number of issues documented for the categories listed above. This review also established that no issue has been identified which appeared to be a programmatic challenge to WBN's design control processes.

4. <u>Use of Industry Experience:</u> Another element of the TVA corrective action program is the review of issues, both design-related and otherwise, from other TVA plants. This includes the prompt evaluation of Problem Evaluation Reports (PERs) initiated at a TVA site for applicability to other TVA sites. PERs which are classified as Level A or B and are determined to be potentially generic, are forwarded to the other sites for generic applicability review. This process is supplemented by the review of industry documents as part of the Operating Experience (OE) program.

Since initial fuel load (November 9, 1995), Browns Ferry and Sequoyah Nuclear Plants have forwarded numerous PERs to Watts Bar for generic applicability review. Evaluations by Watts Bar personnel have determined that approximately 20 percent of the issues are applicable to Watts Bar and have been appropriately documented in the corrective action program.

The effectiveness of this process at Watts Bar has been evaluated by two separate assessments. The first was the Independent Review & Analysis Operating Experience Self-Assessment (IRA-WB-96-006) conducted in June 1996. The purpose of this self-assessment was to evaluate the Corrective Action, Independent Safety Engineering (ISE), and OE programs against the criteria in INPO 90-15. This action was initiated to verify the effectiveness of these programs, ensure they were met management expectations and applicable procedural requirements, and ensure they adequately support Watts Bar Unit 1. This first assessment identified no technical inadequacies in the Watts Bar applicability reviews of offsite generic conditions.

The second assessment was the Corporate Nuclear Assurance audit (SSA9613) of the TVA Nuclear Corrective Action Program. It was conducted to determine whether the Corrective Action Program was being implemented in accordance with TVA and regulatory requirements. One of the objectives of the audit was to determine if generic issues from other sites are promptly and effectively evaluated for applicability at each site. This audit did not identify any significant deficiencies in the processing of generic reviews at Watts Bar.

As a point of clarification, it should be noted that this audit did not focus specifically on design related issues. However, it did assess the implementation of a program that ensures proper resolution of design issues. Therefore, through audits of this nature, additional assurance is gained that design issues are being addressed appropriately and conformance with the design basis is maintained.

5. <u>Adequacy of 10 CFR 50.59 Evaluations:</u> TVA's offsite safety review organization, the NSRB, provides TVA management with an independent viewpoint of plant practices and conformance to nuclear industry standards and regulations. Oversight of the WBN program for implementing 10 CFR 50.59 is specifically performed by the WBN NSRB Safety Assessment/Safety Evaluation (SA/SE) subcommittee, which currently meets on a quarterly basis. This subcommittee is responsible for reviewing representative Safety Evaluations and their associated Safety Assessments. The owner of the site 10 CFR 50.59 program in Site Engineering reviews SA/SEs as part of the NSRB subcommittee.

Since the 10 CFR 50.59 program is an integral part of the design change process, subcommittee reviews provide a valuable indicator as to the effectiveness of the engineering staff and the process controls for maintaining the design and licensing bases at WBN. As of mid-January 1997, SA/SE subcommittee members have reviewed approximately 90 SA/SEs generated at WBN since inception of the program in 1995 and concurred that the unreviewed safety question determinations were correct. Corrective action documents are initiated for program implementation discrepancies. None, however, have resulted in a revision to the conclusions in an evaluation.

It should be noted that the current 10 CFR 50.59 program is being revised to correct recently identified weaknesses. These weaknesses included allowing non-quality and non safety-related procedures and certain design inputs to be changed without a SA/SE. However, no Unreviewed Safety Questions have been identified as a result of these weaknesses.

6. __Assessments by External Organizations:__ Since initial fuel load, two key reviews have been performed which assessed WBN's operational readiness. One of these reviews was performed in July 1996 by the Institute of Nuclear Power Operations (INPO). As part of this evaluation, INPO noted that there were several notable successes during the transition of WBN from a construction site to a commercial power producer. Key to this transition was the preoperational and startup testing programs, which were supported by programs which provided reasonable assurance of the functional adequacy for installed systems and components (i.e., SPAE/SPOC).

The other key assessment was performed by an NRC Operational Readiness Assessment Team (ORAT). The ORAT review was performed in March 1996, and was an independant assessment of Unit 1 readiness for full-power operation. The review focused on the four functional areas of operations, maintenance, engineering, and plant support and was performed during power ascension testing while Unit 1 was operating at levels below 50 percent power.

As part of the inspection, NRC reviewed applicable portions of the FSAR that related to the inspection areas. The wording of the FSAR was verified to be consistent with observed plant practices, procedures and/or parameters. Other areas reviewed relating to engineering and design control included the DCN, drawing control processes, and the self-assessments that were being performed on engineering practices. Overall, the ORAT inspection concluded that TVA demonstrated a readiness for operations in the areas reviewed. In addition, the inspection concluded that TVA had implemented effective programs that allowed management to perform a self-assessment of the performance of the WBN engineering organization.

7. __Summary of Design Basis Activities:__ Prior to initial fuel load, extensive design basis reviews were performed at WBN. They are described in detail in the RAAR. Since initial fuel load, TVA audits, reviews, and assessments, along with organizational self-assessments,

have provided management with ongoing feedback which confirms that plant configuration and operation are consistent with the design basis. These activities have allowed for prompt corrective action following problem identification and establishment of an atmosphere for continued performance improvement.

The combined effect of these initiatives and assessments, along with the overall performance of the plant since commercial operation, provides reasonable assurance of the correctness of the design and adequacy of construction and configuration control processes, as well as the effective translation of design requirements into plant operating procedures and instructions. Together, these factors give TVA confidence in the overall effectiveness of design basis processes at WBN which ensure that the plant configuration is consistent with the design basis.

F. Additional Efforts: TVA is performing additional efforts to assess and verify the accuracy of the required design basis for WBN and programs used to maintain that basis. Some efforts are in addition to those programs and processes that continually maintain the required design basis. The following is a description of these efforts.

1. __FSAR Verification__: As discussed in the above response to NRC's Request (e), reviews of the WBN FSAR will be undertaken in conjunction with the first update of the FSAR. These reviews, along with the continuing resolution of discrepancies through the corrective action program, provide an appropriate means to further improve the accuracy of the FSAR.

2. __Confirmatory Vertical Slice Review Assessments__: As a further measure to confirm the conformance of plant configuration with design basis requirements, TVA is currently utilizing the vertical slice technique as part of the formal audit program at each site. Vertical slice audits are performed at TVA's nuclear plant sites and, if applicable, at the corporate office. The vertical slices are directed at a particular system and incorporate the periodic audits required by 10 CFR 50, Appendix B, as appropriate. Other required audits, e.g., fire protection, emergency preparedness, security, safeguards, and fitness for duty, will continue to be performed according to their required periodicity, either as part of or separate from the vertical slice reviews.

Vertical slice audits are comprehensive and evaluate the engineering design and configuration controls related to the selected system, compare the as-built plant and as-modified condition of the system, verify system performance, and assess whether design basis requirements for that system have been translated into associated operating, maintenance, and test procedures. Audit findings are documented, tracked, and corrected in accordance with TVA's corrective action program.

3. __Licensing Basis:__ Nuclear Assurance and Licensing will perform licensing basis assessments to determine if changes to the design basis are adequately reflected in the licensing basis, as applicable. This assessment will be tailored to evaluate the WBN programs in place that identify and control commitments that effect the licensing basis. Planned review areas include design change notices, changes to the Quality Assurance, Security, and Emergency Preparedness programs, outstanding corrective actions, operating procedures, FSAR change requests, relief requests, operator workarounds, operations standing orders and nonconforming items. Results of this review will help identify missing or incorrectly applied programmatic elements that can lead to licensing basis differences.

ENCLOSURE 3
ATTACHMENT
WBN CAPS AND SPS

WBN CAPs	Reference Documents: TVA Completion Certification Letter to NRC	NRC Review and Acceptance: NRC Safety Evaluation Report	NRC Review and Acceptance: NRC Inspection Report
Cable Issues	November 1, 1995	SSER 9, SSER 17	390/95-77
Cable Tray and Cable Tray Supports	November 1, 1995	SSER 6	390/95-69
Design Baseline and Verification Program (DBVP)	September 27, 1995	NUREG 1232, Volume 4	390/95-36, 390/95-47
Electrical Conduit and Conduit Support	October 30, 1995	SSER 6	390/95-69
Electrical Issues	November 1, 1995	NUREG 1232, Volume 4	390/95-77
Equipment Seismic Qualification	October 30, 1995	SSER 6	390/95-55
Fire Protection	November 1, 1995	SSER 18	390/95-61
Hanger and Analysis Update Program (HAAUP)	October 27, 1995	SSER 6	390/95-53
Heat Code Traceability	July 31, 1990	SSER 7	390/90-02
Heating, Ventilation, and Air Conditioning (HVAC) Duct Supports	October 10, 1995	SSER 6	390/95-46
Instrument Lines	October 31, 1995	SSER 6	390/95-61
Prestart Test Program	February 13, 1992 (withdrawal)	NUREG 1232, Volume 4	
Quality Assurance (QA) Records	April 27, 1994	SSER 9, SSER 17 NRC Letter dated April 25, 1994	390/94-40
Q-LIST	January 28, 1994	SSER 13	390/94-27
Replacement Items Program (RIP)	October 13, 1995	SSER 6 NRC Letter dated February 6, 1995	390/95-50
Seismic Analysis	October 30, 1995	SSER 6, SSER 9	
Vendor Information	November 1, 1995	SSER 11	390/95-67
Welding	January 9, 1993	NUREG 1232, Volume 4, SSER 17	390/94-79

WBN SPs	Reference Documents: TVA Completion Certification Letter to NRC	NRC Review and Acceptance: NRC Safety Evaluation Report	NRC Review and Acceptance: NRC Inspection Report
Concrete Quality Program	August 31, 1990	SSER 7	390/90-26
Containment Cooling	September 28 1995	SSER 7	390/95-38
Detailed Control Room Design Review	October 30, 1995	SSER 5, SSER 15	390/94-22
Environmental Qualification Program	November 1, 1995	SSER 15	390/95-54
Master Fuse List	October 30, 1995	SSER 9	390/93-31
Mechanical Equipment Qualification	November 1, 1995	SSER 15	390/95-54
Microbiologically Induced Corrosion (MIC)	October 30, 1995	SSER 10	390/93-67
Moderate Energy Line Break Flooding (MELB)	October 31, 1995	SSER 11	390/95-61
Radiation Monitoring System (RMS)	November 1, 1995	NUREG 1232, Volume 4	390/95-65
Soil Liquefaction	July 27, 1992	SSER 9, SSER 11	390/92-45
Use-As-Is Conditions Adverse to Quality (CAQs)	July 24, 1992	NUREG 1232, Volume 4	390/93-10

Confirmatory Programs	Reference Documents
Program for Assurance of Completion and Assurance of Quality (PAC/AQ)	TVA letters to NRC dated November 8, 1991, April 30, 1992, May 12, 1995 NRC Inspection Reports 390/93-203, 390/93-204

ENCLOSURE 4

TENNESSEE VALLEY AUTHORITY

**LIST OF COMMITMENTS MADE IN
RESPONSE TO REQUEST FOR INFORMATION REGARDING ADEQUACY
AND AVAILABILITY OF DESIGN BASES INFORMATION**

ENCLOSURE 4

LIST OF COMMITMENTS

1. TVA will implement the DBVP on Browns Ferry Unit 1 prior to that unit's return to service.

2. TVA will continue its reviews of the Browns Ferry UFSAR, evaluate the remaining discrepancies, and prepare the required changes to Browns Ferry's UFSAR.

3. TVA will continue its reviews of the Sequoyah UFSAR, evaluate the remaining discrepancies, and prepare the required changes to Sequoyah's UFSAR.

4. Reviews of the Watts Bar FSAR, similar to ones that have been defined for Sequoyah and Browns Ferry, will be undertaken in conjunction with the first update of the FSAR.