WATTS BAR NUCLEAR PLANT

DESIGN BASELINE AND VERIFICATION PROGRAM (DBVP)

CORRECTIVE ACTION PROGRAM PLAN

REVISION 2

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Title: PROGRAM DESCRIPTION FOR WATTS BAR DESIGN BASELINE AND VERIFICATION PROGRAM (DBVP)	REVISION LOG	
Revision No.	Description of Revision	Date Approved
0	Initial issue.	07/21/86
1	This is a general revision to reflect revised scopes of work to be more consistent with the content of the BFN and SQN DBVPs. Changes include addition of calculation activity, addition of testing requirements activity, addition of system evaluations, performance of vertical slice review by an independent contractor outside the DBVP in lieu of previously scoped DBVP verifications, and normal quality assurance/engineering assurance oversight role.	10/06/88
2	This revision addresses comments made by NRC in the presentation of this plan on February 7, 1989. Changes include the addition of logic diagrams to the DBVP scope, clarification that the portion of the fire protection system necessary to mitigate a design basis event is within scope, and clarification with regard to primary and secondary safety-related features to be included in the calculation effort.	03/29/89

WATTS BAR NUCLEAR PLANT

DESIGN BASELINE AND VERIFICATION PROGRAM (DBVP)

TABLE OF CONTENTS

DESIGN BASELINE AND VERIFICATION PROGRAM

1.0 INTRODUCTION

The Watts Bar Nuclear Plant (WBN) Design Baseline and Verification Program (DBVP) assures that the WBN licensing basis, design basis, calculations, and safety-related plant functional configuration for unit 1 and common features are in agreement, and establishes the necessary systems and procedures to maintain this baseline. The DBVP also establishes test requirements for the WBN Prestart Test Program.

TVA became aware of inconsistencies and omissions in the WBN licensing and design basis documentation as the result of several activities, including:

- Conditions Adverse to Quality (CAQs)
- Employee concerns
- TVA self-evaluations, including lessons learned from Sequoyah (SQN) and Browns Ferry Nuclear Plants (BFN)
- Industry experience and reviews
- Regulatory reviews

Upon investigation, TVA determined that there were instances of the following conditions:

- Inconsistencies between the WBN Final Safety Analysis Report (FSAR) and WBN design documentation.
- Incomplete and some inconsistent design input information.
- Missing, incomplete, and out-of-date design calculations.
- Disagreements between the actual plant configuration and the as-constructed drawings.

Attachment 1 lists the CAQs and employee concerns which form the basis for the DBVP, and which are being corrected through DBVP activities.

The following related causes appear to have contributed to the conditions described above:

- Lack of effective licensing and design change control procedures and data bases to ensure that design requirements were maintained consistent with the FSAR and other commitments to NRC;
- Insufficient definition of design criteria and system description information at the level of detail needed to control design changes.

- Lack of a complete calculation listing to establish the full scope of calculations needed for WBN and procedures to ensure the calculations are maintained consistent with the WBN design;

- Lack of an effective definition of drawings to be maintained under configuration control, and an ineffective system for keeping appropriate drawings as-constructed as plant changes are made.

TVA has determined that the underlying root cause of this situation was ineffective design and configuration control measures.

TVA has developed the WBN DBVP to correct the situation that had developed and to prevent the recurrence of such a situation by eliminating the root cause. The DBVP has the following major components:

- Licensing Verification

- Design Basis

- Calculations

- Configuration Control

- Testing Requirements

The DBVP establishes a baseline of information for each of these areas, including data bases that facilitate the identification of affected documents as changes to the plant are made. Improved design change control procedures will be generated to address the development and maintenance of a single set of plant drawings that are to replace the existing sets of "as-designed" and "as-constructed" drawings.

The program will be performed in accordance with the TVA Quality Assurance Program. This will include inspections and audits by the QA organization.

This revision to the DBVP supersedes the initial WBN DBVP plan dated July 21, 1986, which was previously submitted to the Nuclear Regulatory Commission (NRC).

2.0 OBJECTIVES

The objectives of the WBN DBVP for each program activity are:

2.1 Licensing Verification

- Assure that commitments to NRC are captured in the appropriate highest level controlling document.

- Establish procedures and systems to maintain compatibility between commitments and controlling documents.

2.2 Design Basis

- Establish a plant design basis document (DBD) that contains or references appropriate engineering requirements including design basis commitments.

- Establish procedures and systems to maintain the design basis consistent with changes to the plant, technical requirements, and licensing commitments.

2.3 Calculations

- Assure the existence and retrievability of calculations that are technically adequate and consistent with the "safety-related" plant design.

- Establish a process for statusing calculations that will maintain calculations current with plant design changes.

2.4 Configuration Control

- Develop and implement an improved design change control system.

- Establish a single set of configuration control drawings (CCDs) and verify that the configuration of the portions of plant systems that mitigate plant design basis events reflect functional requirements.

2.5 Testing Requirements

- Assure that preoperational test scoping documents (which define system and component preoperational test requirements) are current and consistent with the DBD.

3.0 SCOPE

The WBN DBVP applies to Unit 1 and common features. The scope of specific program areas is as follows:

3.1 Licensing Verification

The Licensing Verification activity includes verification of docketed WBN commitments associated with design, construction, operations, maintenance and inspection identified in the following types of documents:

- Final Safety Analysis Report (FSAR)

- NRC Safety Evaluation Report (SER) and Supplements

- Draft WBN Fuel Load License and Appendices (includes Final Draft Technical Specifications)
- 10 CFR 50.55(e) Final Reports
- Responses to NRC regarding: Violations/Deviations
  Bulletins and Circulars
  Generic Letters
  Confirmation of Action Letters
  Show Cause Letters
- Correspondence referenced in the SER and Supplements
- Correspondence since SER Supplement 4.

3.2 Design Basis

The Design Basis activity includes the development and consolidation of design basis engineering requirements and licensing commitments for the plant features that perform a primary or secondary safety function as defined by the Watts Bar FSAR Section 17.2.1.

3.3 Calculations

The Calculations activity includes the identification, statusing, and evaluation for technical adequacy of those calculations that are necessary to establish or support the plant systems or design features which perform a primary or secondary safety function as defined by the Watts Bar FSAR Section 17.2.1.

3.4 Configuration Control

The Configuration Control activity includes the development and implementation of an improved design change control process which will be utilized for subsequent plant changes. CCDs will be developed for the following categories of safety-related control room drawings:

- Flow Diagrams
- Electrical Single Lines
- Control Diagrams
- Schematics
- Logic Diagrams

These drawings will be verified to agree with plant functional configuration for the primary safety-related portions of plant systems. In addition, system evaluations will be performed for those portions of the systems identified in Attachment 2 that are necessary to mitigate the design basis events for WBN.

3.5 Testing Requirements

The Testing Requirements activity includes a review of preoperational test scoping documents for the tests identified in Table 14.2-1 of the WBN FSAR.

4.0 DESCRIPTION OF PROGRAM ACTIVITIES

The DBVP will be performed through baselining efforts in five program areas as described in Sections 4.1 through 4.5 below. The flowchart for the DBVP, including program interfaces, is provided in diagram format in Attachment 3. Quality Assurance/Engineering Assurance oversight of DBVP activities is described in Section 4.6.

4.1 Licensing Verification

The Licensing Verification activity will assure that licensing commitments have been incorporated into appropriate WBN controlling documents. This verification will apply to the docketed commitments contained within the source documents identified in Section 3.0 above. Commitments will be reviewed to determine the controlling TVA or vendor document that implements the commitment.

A Licensing Document Commitment Matrix (LDCM) cross referencing the commitment to its implementing document will be established. This matrix will be used as a tool for maintaining consistency between licensing commitments and implementing documents when future changes in licensing commitments or plant design are made. This matrix will facilitate identifying the pertinent sections of the FSAR and other licensing commitments that could be affected when a proposed change to a WBN document is considered.

As inconsistencies are identified between licensing commitments and implementing documents, an Open Item Report (OIR) will be generated, tracked, and controlled in an open item management system. If an open item is determined to be a CAQ, it will be tracked and controlled by the TVA CAQ system.

4.2 Design Basis

The Design Basis activity involves the review of existing criteria contained in either design criteria documents or system descriptions. The review will assure that these documents contain the licensing commitments and engineering

requirements that make up the design basis of WBN. In order to accomplish this review, licensing commitments and design requirements have been reviewed by senior TVA engineers familiar with plant design and categorized as to whether they contain design input associated with plant structures, systems, components or general design topics.

The categorized commitments and requirements (C/R) have been entered into a relational C/R data base with sorting capability for a specific structure, system, component, or design topic. Selected sorts appropriate for each design criteria or system description have been generated, and the commitments or requirements appropriate for each document have been identified. Existing documents will be revised or new documents issued as required to ensure that the design basis for WBN is correct, complete, and in accordance with licensing commitments and engineering requirements.

The Design Basis activity includes the preparation of a new design criteria document that addresses WBN design basis events. These criteria will provide safety limits and safety functions for each event's mitigation scheme, and will identify the required systems for each event.

As inconsistencies are identified between the licensing commitments/design requirements and the existing criteria, OIRs will be generated, tracked, and controlled in an open item management system. If an open item is determined to be CAQ, it will be tracked and controlled by the TVA CAQ system.

4.3 Calculations

The Calculation activity includes the review for technical adequacy of those safety-related calculations associated with problem areas and selected calculations for areas where problems have not been identified, and the development of any missing calculations necessary to support plant design. A list of calculations which are necessary to establish or support the plant systems and features which perform either a primary or secondary safety function will be generated for each of the engineering disciplines.

As inconsistencies are identified between calculations and other design documents, OIRs will be generated, tracked, and controlled in an open item management system. If an open item is determined to be a CAQ, it will be tracked and controlled by the TVA CAQ system.

Details of the Calculation activity are provided in Attachment 4.

4.4 Configuration Control

The Configuration Control activity ensures that the functional configuration of primary safety-related systems is accurately depicted on plant control room drawings and that these drawings are in conformance with design basis requirements. The Configuration Control activity includes the implementation of an improved means of design change control; the development and functional verification of CCDs for safety-related control room drawings; and the performance of system evaluations to confirm functional consistency between the LBDs, CCDs, and associated safety-related calculations.

An improved means of design change control for WBN will be developed consistent with the corporate TVA approach identified in TVA Nuclear Performance Plan Volume I. This change control process is based on the design change "package" process as described by the INPO Good Practice TS-402, "Plant Modification Control Program."

A single series of baseline drawings called CCDs will be developed that combine the former "as-designed" (AD) and "as-constructed" (AC) drawings for the control room drawings. The primary safety-related portions of the CCDs will be verified to match plant configuration and will have remaining plant modifications identified against them. To provide assurance that the CCDs match plant functional configuration, a walkdown of the primary safety-related portions of the systems will be performed for flow, control, and single line drawings.

The walkdowns will include an evaluation of the systems and components identified on the flow, control, and single line drawings sufficient to assure that the drawings match the plant functional configuration. The portions of the systems to be walked down will be identified in a system baseline boundary calculation for the system. These system walkdowns will be conducted in a manner similar to the walkdowns conducted in the SQN and BFN DBVPs.

Systems and components which cannot be confirmed through walkdowns (for example electrical circuits represented on schematics) will be tested or the results of previous tests evaluated in order to ensure functional performance consistent with the drawings. The portions of the systems requiring this test or test document evaluation will be defined by the system baseline boundary calculation. These tests or evaluations will be conducted in a manner similar to those performed in the SQN and BFN DBVPs. Utilizing baselined schematics, the logic diagrams will then be confirmed.

Subsequent to the confirmation of the CCDs through the performance of walkdowns and/or testing, system evaluations will be performed for the portions of the systems listed in Attachment 2 which are necessary to mitigate the design basis events for WBN. These

design basis events are defined in WBN design criteria WB-DC-40-64, and include the design basis events defined in Chapter 15 of the WBN FSAR. The portion of each system to be addressed within the associated system evaluation will be defined in the system baseline boundary calculation. These evaluations will be functional assessments of each system's proposed configuration at fuel loading. The requirements for system configuration as defined by the DBD, calculations, and preoperational test scoping documents will be compared to the CCDs to ensure that the system meets functional requirements and will perform as intended.

Outstanding design changes will be reviewed to identify those planned for implementation before or after fuel loading. Design changes that are planned for implementation after fuel loading will receive an Unimplemented Design Item Evaluation (UDIE). The UDIE is a safety evaluation to ensure that the effect of not implementing the change until after fuel loading does not compromise plant safety or WBN licensing commitments. The system evaluations will confirm the functional capability of the systems to perform their intended safety functions, and will identify the open items that must be completed to establish an acceptable configuration for fuel loading. Procedures will be established to ensure that design changes initiated after the completion of the system evaluation receive a comparable evaluation to determine requirements for implementation before or after fuel loading.

As inconsistencies are identified between the design basis, the system CCDs, or the constructed plant, OIRs will be generated, tracked, and controlled in an open item management system. If an open item is determined to be a CAQ, it will be tracked and controlled by the TVA CAQ system.

4.5 Testing Requirements

The Testing Requirements activity will begin with a review of preoperational test scoping documents (i.e., documents which define system and component functional test requirements) against the DBD. Functional testing requirements which have changed due to a change in the plant design basis will be identified and the scoping documents revised as appropriate. Revised preoperational test scoping documents will serve as input to the WBN Prestart Test Program. A review of the preoperational test results package for previously tested systems against the updated scoping document will be performed to ensure validity of the test, or to identify areas in which additional testing is required. For systems that have not been preoperationally tested, the plant preoperational test instruction will be reviewed against this updated scoping document.

Any discrepancies between the updated scoping documents and associated preoperational test documents (test instructions/test results) will be resolved in accordance with the requirements of the preoperational testing program as described in Chapter 14 of the WBN FSAR.

Discrepancies between the DBD, the scoping documents, and the preoperational test documents will be identified as open items, tracked, and controlled in an open item management system. If it is determined that an open item is a CAQ, it will be tracked and controlled by the TVA CAQ system.

4.6 Quality Assurance Oversight

Activities affecting the quality of plant design or configuration will be conducted in accordance with documented procedures which receive a QA review. Activities will be monitored through scheduled audits and/or surveillances.

In addition to the QA activities, findings identified by QA, and NRC against the DBVPs at SQN and BFN will be reviewed for applicability to similar WBN DBVP activities. Any such findings determined to be applicable to WBN DBVP activities will be identified as OIRs and tracked to resolution.

5.0 PROGRAM INTERFACES

The program interfaces include both those between major DBVP activities as well as those with other WBN special programs. Internal program interfaces are depicted in Attachment 3, and include:

- Licensing commitments that are design input are verified against the DBD.
- The DBD is supported by calculations.
- The DBD provides system functional requirements to the test requirements activity for the review of preoperational test scoping documents.
- The DBD, calculations, and preoperational test scoping documents define the functional requirements against which the CCDs and outstanding design changes will be compared during the performance of system evaluations.

External program interfaces with other WBN special programs are characterized as follows:

- The DBD interfaces with other WBN special programs that involve the preparation or revision of design criteria or system descriptions. Examples include the Hanger and Analysis Update Program (HAAUP) and the Conduit Support Program. The DBD activity provides procedural controls for the preparation or revision of these design criteria or system description documents to ensure proper incorporation of applicable commitments and requirements in accordance with the DBVP open items management system.

- Revised preoperational test scoping documents will provide the system functional testing requirements to the WBN Prestart Test Program.

- The calculation program interfaces with other special programs that involve the preparation or review of calculations. An example of such an interface includes the HAAUP effort to regenerate or review pipe stress and pipe support calculations.

- The configuration control activity will utilize DBVP accepted inputs from other programs for the verification of CCDs and for the system evaluations. An example of such inputs includes HAAUP walkdown data.

6.0 PROGRAM IMPLEMENTATION

The DBVP will be conducted by a program management team as shown in Attachment 6. This team is responsible for procedure development and management of program activities and interfaces. Program activities are performed by the normal line organizations or by contractors where appropriate.

Procedures to control DBVP activities will be issued prior to the initiation of the activity. Procedures that control DBVP activities only are to be contained within the DBVP Program Manual, which is a part of the Watts Bar Engineering Project (WBEP) Manual. Procedures produced by the DBVP, which are intended for project use beyond the conclusion of the DBVP, are issued as project procedures in the WBEP Manual. DBVP activities requiring procedural control are identified in Attachment 6.

The status of the DBVP as of August 1, 1988, is shown in Attachment 7.

7.0 PROGRAM DOCUMENTATION

Deliverables from the DBVP include the following documents:

- New Design Change Control Procedures

- Licensing Document Commitment Matrix database

- Commitment/Requirement data base

- Watts Bar Design Basis Document
- Complete Calculation Cross Reference Index System (CCRIS)
- New or Revised calculations
- Configuration Control Drawings
- System Evaluations, including UDIEs
- Revised Preoperational Test Scoping Documents

Any discrepancies identified during the DBVP will be documented, tracked, and controlled in an open item management system. If an open item is determined to be a CAQ, it will be tracked and controlled by the TVA CAQ system.

A final report, describing the results of each area of the DBVP will be produced at program completion.

8.0 CONCLUSION

The DBVP is an integrated effort to ensure that the plant licensing basis is properly embodied within plant design; that the plant design basis is supported by analysis; and that functional plant configuration is properly supported by the design basis. DBVP will also ensure that an effective design change control process will be implemented to maintain configuration control. Performance in each program area will be summarized in a report with significant observations identified.

Attachment 1

BASIS FOR DESIGN BASELINE AND VERIFICATION PROGRAM

I. CONDITIONS ADVERSE TO QUALITY	SUBJECT
Design Basis Area	
CAQR WBP 870443	Insufficient Design Input
Licensing Verification Area	
CAQR WBT870165	FSAR not current with respect to plant design
Calculations Area	
See Attachment 4	

II. EMPLOYEE CONCERNS	SUBJECT
Design Basis Area	
EC 20103-WBN-01 EC 30711-WBN-01	Lack of Adequate Design Criteria

Attachment 1

BASIS FOR DESIGN BASELINE AND VERIFICATION PROGRAM

Configuration Control Area

EC 20406-WBN-02 EC 20601-WBN-02 EC 20601-WBN-03	Lack of adequate Design Change Control Process
EC 20601-WBN-01 EC 30713-WBN-02	As-Constructed Drawings do not match plant configuration

Calculations Area

See Attachment 4

III. AUDIT FINDINGS — SUBJECT

Test Requirements Area

QWB-A-86-0017-D01	Inadequate preoperational test scope definition

Attachment 2

WBN SYSTEMS WITHIN THE SCOPE OF THE DBVP
CONFIGURATION CONTROL ACTIVITY

Designation	System
1/15	Main Steam System (and Steam Generator Blowdown System)
3	Main and Auxiliary Feedwater System
13	Fire Detection System
18	Fuel Oil System
26	High Pressure Fire Protection
30	Ventilating System
31	Air-Conditioning (Cooling-Heating) System
32	Control Air System
33*	Service Air System
39	CO_2 Storage, Fire Protection, and Purging System
41*	Layup Water Treatment
42*	Chemical Cleaning
43*	Sample and Water Quality System
46	Feedwater Control System
52*	System Test Facility
57	Associated Electrical Systems
59*	Demineralized Water & Cask Decontamination System
61	Ice Condenser System
62	Chemical and Volume Control System
63	Safety Injection System
65	Emergency Gas Treatment System
67	Essential Raw Cooling Water System
68	Reactor Coolant System
70	Component Cooling System
72	Containment Spray System
74	Residual Heat Removal System
77	Waste Disposal System
78	Spent Fuel Pit Cooling System
81*	Primary Makeup Water System
82	Standby Diesel Generator System
83	Hydrogen Recombination System
84	Flood Mode Boration System
85	Control Rod Drive System
86	Diesel Starting Air System
88	Containment Isolation System
90	Radiation Monitoring System
92	Neutron Monitoring System
94	In-Core Flux Detectors
99	Reactor Protection System
211	6.9-kV Shutdown Power

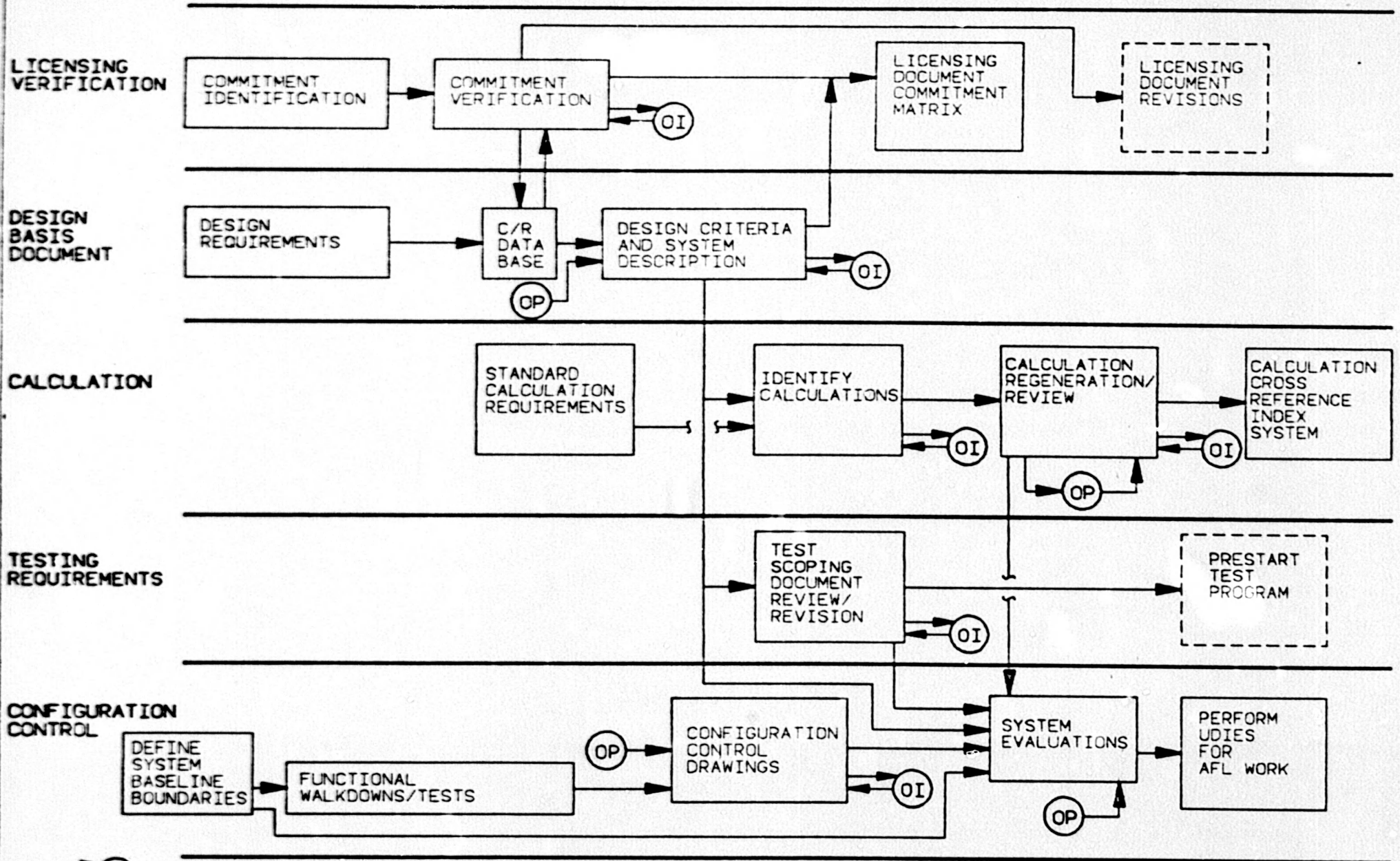
*Containment Isolation Function Only

Attachment 2

WBN SYSTEMS WITHIN THE SCOPE OF THE DBVP
CONFIGURATION CONTROL ACTIVITY

Designation	System
212	480-V Shutdown Power
213	Reactor Motor Operated Valve Power
214	Control & Auxiliary Vent Power
215	Diesel Auxiliary Power
228	Plant Lighting
232	Reactor Vent Power
235	120-VAC Vital Power
236	125-VDC Vital Power
251	Sound-Powered Telephones
268	Permanent Hydrogen Mitigation System
271	Containment and Auxiliary Buildings (Reactor Components Handling Systems Only)

ATTACHMENT 3: FLOWCHART FOR WBN DESIGN BASELINE & VERIFICATION PROGRAM



OI REFLECTS INTERNAL DBVP INTERFACE WITH DBVP OPEN ITEM MANAGEMENT SYSTEM

OP REFLECTS DBVP INTERFACE WITH OTHER WBN SPECIAL PROGRAMS

Attachment 4

DESIGN BASELINE AND VERIFICATION PROGRAM CALCULATION ACTIVITY DESCRIPTION

TABLE OF CONTENTS

WATTS BAR CALCULATION ACTIVITY DESCRIPTION

1.0 INTRODUCTION

Over the past several years, the TVA design control program has been the focus of a number of internal and external reviews. These reviews include audits by TVA's quality assurance organizations, inspections conducted by the Nuclear Regulatory Commission (NRC), and evaluations performed by the Institute of Nuclear Power Operations (INPO). Review findings have shown that TVA's nuclear power plant design basis and calculations are not adequately documented. Calculations have been identified as missing, incomplete, or not updated as the plant configuration has been altered through approved design and construction modifications. Further, a composite calculation listing had not been established that specifically defines the full scope of safety-related calculations needed for WBN.

Calculation deficiencies were initially identified in the electrical discipline area. Subsequent assessments by TVA management have concluded that similar conditions could exist in the other engineering disciplines. The root cause of this situation can be attributed to ineffective procedural controls, inadequate training, failure to follow procedures, and incomplete design reviews.

In order to prevent recurrence, the design control aspects of this condition have been addressed by TVA through an improved design change control process under the Configuration Control Activity of the DBVP. To ensure that safety-related calculations are adequate and in place prior to receipt of an operating license, the plan described herein has been formulated. Conditions Adverse to Quality (CAQ) and employee concerns being addressed by the calculation activity are identified in Appendix A.

2.0 OBJECTIVES

The fundamental goal of the Watts Bar Calculation activity is to assure the existence and retrievability of design calculations that are both technically adequate and consistent with the current plant design. In order to achieve this goal, the following specific objectives have been established:

1. Identify calculations

2. Verify the existence and retrievability of the calculations and generate any calculations determined to be missing.

3. Assure that the calculations are technically adequate.

4. Assure that calculations are consistent with the plant design.

5. Establish a process that will maintain calculations current with the plant design.

3.0 SCOPE

The scope of calculations encompassed by this plan consists of those which are necessary to establish or support the unit 1 and common safety-related plant systems or design features necessary to ensure:

1. The integrity of the reactor coolant pressure boundary;

2. The capability to shut down the reactor and maintain it in a safe shutdown condition; or

3. The capability to prevent or mitigate the consequences of an incident which could result in potential offsite exposures comparable to those specified in 10 CFR 100.

The scope of this program also encompasses those calculations necessary to establish or support plant features which must either:

1. Retain adequate structural integrity because its failure could jeopardize to an unacceptable extent the achievement of a primary safety function or because it forms an interface between Seismic Category I and non-Seismic Category I plant features; or

2. Perform a function that is not a primary safety function but whose failure or unwanted action could jeopardize to an unacceptable extent the achievement of a primary safety function.

The criteria stated above will be used in the review of the WBN design calculations to determine which calculations are within the scope of the calculation program.

4.0 DESCRIPTION OF CALCULATION ACTIVITY

The Calculation activity has been structured to accomplish the five objectives identified in Section 2.0. The plan to achieve each of these is described below.

4.1 Identification of Calculations

Calculations will be identified by reviewing the following:

1. Standard calculation types required by each TVA engineering discipline.

2. System Descriptions (SD) and Design Criteria (DC) which constitute the WBN Design Basis Document (DBD).

Each TVA engineering discipline has defined the standard calculation types which are to be used in identifying WBN safety-related

calculations. These standard calculation types are defined in References 1 through 4. The extent of applicability of each standard calculation type to WBN will be determined. This will be accomplished primarily by means of reviewing applicable design output documents to identify specific safety-related plant features which require supporting calculations within each calculation type. This review will be oriented towards physical design features. Additionally, the DBD development effort includes provisions to identify the design basis requirements for WBN which should be supported by calculations. The resulting list of WBN calculations will be compared to the SQN calculations list in order to finalize the WBN list.

4.2 Verification of Existence and Retrievability

Watts Bar calculations have been transferred from diverse filing locations to a central location on site. Copies of joint Sequoyah Nuclear Plant (SQN)/WBN calculations and other applicable calculations that are not specific to WBN will also be identified and filed in this location. A consolidated WBN calculation list will be created reflecting calculations in this central file.

Existing safety-related calculations will be entered into a computerized data base using the Calculation Cross Reference Information System (CCRIS) software program. This data base will replace and consolidate various calculation indexes that currently exist and will also contain additional calculation information including cross reference documents, category type, and RIMS accession number. Existing calculations that are of a type no longer performed for WBN (e.g., support variance calculations) will not be entered into CCRIS. Their existing manual calculation log, however, will be maintained.

Upon completion of CCRIS data entry, the resulting calculation list, sorted by category type, will be compared to the list of required calculations to determine those that are missing. Missing calculations will be generated in accordance with current calculation procedures. Completion of these efforts will achieve a complete set of engineering calculations, which will be filed in a central location on site and verified as retrievable.

4.3 Assurance of Technical Adequacy

The technical adequacy of existing WBN calculations will be established through the generation of new calculations, the technical review of affected calculations in identified deficient areas, or a review of selected calculations in those areas where problems have not been previously identified. The combination of these methods will provide adequate confidence in the technical adequacy of WBN calculations.

The determination of the methodology to be applied to each calculation type has been or will be made based upon an evaluation of identified problem areas. This evaluation will consider both WBN deficiencies and those calculation-related deficiencies identified at SQN. Calculation inadequacies identified by other WBN special programs, the TVA CAQ process, and the WBN Vertical Slice Review will be reviewed for specific and generic impact to WBN calculations.

TVA has determined that the generation of new calculations is appropriate in the following two major areas. Electrical calculations will be regenerated prior to Unit 1 fuel loading based on CAQR WBNEEB8571, which documents lack of adequate control for electrical calculations, and the results of internal calculation reviews and SQN experience. Additionally, pipe stress analysis calculations will also be regenerated prior to Unit 1 fuel loading as described in the HAAUP.

Calculations associated with other deficient areas, as identified in the evaluation described above, will be reviewed for technical adequacy or new calculations generated in accordance with current calculation procedures. Documentation of the technical reviews of existing calculations will be maintained for examination and future reference. As the technical review of the calculations identifies inadequacies, the affected calculations will be revised or new calculations generated. Unacceptable calculations will normally be revised in conjunction with the review process unless circumstances justify deferral based on other planned work or work in progress. Calculations which are technically acceptable but contain discrepancies will be tracked to ensure their correction when the calculation is next revised.

For calculations which are not regenerated or reviewed based on known deficiencies, a review of selected calculations will be performed to confirm that additional inadequacies do not exist. Evaluations will be made of the extent of applicability of any identified technical deficiencies. If these technical deficiencies are determined to be programmatic or have a root cause which could have caused other deficiencies, the scope of review within that calculation type will be increased to ensure that technical deficiencies are found and corrected.

Discrepancies encountered in the review process will be identified as OIRs, tracked, and controlled in an open items management system. If an open item is determined to be a CAQ, it will be tracked and controlled by the TVA CAQ system, including an evaluation for reportability as appropriate.

4.4 Assurance of Consistency With Plant Design

Assurance of consistency with plant design will be established concurrent with the assurance of technical adequacy. The consistency review will be performed for the same calculations reviewed for technical adequacy. Consistency of calculations with current plant design will be assured by one or more of the following methods, as applicable:

1. Reconciliation with as-built conditions as determined by field walkdowns.

2. Reconciliation with current revisions of applicable design output (drawings, specifications, etc.).

3. Reconciliation based on resolution of test deficiencies.

Walkdown or testing information being developed for other WBN programs will be used as available and applicable. An example of such a program includes walkdowns associated with HAAUP.

Completion of these reconciliation activities and any corrective actions that may evolve from the technical adequacy reviews will provide assurance that calculations reflect the current plant design.

4.5 Establishment Of A Calculation Maintenance Process

Maintenance of calculations to reflect ongoing design changes and/or plant modifications will be accomplished by means of procedural controls requiring the use of cross reference information contained in the CCRIS database. Procedural requirements will be implemented to require the identification and update of calculations that are either necessary to support the design change or that may be affected by the change. Upon implementation of CCRIS, identification of such existing calculations will be accomplished by searching the database for calculations that are either predecessors or successors to the design document being changed.

Changes to design documentation which do not entail physical modifications will also be checked against the CCRIS database for potential impact on calculations. Additionally, when calculations are revised for any reason, the CCRIS data base will be utilized to identify any subsequent successor document that may also require update. Ongoing updates to the CCRIS database when any new or revised calculations are issued will ensure that cross reference information, as well as the calculation, is kept current.

5.0 CALCULATION ACTIVITY INTERFACES

An interface exists with the DBD area of the DBVP. The Design Basis activity will identify the calculations (existing and missing) which are required to support the plant design basis. In turn, the Calculation activity will assure that those calculations required to support the DBD are current and technically adequate. Furthermore, system functional requirements specified by calculations will provide input to the system evaluations in the Configuration Control activity.

Additionally, the Calculation activity will interface with other WBN programs that either rely on data obtained from existing calculations or that will require the preparation of new or revised calculations. One such program is HAAUP, which will interface with the Calculation activity for both of these reasons. Other programs having similar interfaces include the conduit support, equipment seismic qualification, and electrical issues.

6.0 CALCULATION ACTIVITY DOCUMENTATION

Calculation activity work products will be prepared in accordance with procedures. These work products will include:

- Complete CCRIS data base
- New or revised calculations
- An open items tracking system and OIRs
- Task or activity summary reports, if appropriate

These work products, as well as ongoing program activities, will be subject to QA audits or surveillance to assure completeness and traceability of program documentation.

Any discrepancies identified during the Calculation activity will be documented, tracked, and controlled in an open item management system. If an open item is determined to be a CAQ, it will be tracked and controlled by the TVA CAQ system.

A final report, describing the results of the Calculation activity will be produced at program completion.

7.0 CONCLUSION

Upon completion of the Calculation activities, WBN will have the safety-related engineering calculations in place with assurance that they are technically adequate and up to date. Calculations that have been reviewed will have documentation available to demonstrate technical adequacy. A user-accessible data base of calculations, complete with interdependency cross reference, will be available. Finally, a system will be in place to ensure that calculations are maintained up to date to reflect any future design changes over the life of the plant.

8.0 REFERENCES

1. Electrical Engineering Procedure Method PM 86-02 "Electrical Calculations" dated July 17, 1987 (B43 870717 903).

2. Civil Engineering Branch Instruction CI-21.53 "Calculations" dated July 17, 1988 (B41 880715 001).

3. Mechanical Engineering Branch Instruction, "Design Calculation," MEB-I-23.2, dated November 6, 1987 (B44 871106 002).

4. Nuclear Technology Branch Instruction, "Calculation Classification and Categorization," NTB-I-25-3.1.4, dated July 13, 1988 (B45 880712 255).

APPENDIX A

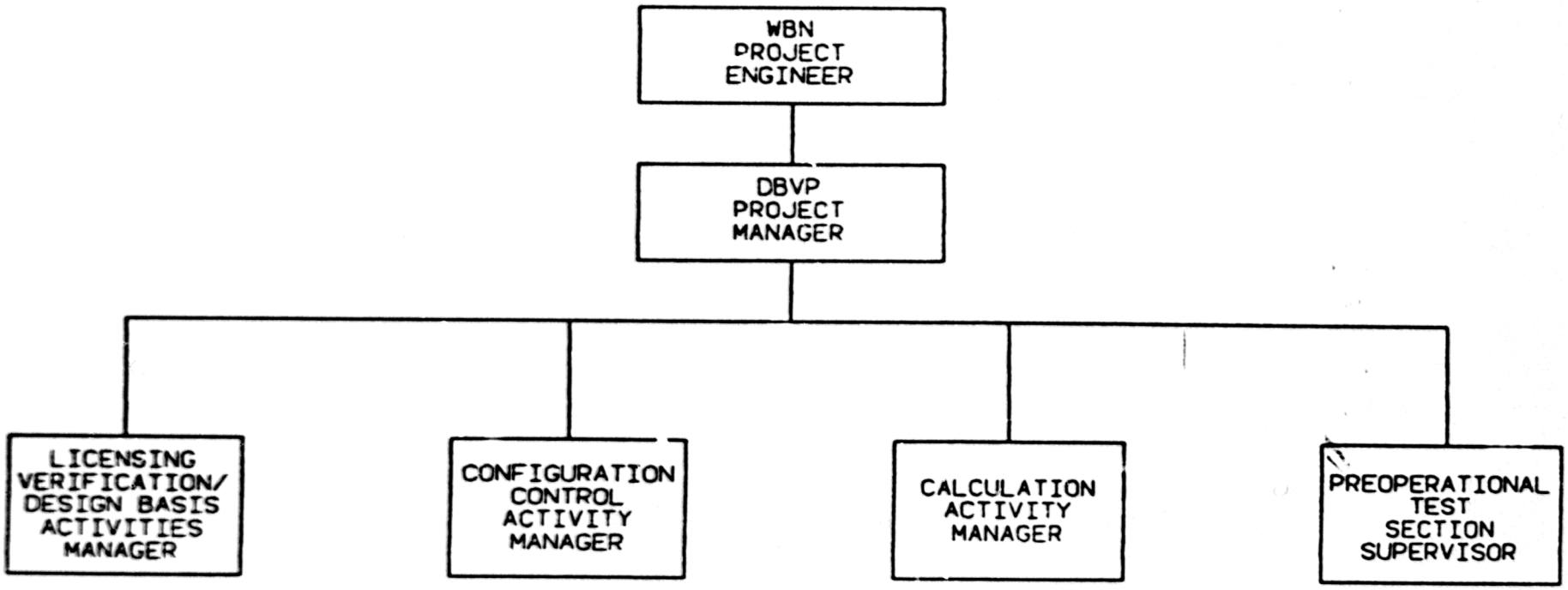
BASIS FOR DESIGN BASELINE AND VERIFICATION PROGRAM CALCULATION ACTIVITY

CONDITIONS ADVERSE TO QUALITY REPORTS	SUBJECT
WBF 870038	Seismic Reanalysis for Condensate Demineralizer Waste Evaporator Building
WBF 870039	Technical Adequacy Review of Seismic Analysis for Additional Diesel Generator Building
WBP 870396	Seismic Reanalysis for Diesel Generator Building and Waste Packaging Area

EMPLOYEE CONCERNS	SUBJECT
Report 201.6(A)	Incorporation of Requirements and Commitments in Design
Report 205.1(A)	Control of Design Calculations
Report 215.6(A)	Hanger Loads on Structures
Report 21200	Pipe Support Program

SIGNIFICANT CONDITION REPORT	SUBJECT
WBNEEB8571	Lack of Electrical Calculations Control

ORGANIZATION FOR THE WBN DESIGN BASELINE AND VERIFICATION PROGRAM



ATTACHMENT 5

ATTACHMENT 6

DBVP ACTIVITIES REQUIRING PROCEDURAL CONTROL

Compilation of Licensing Commitment Units

Commitment Unit Verification

Maintenance of Licensing Commitments Consistent with Plant Design

Preparation of Commitment/Requirement Data Base

Preparation of Design Basis Document

Maintenance of the Design Basis Document

Identification of Required Calculations

Selection of Calculations for Technical Review

Preparation of Design Change Notices

Preparation of Plant Modification Packages

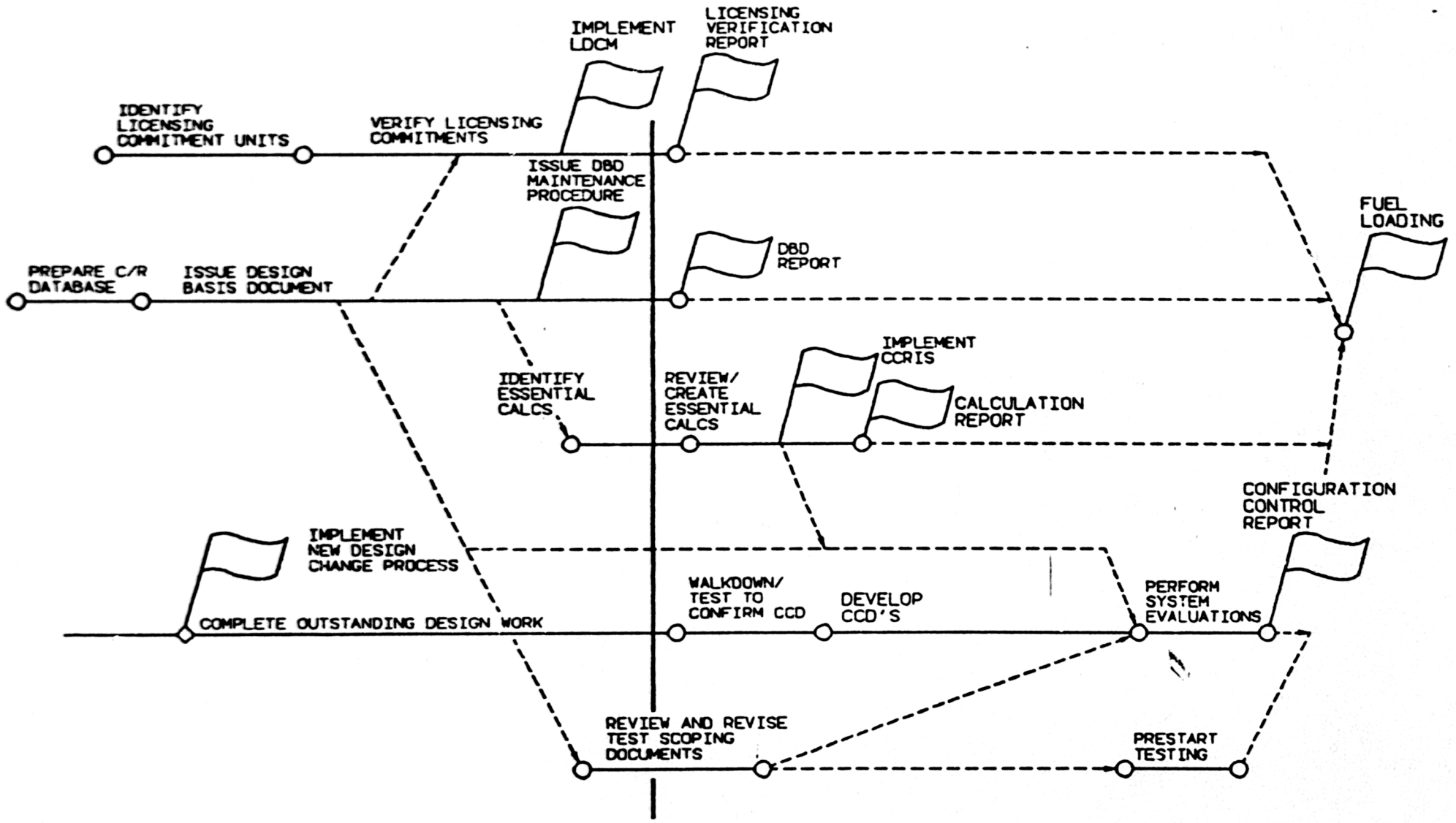
Preparation of ECN Modification Packages

Configuration Control Drawing Preparation and Control

Walkdowns

Performance of System Evaluations

ATTACHMENT 7
DBVP STATUS



Comment 3: System logic diagrams, i.e., 611 series prints, are presently not within the scope of the configuration control activity of the DBVP. What is the rationale for their absence?

TVA Response:

TVA has decided to incorporate system logic diagrams within the scope of the configuration control activity. This addition is reflected in revision 2 of the DBVP CAP (see enclosure 1).

Comment 4: What will be included in the Preoperational Testing and Prestart Test Program? Current staff position is that no credit will be allowed for any system preoperation test. A preoperational test on a component level may be acceptable.

TVA Response:

The scope of the Watts Bar testing program is the subject of the Prestart Test Program CAP and is not within the scope of the DBVP. Refer to the Prestart Test Program CAP submitted by letter dated December 30, 1988 (L44 881230 800), for a description of what is included in the Preoperational and Prestart Test Program. This CAP was presented to NRC, and NRC comments were addressed during a meeting held on April 18, 1989. A revision to the CAP, based on NRC comments during the meeting, will be submitted by June 30, 1989.

ENCLOSURE 2

TVA Response to NRC Comments Regarding the Design Baseline and Verification Program (DBVP) Corrective Action Program (CAP) Plan Presentation on February 8, 1989

Comment 1: How are commitments controlled with respect to revisions to referenced criteria, e.g., G-29, and how the plant features comply?

TVA Response:

The DBVP licensing verification (LV) activity will verify that commitments to NRC contained in the designated source documents have been captured in the appropriate highest level controlling document. This effort will ensure that current commitments are captured in the current controlling documents. These controlling documents could include procedures, criteria, technical specifications, etc. The Licensing Document Commitment Matrix (LDCM) is being established as a tool for maintaining consistency between licensing commitments and the associated implementing documents.

The LV effort will not verify the implementation of commitments in the final design or construction. The WBN vertical slice review was conducted to provide additional assurance that the WBN design and construction meet licensing commitments.

Previous correspondence regarding G-Specs have been related to NRC Inspection Report Numbers 50-390/86-14 and 50-391/86-14, notice of violation 391/86-14-03. The revised TVA response to notice of violation 391/86-14-03 was submitted to NRC via letter dated September 7, 1988 (L44 880907 803). A supplemental response to this notice of violation was submitted to NRC via letter dated April 7, 1989 (L44 890407 801), to address the use of locking devices for pipe support designs.

Comment 2: The DBVP CAP referenced FSAR section 17.2.1, but this section of the FSAR currently refers to the QA Topical Report. Evaluate this apparent discrepancy and correct the DBVP CAP (as necessary) to refer to the current reference.

TVA Response:

TVA has evaluated NRC's comment and has verified that FSAR section 17.2.1 is the correct reference (refer to FSAR page 17.2-1). However, although no revision to the DBVP CAP is necessary, revision 2 of the DBVP incorporates the definition of primary and secondary safety functions consistent with FSAR section 17.2.1.

ENCLOSURE 3

LIST OF COMMITMENTS

For the Watts Bar Nuclear Plant (WBN), TVA commits to:

- Perform the Design Baseline Verification Program which has the following major components: licensing verification, design basis, calculations, configuration control, and testing requirements.