April 16, 1993

Docket Nos. 50-390
50-391

Tennessee Valley Authority
ATTN: Dr. Mark O. Medford, Vice President
Nuclear Assurance, Licensing & Fuels
3B Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Dr. Medford:

SUBJECT: WATTS BAR NUCLEAR PLANT - ISSUANCE OF SAFETY EVALUATION REPORT SUPPLEMENT 11 (TAC M63595, M71921, M71922, M71923, M77548, M77549, M77896, M79717, M80346, M82032, M82033, M82644, M82645, M83322, M83323, M84747, M84748)

The U.S. Nuclear Regulatory Commission staff has completed Safety Evaluation Report, Supplement 11, related to the operation of Watts Bar Nuclear Plant, Units 1 and 2 (NUREG-0847, Supplement 11). Twenty (20) copies of the report are enclosed for your use. Also enclosed is a copy of a related notice of availability which has been sent to the Office of the Federal Register for publication. Any comments should be addressed to Peter Tam, Project Manager for Watts Bar.

Sincerely,

Original signed by

Frederick J. Hebdon, Director
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. NUREG-0847, Supplement 11 (20)
2. Federal Register Notice

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NUREG–0847
Supplement No. 11

Safety Evaluation Report

related to the operation of
Watts Bar Nuclear Plant,
Units 1 and 2

Docket Nos. 50–390 and 50–391

Tennessee Valley Authority

U.S. Nuclear Regulatory Commission

Office of Nuclear Reactor Regulation

April 1993

ABSTRACT

This report supplements the Safety Evaluation Report (SER), NUREG-0847 (June 1982), Supplement No. 1 (September 1982), Supplement No. 2 (January 1984), Supplement No. 3 (January 1985), Supplement No. 4 (March 1985), Supplement No. 5 (November 1990), Supplement No. 6 (April 1991), Supplement No. 7 (September 1991), Supplement No. 8 (January 1992), Supplement No. 9 (June 1992), and Supplement No. 10 (October 1992), issued by the Office of Nuclear Reactor Regulation of the U.S. Nuclear Regulatory Commission with respect to the application filed by the Tennessee Valley Authority, as applicant and owner, for licenses to operate the Watts Bar Nuclear Plant, Units 1 and 2 (Docket Nos. 50-390 and 50-391). The facility is located in Rhea County, Tennessee, near the Watts Bar Dam on the Tennessee River. This supplement provides recent information regarding resolution of some of the outstanding and confirmatory items, and proposed license conditions identified in the SER.

TABLE OF CONTENTS

ABBREVIATIONS

ADGB	additional diesel generator building
ASME	American Society of Mechanical Engineers
ATWS	anticipated transient without scram
CAP	corrective action program
CAQ	condition adverse to quality
CNPP	Corporate Nuclear Performance Plan
CSB	Containment Systems Branch
DCCS	TVA Document Control Change System
DCRM	Document Control and Records Management
ERCW	essential raw cooling water
FSAR	Final Safety Analysis Report
GDC	general design criterion
GL	generic letter
IE	Office of Inspection and Enforcement
LOCA	loss-of-coolant accident
MELB	moderate energy line break
NE	TVA Nuclear Engineering
NRC	Nuclear Regulatory Commission
NSSS	nuclear steam supply system
OBE	operating basis earthquake
OIR	open item report
PORV	pilot-operated relief valve
PTS	pressurized thermal shock
QA	quality assurance
RTD	resistance temperature detector
SER	Safety Evaluation Report
SP	special program
SRP	Standard Review Plan
SSER	Supplemental Safety Evaluation Report
SSI	soil-structure interaction
TAC	technical assignment control
TI	temporary instruction
TMI	Three Mile Island
TVA	Tennessee Valley Authority

VI	vendor information
VTD	vendor technical document
VTM	vendor technical manual
WBN	Watts Bar Nuclear Plant
WBNPP	Watts Bar Nuclear Performance Plan
WISP	Workload Information and Scheduling System

INTRODUCTION AND DISCUSSION

1.1 Introduction

In June 1982, the Nuclear Regulatory Commission staff (NRC staff or staff) issued a Safety Evaluation Report, NUREG-0847, regarding the application by the Tennessee Valley Authority (TVA or the applicant) for licenses to operate the Watts Bar Nuclear Plant, Units 1 and 2. The Safety Evaluation Report (SER) was followed by Supplement No. 1 (SSER 1, September 1982), Supplement No. 2 (SSER 2, January 1984), Supplement No. 3 (SSER 3, January 1985) Supplement No. 4 (SSER 4, March 1985), Supplement No. 5 (SSER 5, November 1990) Supplement No. 6 (SSER 6, April 1991), Supplement No. 7 (SSER 7, September 1991), Supplement No. 8 (SSER 8, January 1992), Supplement No. 9 (SSER 9, June 1992), and Supplement No. 10 (SSER 10, October 1992). As of this date, the staff has completed review of the applicant's Final Safety Analysis Report (FSAR) up to Amendment 70.

The SER and SSERs were written in accordance with the format and scope outlined in the Standard Review Plan (SRP, NUREG-0800). Issues arising as a result of the SRP review that were not closed out at the time the SER was published were classified into outstanding issues, confirmatory issues, and proposed license conditions (see Sections 1.7, 1.8, and 1.9, respectively, which follow).

In addition to the guidance of the SRP, the staff would issue generic requirements or recommendations in the form of bulletins and generic letters. Each of these bulletins and generic letters carries its own applicability, work scope, and acceptance criteria; some are applicable to Watts Bar. The implementation status was addressed in Section 1.14 of SSER 6. The staff is reevaluating the status of implementation of all bulletins and generic letters. Results of this reevaluation will be published in a future SSER.

Each of the following sections or appendices of this supplement is numbered the same as the section or appendix of the SER that is being updated, and the discussions are supplementary to, and not in lieu of, the discussion in the SER unless otherwise noted. Accordingly, Appendix A is a continuation of the chronology of the safety review. Appendix B is an updated bibliography.[1] Appendix E is a list of principal contributors to this supplement. Appendix I, a safety evaluation of the Vendor Information Corrective Action Program, is revised. Appendices C, D, F-H, and J-Z are not changed by this SSER.

The Project Manager is Peter S. Tam. Mr. Tam may be contacted by calling (301) 492-7000, or by writing to the following address:

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[1]Availability of all material cited is described on the inside front cover of this report.

Mr. Peter S. Tam
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

1.7 Summary of Outstanding Issues

SER Section 1.7 identified 17 outstanding issues (open items) that had not been resolved at the time the SER was issued. Additional outstanding issues were added in SSERs that followed. This section updates the status of those items. The completion status of each of the issues is tabulated below with the relevant document in which the issue was last addressed shown in parentheses. Detailed, up-to-date status information is conveyed in the staff's summary of the monthly meeting regarding licensing status.

Issue[2]	Status	Section
(1) Potential for liquefaction beneath ERCW pipelines and Class 1E electrical conduit	Resolved (SSER 3)	2.5.4.4
(2) Buckling loads on Class 2 and 3 supports	Resolved (SSER 4)	3.9.3.4
(3) Inservice pump and valve test program (TAC M74801)	Updated (SSER 5)	3.9.6
(4) Qualification of equipment		
(a) Seismic (TAC M71919)	Resolved (SSER 9)	3.10
(b) Environmental (TAC M63591)	Under review (SER)	3.11
(5) Preservice inspection program (TAC M63627)	Resolved for Unit 1 (SSER 10)	5.2.4, 6.6, App. Z
(6) Pressure-temperature limits for Unit 2	On hold	5.3.2, 5.3.3
(7) Model D-3 steam generator preheater tube degradation	Resolved (SSER 4)	5.4.2.2
(8) Branch Technical Position CSB 6-4	Resolved (SSER 3)	6.2.4
(9) H_2 analysis review	Resolved (SSER 4)	6.2.5
(10) Safety valve sizing analysis (WCAP-7769)	Resolved (SSER 2)	5.2.2

[2]The TAC (technical assignment control) number that appears in parentheses after the issue title is an internal NRC control number by which the issue is managed through the Workload Information and Scheduling Program (WISP) and relevant documents are filed. Documents associated with each TAC number can be listed by the NRC document control system, NUDOCS/AD.

Issue	Status	Section
(11) Compliance of proposed design change to the offsite power system to GDC 17 and 18 (TAC M63649)	Under review (SSER 3)	8.2
(12) Fire-protection program (TAC M63648)	Under review (SER)	9.5.1
(13) Quality classification of diesel generator auxiliary system piping and components (TAC M63638)	Resolved (SSER 5)	9.5.4.1
(14) Diesel generator auxiliary system design deficiencies (TAC M63638)	Resolved (SSER 5)	9.5.4, 9.5.5, 9.5.7
(15) Physical Security Plan (TAC M63657)	Under review (SER)	13.6
(16) Boron-dilution event	Resolved (SSER 4)	15.2.4.4
(17) QA Program (TAC M76972)	Updated (SSER 5)	17
(18) Seismic classification of cable trays and conduit (TAC R00508, R00516)	Resolved (SSER 8)	3.2.1, 3.10
(19) Seismic design concerns (TAC M79717, M80346):		
(a) Number of OBE events	Resolved (SSER 8)	3.7.3
(b) 1.2 multi-mode factor	Resolved (SSER 9)	3.7.3
(c) Code usage	Resolved (SSER 8)	3.7.3
(d) Conduit damping values	Resolved (SSER 8)	3.7.3
(e) Worst case, critical case, bounding calculations	Under review (SSER 6)	3.7.3
(f) Mass eccentricities	Resolved (SSER 8)	3.7.2.1.2
(g) Comparison of set A versus set B response	Resolved (SSER 11)	3.7.2.12
(h) Category 1(L) piping qualification	Resolved (SSER 8)	3.9.3
(i) Pressure relief devices	Resolved (SSER 7)	3.9.3.3
(j) Structural issues	Resolved (SSER 9)	3.8
(k) Update FSAR per 12/18/90 letter	Resolved (SSER 8)	3.7
(20) Mechanical systems and components (TAC M79718, M80345)		
(a) Feedwater check valve slam	Under review (SSER 6)	3.9.1
(b) New support stiffness and deflection limits	Resolved (SSER 8)	3.9.3.4
(21) Removal of RTD bypass system (TAC M63599)	Resolved (SSER 8)	4.4.3

Issue	Status	Section
(22) Removal of upper head injection system (TAC M77195)	Resolved (SSER 7)	6.3.1
(23) Containment isolation using closed systems (TAC M63597)	Awaiting submittal (SSER 7)	6.2.4
(24) Main streamline break outside containment (TAC M63632)	Under review (SSER 7)	3.11
(25) Health Physics Program (TAC M63647)	Resolved (SSER 10)	12
(26) Regulatory Guide 1.97, Instruments To Follow Course of Accident (TAC M77550, M77551)	Resolved (SSER 9)	7.5.2
(27) Containment sump screen design anomalies (TAC M77845)	Resolved (SSER 9)	6.3.3
(28) Emergency procedure (TAC M77861)	Resolved (SSER 9)	13.5.2.1

1.8 Summary of Confirmatory Issues

SER Section 1.8 identified 42 confirmatory issues for which additional information and documentation were required to confirm preliminary conclusions. This section updates the status of those items for which the confirmatory information has subsequently been provided by the applicant and for which review has been completed by the staff. The completion status of each of the issues is tabulated below, with the relevant document in which the issue was last addressed shown in parentheses. Detailed, up-to-date status information is conveyed in the staff's summary of the monthly meeting regarding licensing status.

Issue	Status	Section
(1) Design-basis groundwater level for the ERCW pipeline	Resolved (SSER 3)	2.4.8
(2) Material and geometric damping effect in SSI analysis	Resolved (SSER 3)	2.5.4.2
(3) Analysis of sheetpile walls	Resolved (SSER 3)	2.5.4.2
(4) Design differential settlement of piping and electrical components between rock-supported structures	Resolved (SSER 3)	2.5.4.3
(5) Upgrading ERCW system to seismic Category I (TAC M63617)	Resolved (SSER 5)	3.2.1, 3.2.2
(6) Seismic classification of structures, systems, and components important to safety (TAC M63618)	Resolved (SSER 5)	3.2.1

Issue	Status	Section
(7) Tornado-missile protection of diesel generator exhaust	Resolved (SSER 2)	3.5.2, 9.5.4.1, 9.5.8
(8) Steel containment building buckling research program	Resolved (SSER 3)	3.8.1
(9) Pipe support baseplate flexibility and its effects on anchor bolt loads (IE Bulletin 79-02) (TAC M63625)	Resolved (SSER 8)	3.9.3.4
(10) Thermal performance analysis	Resolved (SSER 2)	4.2.2
(11) Cladding collapse	Resolved (SSER 2)	4.2.2
(12) Fuel rod bowing evaluation	Resolved (SSER 2)	4.2.3
(13) Loose-parts monitoring system	Resolved (SSER 3)	4.4.5
(14) Installation of residual heat removal flow alarm	Resolved (SSER 5)	5.4.3
(15) Natural circulation tests (TAC M63603, M79317, M79318)	Resolved (SSER 10)	5.4.3
(16) Atmospheric dump valve testing	Resolved (SSER 2)	5.4.3
(17) Protection against damage to containment from external pressure	Resolved (SSER 3)	6.2.1.1
(18) Designation of containment isolation valves for main and auxiliary feedwater lines and feedwater bypass lines (TAC M63623)	Resolved (SSER 5)	6.2.4
(19) Compliance with GDC 51	Resolved (SSER 4)	6.2.7, App. H
(20) Insulation survey (sump debris)	Resolved (SSER 2)	6.3.3
(21) Safety system setpoint methodology	Resolved (SSER 4)	7.1.3.1
(22) Steam generator water level reference leg	Resolved (SSER 2)	7.2.5.9
(23) Containment sump level measurement	Resolved (SSER 2)	7.3.2
(24) IE Bulletin 80-06	Resolved (SSER 3)	7.3.5
(25) Overpressure protection during low-temperature operation	Resolved (SSER 4)	7.6.5

Issue	Status	Section
(26) Availability of offsite circuits	Resolved (SSER 2)	8.2.2.1
(27) Non-safety loads powered from the Class 1E ac distribution system	Resolved (SSER 2)	8.3.1.1
(28) Low and/or degraded grid voltage condition (TAC M63649)	Updated (SSER 7)	8.3.1.2
(29) Diesel generator reliability qualification testing (TAC M63649)	Resolved (SSER 7)	8.3.1.6
(30) Diesel generator battery system	Resolved (SSER 2)	8.3.2.4
(31) Thermal overload protective bypass	Resolved (SSER 2)	8.3.3.1.2
(32) Update FSAR on sharing of dc and ac distribution systems (TAC M63649)	Under review (SSER 3)	8.3.3.2.2
(33) Sharing of raceway systems between units	Resolved (SSER 2)	8.3.3.2
(34) Testing Class 1E power systems	Resolved (SSER 2)	8.3.3.5.2
(35) Evaluation of penetration's capability to withstand failure of overcurrent protection device (TAC M63649)	Resolved (SSER 7)	8.3.3.6
(36) Missile protection for diesel generator vent line (TAC M63639)	Resolved (SSER 5)	9.5.4.2
(37) Component cooling booster pump relocation	Resolved (SSER 5)	9.2.2
(38) Electrical penetrations documentation (TAC M63648)	Under review (SER)	9.5.1.3
(39) Compliance with NUREG/CR-0660 (TAC M63639)	Resolved (SSER 5)	9.5.4.1
(40) No-load, low-load, and testing operations for diesel generator (TAC M63639)	Resolved (SSER 5)	9.5.4.1
(41) Initial test program	Resolved (SSER 3)	14
(42) Submergence of electrical equipment as result of a LOCA (TAC M63649)	Under review (SER)	8.3.3.1.1
(43) Safety parameter display system (TAC M73723, M73724)	Updated (SSER 6)	18.2, App. P

1.9 Summary of Proposed License Conditions

In Section 1.9 of the SER and in SSERs that followed, the staff identified 43 proposed license conditions. Since these documents were issued, the applicant has submitted additional information on some of these items, thereby removing the necessity to impose a condition. The completion status of the proposed license conditions is tabulated below, with the relevant document in which the issue was last addressed shown in parentheses. Detailed, up-to-date status information is conveyed in the staff's summary of the monthly meeting regarding licensing status.

Proposed Condition	Status	Section
(1) Relief and safety valve testing (II.D.1)	Resolved (SSER 3)	3.9.3.3, 5.2.2
(2) Inservice testing of pumps and valves (TAC M74801)	Updated (SSER 5)	3.9.6
(3) Detectors for inadequate core cooling (II.F.2) (TAC M77132, M77133)	Resolved (SSER 10)	4.4.8
(4) Inservice Inspection Program (TAC M76881)	Updated (SSER 10)	5.2.4, 6.6
(5) Installation of reactor coolant vents (II.B.1)	Resolved (SSER 5)	5.4.5
(6) Accident monitoring instrumentation (II.F.1)		
(a) Noble gas monitor (TAC M63645)	Resolved (SSER 5)	11.7.1
(b) Iodine particulate sampling (TAC M63645)	Resolved (SSER 6)	11.7.1
(c) High-range in-containment radiation monitor (TAC M63645)	Resolved (SSER 5)	12.7.2
(d) Containment pressure	Resolved (SSER 5)	6.2.1
(e) Containment water level	Resolved (SSER 5)	6.2.1
(f) Containment hydrogen	Resolved (SSER 5)	6.2.5
(7) Modification to chemical feedlines (TAC M63622)	Resolved (SSER 5)	6.2.4
(8) Containment isolation dependability (II.E.4.2) (TAC M63633)	Resolved (SSER 5)	6.2.4
(9) Hydrogen control measures (NUREG-0694, II.B.7) (TAC M77208)	Resolved (SSER 8)	6.2.5, App. C
(10) Status monitoring system/BISI (TAC M77136, M77137)	Resolved (SSER 7)	7.7.2

Proposed Condition	Status	Section
(11) Installation of acoustic monitoring system (II.D.3)	Resolved (SSER 5)	7.8.1
(12) Diesel generator reliability qualification testing at normal operating temperature	Resolved (SSER 2)	8.3.1.6
(13) DC monitoring and annunciation (TAC M63649)	Under review (SSER 3)	8.3.2.2
(14) Possible sharing of dc control power to ac switchgear	Resolved (SSER 3)	8.3.3.2.4
(15) Testing of associated circuits	Resolved (SSER 3)	8.3.3.3
(16) Testing of non-Class 1E cables	Resolved (SSER 3)	8.3.3.3
(17) Low-temperature overpressure protection/power supplies for pressurizer relief valves and level indicators (II.G.1) (TAC M63649)	Resolved (SSER 7)	8.3.3.4
(18) Testing of reactor coolant pump breakers	Resolved (SSER 2)	8.3.3.6
(19) Postaccident sampling system (TAC M77543)	Updated (SSER 5)	9.3.2
(20) Fire protection program (TAC M63648)	Under review (SER)	9.5.1.8
(21) Performance testing for communications systems (TAC M63637)	Resolved (SSER 5)	9.5.2
(22) Diesel generator reliability (NUREG/CR-0660) (TAC M63640)	Resolved (SSER 5)	9.5.4.1
(23) Secondary water chemistry monitoring and control program	Resolved (SSER 5)	10.3.4
(24) Primary coolant outside containment (III.D.1.1) (TAC M63646, M77553)	Resolved (SSER 10)	11.7.2
(25) Independent safety engineering group (I.B.1.2) (TAC M63592)	Resolved (SSER 8)	13.4
(26) Use of experienced personnel during startup (TAC M63592)	Resolved (SSER 8)	13.1.3
(27) Emergency preparedness (III.A.1.1, III.A.1.2, III.A.2) (TAC M63656)	Under review (SER)	13.3

Proposed Condition	Status	Section
(28) Review of power ascension test procedures and emergency operating procedures by NSSS vendor (I.C.7) (TAC M77861)	Resolved (SSER 10)	13.5.2
(29) Modifications to emergency operating instructions (I.C.8) (TAC M77861)	Resolved (SSER 10)	13.5.2
(30) Report on outage of emergency core cooling system (II.K.3.17)	Resolved (SSER 3)	13.5.3
(31) Initial test program (TAC M79872)	Resolved (SSER 7)	14.2
(32) Effect of high-pressure injection for small-break LOCA with no auxiliary feedwater (II.K.2.13)	Resolved (SSER 4)	15.5.1
(33) Voiding in the reactor coolant system (II.K.2.17)	Resolved (SSER 4)	15.5.2
(34) PORV isolation system (II.K.3.1, II.K.3.2) (TAC M63631)	Resolved (SSER 5)	15.5.3
(35) Automatic trip of the reactor coolant pumps during a small-break LOCA (II.K.3.5)	Resolved (SSER 4)	15.5.4
(36) Revised small-break LOCA analysis (II.K.3.30, II.K.3.31) (TAC M77298)	Resolved (SSER 5)	15.5.5
(37) Detailed control room design review (I.D.1) (TAC M63655)	Updated (SSER 6)	18.1
(38) Physical Security Plan (TAC M63657, M83973)	Resolved (SSER 10)	13.6.4
(39) Control of heavy loads (NUREG-0612) (TAC M77560)	Updated (SSER 3)	9.1.4
(40) Anticipated transients without scram (Generic Letter 83-28, Item 4.3) (TAC M64347)	Resolved (SSER 5)	15.3.6
(41) Steam generator tube rupture (TAC M77569)	Updated (SSER 5)	15.4.3
(42) Loose-parts monitoring system (TAC M77177)	Resolved (SSER 5)	4.4.5
(43) Safety parameter display system (TAC M73723, M73724)	Opened (SSER 5)	18.2

1.12 Approved Technical Issues for Incorporation in the License as Exemptions

The applicant applied for exemptions from certain provisions of the regulations. These have been reviewed by the staff and approved in appropriate sections of the SER and SSERs. These technical issues are listed below and the actual exemptions will be incorporated in the operating license:

(1) Seal leakage test instead of full-pressure test (Section 6.2.6, SSER 4) (TAC M63615)

(2) Criticality monitor (Section 9.1, SSER 5) (TAC M63615)

(3) Fracture toughness requirements (Section 5.3.1.1, SER) (TAC M85712 and M85713)

1.13 Implementation of Corrective Action Programs and Special Programs

On September 17, 1985, the NRC sent a letter to the applicant, pursuant to Title 10 of the Code of Federal Regulations, Section 50.54(f), requesting that the applicant submit information on its plans for correcting problems concerning the overall management of its nuclear program as well as on its plans for correcting plant-specific problems. In response to this letter, TVA prepared a Corporate Nuclear Performance Plan (CNPP) that identified and proposed corrections to problems concerning the overall management of its nuclear program, and a site-specific plan for Watts Bar entitled, "Watts Bar Nuclear Performance Plan" (WBNPP). The staff reviewed both plans and documented results in two safety evaluation reports, NUREG-1232, Vol. 1 (dated July 1987), and NUREG-1232, Vol. 4 (dated January 1990).

In a letter of September 6, 1991, the applicant submitted Revision 1 of the WBNPP. In SSER 9, the staff concluded that Revision 1 of the WBNPP does not necessitate any revision of the staff's safety evaluation report, NUREG-1232, Vol. 4.

In NUREG-1232, Vol. 4, the staff documented its general review of the corrective action programs (CAPs) and special programs (SPs) through which the applicant would effect corrective actions at Watts Bar. When the report was published, some of the CAPs and SPs were in their initial stages of implementation. The staff stated that it will report its review of the implementation of all CAPs and SPs and closeout of open issues in future supplements to the licensing SER, NUREG-0847; accordingly, the staff prepared Temporary Instructions (TIs) 2512/016-043 and adhered to the TIs to perform inspections of the CAPs and SPs. This new section was introduced in SSER 5 and will be updated in subsequent SSERs. The current status of all CAPs and SPs follows. The status described here fully supersedes that described in previous SSERs.

1.13.1 Corrective Action Programs

(1) Cable Issues (TAC M71917)

Program review status: Complete: NUREG-1232, Vol. 4; Letter, P. S. Tam (NRC) to D. A. Nauman (TVA), April 25, 1991 (the safety evaluation was reproduced in SSER 7 as Appendix P); supplemental safety evaluation dated April 24, 1992 (Appendix T of SSER 9).

Implementation status: Full implementation expected by November 1993.

NRC inspections: Inspection Reports 50-390, 391/90-09 (June 22, 1990); 50-390, 391/90-20 (September 25, 1990); 50-390, 391/90-22 (November 21, 1990); 50-390, 391/90-24 (December 17, 1990); 50-390, 391/90-27 (December 20, 1990); 50-390, 391/90-30 (February 25, 1991); 50-390, 391/91-07 (May 31, 1991); 50-390, 391/91-09 (July 15, 1991); 50-390, 391/91-12 (July 12, 1991); 50-390, 391/91-31 (January 13, 1992); 50-390, 391/92-01 (March 17, 1992); audit report of June 12, 1992 (Appendix Y of SSER 9); 50-390, 391/92-05 (April 17, 1992); 50-390, 391/92-13 (July 16, 1992); 50-390, 391/92-18 (August 14, 1992); 50-390, 391/92-22 (September 18, 1992); 50-390, 391/92-26 (October 16, 1992); 50-390, 391/92-30 (November 13, 1992); 50-390, 391/92-35 (December 15, 1992); 50-390, 391/92-40 (January 15, 1993); 50-390, 391/93-10 (March 19, 1993); 50-390, 391/93-11 (March 25, 1993); to come.

(2) Cable Tray and Tray Supports (TAC R00516)

Program review status: Complete: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), September 13, 1989; NUREG-1232, Vol. 4; SSER 6, Section 3.

Implementation status: Full implementation expected by December 1993.

NRC inspections: Inspection Reports 50-390, 391/89-14 (December 18, 1989); 50-390, 391/90-20 (September 25, 1990); 50-390, 391/90-22 (November 21, 1990); 50-390, 391/92-02 (March 17, 1992); audit report of May 14, 1992 (Appendix S of SSER 9); 50-390, 391/92-13 (July 16, 1992); 50-390, 391/92-201 (September 21, 1992); 50-390, 391/93-07 (February 19, 1993); to come.

(3) Design Baseline and Verification Program (TAC M63594)

Program review status: Complete: Inspection Report 50-390, 391/89-12 (November 20, 1989); NUREG-1232, Vol. 4.

Implementation status: Full implementation expected by December 1993.

NRC inspections: Inspection Reports 50-390, 391/89-12 (November 20, 1989); 50-390, 391/90-09 (June 22, 1990); 50-390, 391/90-20; (September 25, 1990); 50-390/91-201 (March 22, 1991); 50-390, 391/91-20 (October 8, 1991); 50-390, 391/91-25 (December 13, 1991); 50-390, 391/92-06 (April 3, 1992); 50-390, 391/92-201 (September 21, 1992); to come.

(4) Electrical Conduit and Conduit Support (TAC R00508)

Program review status: Complete: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), September 1, 1989; NUREG-1232, Vol. 4; SSER 6, Section 3.

Implementation status: Full implementation expected by December 1993.

NRC inspections: Inspection Reports 50-390, 391/89-05 (May 25, 1989); 50-390, 391/89-07; (July 11, 1989); 50-390, 391/89-14 (December 18, 1989); 50-390, 391/90-20 (September 25, 1990); 50-390, 391/91-31 (January 13, 1992); 50-390, 391/92-02 (March 17, 1992); audit report of May 14, 1992 (Appendix S of SSER 9); 50-390, 391/92-05 (April 17, 1992); 50-390, 391/92-09 (June 29, 1992); 50-390, 391/92-201 (September 21, 1992); 50-390, 391/92-26 (October 16, 1992); 50-390, 391/93-07 (February 19, 1993); to come.

(5) Electrical Issues (TAC M74502)

Program review status: Complete: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), September 11, 1989; NUREG-1232, Vol. 4.

Implementation status: Full implementation expected by October 1993.

NRC inspections: Inspection Report 50-390, 391/90-30 (February 25, 1991); 50-390, 391/92-22 (September 18, 1992); 50-390, 391/92-40 (January 15, 1993); to come.

(6) Equipment Seismic Qualification (TAC M71919)

Program review status: Complete: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), September 11, 1989; NUREG-1232, Vol. 4; SSER 6, Section 3.10.

Implementation status: Full implementation expected by July 1993.

NRC inspections: Inspection Reports 50-390, 391/90-05 (May 10, 1990); 50-390, 391/90-20 (September 25, 1990); 50-390, 391/90-28 (January 11, 1991); 50-390, 391/9103 (April 15, 1991); audit report of May 14, 1992 (Appendix S of SSER 9); 50-390, 391/92-201 (September 21, 1992); 50-390, 391/93-07 (February 19, 1993); to come.

(7) Fire Protection (TAC M63648)

Program review status: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), September 7, 1989; NUREG-1232, Vol. 4; review in progress, results to be published in Section 9.5.1 of a future SSER.

Implementation status: Full implementation expected by August 1993.

NRC inspections: To come.

(8) Hanger and Analysis Update Program (TAC R00512)

Program review status: Complete: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), October 6, 1989; NUREG-1232, Vol. 4; SSER 6, Section 3.

Implementation status: Full implementation expected by October 1993.

NRC inspections: Inspection Reports 50-390, 391/89-14 (December 18, 1989); 50-390, 391/90-14 (August 3, 1990); 50-390, 391/90-18 (September 20, 1990); 50-390, 391/90-20 (September 25, 1990); 50-390, 391/90-28 (January 11, 1991); 50-390, 391/91-03 (April 15, 1991); audit report of May 14, 1992 (Appendix S of SSER 9); 50-390, 391/92-201 (September 21, 1992); 50-390, 391/92-26 (October 16, 1992); 50-390, 391/92-35 (December 15, 1992); 50-390, 391/93-07 (February 19, 1993); to come.

(9) Heat Code Traceability (TAC M71920)

Program review status: Complete: Inspection Report 50-390, 391/89-09 (September 20, 1989); NUREG-1232, Vol. 4; letter, P. S. Tam (NRC) to D. A. Nauman (TVA), March 29, 1991.

Implementation status: 100% (certified by letter, E. Wallace (TVA) to NRC, July 31, 1990); staff concurrence in SSER 7, Section 3.2.2.

NRC inspections: Complete: Inspection Reports 50-390, 391/90-02 (March 15, 1990); 50-390, 391/89-09 (September 20, 1989).

(10) Heating, Ventilation, and Air-Conditioning Duct and Duct Supports (TAC R00510)

Program review status: Complete: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), October 24, 1989; NUREG-1232, Vol. 4; SSER 6, Section 3.

Implementation status: Full implementation expected by October 1993.

NRC inspections: Inspection Reports 50-390, 391/89-14 (December 18, 1989); 50-390, 391/90-05 (May 10, 1990); 50-390, 391/90-20 (September 25, 1990); 50-390, 391/91-01 (April 4, 1991); 50-390, 391/92-02 (March 17, 1992); audit report of May 14, 1992 (Appendix S of SSER 9); 50-390, 391/92-08 (May 15, 1992); 50-390, 391/92-13 (July 16, 1992); 50-390, 391/92-201

(September 21, 1992); 50-390, 391/93-07 (February 19, 1993); to come.

(11) Instrument Lines (TAC M71918)

Program review status: Complete: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), September 8, 1989; NUREG-1232, Vol. 4; letter, P. S. Tam (NRC) to O. D. Kingsley (TVA), October 26, 1990 Appendix K of SSER 6).

Implementation status: Full implementation expected by November 1993.

NRC inspections: Inspection Reports 50-390, 391/90-14 (August 3, 1990); 50-390, 391/90-23 (November 19, 1990); 50-390, 391/91-02 (March 6, 1991); 50-390, 391/91-03 (April 15, 1991); 50-390, 391/91-26 (December 6, 1991); to come.

(12) Prestart Test Program (TAC M71924)

Program review status: Complete: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), October 17, 1989; NUREG-1232, Vol. 4; letter, P. S. Tam (NRC) to D. A. Nauman (TVA), March 27, 1991.

Implementation status: Withdrawn by letter (J. H. Garrity (TVA) to NRC, February 13, 1992). Applicant will re-perform preoperational test program per Regulatory Guide 1.68, Revision 2.

(13) Quality Assurance Records (TAC M71923)

Program review status: Complete: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), December 8, 1989; NUREG-1232, Vol. 4; letter, P. S. Tam (NRC) to M. O. Medford (TVA) June 9, 1992 (Appendix X of SSER 9); letter, P. S. Tam (NRC) to M. O. Medford (TVA), January 12, 1993.

Implementation status: Full implementation expected by June 1993.

NRC inspections: Inspection Reports 50-390, 391/90-06 (April 25, 1990); 50-390, 391/90-08 (September 13, 1990); 50-390, 391/91-08 (May 30, 1991); 50-390, 391/91-15 (September 5, 1991); 50-390, 391/91-29 (December 27, 1991); 50-390, 391/92-05 (April 17, 1992); 50-390, 391/92-10 (June 11, 1992); 50-390, 391/93-11 (March 25, 1993); 50-390, 391/93-21 (April 9, 1993); to come.

(14) Q-List (TAC M63590)

Program review status: Complete: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), September 11, 1989; NUREG-1232, Vol. 4; letter, P. S. Tam (NRC) to O. D. Kingsley (TVA), January 23, 1991.

Implementation status: Full implementation expected by September 1993.

NRC inspections: Inspection Reports 50-390, 391/90-08 (September 13, 1990); 50-390, 391/91-08 (May 30, 1991); 50-390, 391/91-29 (December 27, 1991); 50-390, 391/91-31 (January 13, 1992); to come.

(15) Replacement Items Program (TAC M71922)

Program review status: Complete: Letter, S. C. Black (NRC) to O. D. Kingsley (TVA), November 22, 1989; NUREG-1232, Vol. 4; letter, P. S. Tam (NRC) to O. D. Kingsley (TVA), February 11, 1991 (Appendix N of SSER 6); letter, P. S. Tam (NRC) to M. O. Medford (TVA), July 27, 1992.

Implementation status: Full implementation expected by May 1993.

NRC inspections: Inspection Reports 50-390, 391/91-08 (May 30, 1991); 50-390, 391/91-29 (December 27, 1991); 50-390, 391/92-03 (March 16, 1992); 50-390, 391/92-11 (June 12, 1992); 50-390, 391/92-17 (July 22, 1992); 50-390, 391/92-21 (September 18, 1992); 50-390, 391/92-40 (January 15, 1993); to come.

(16) Seismic Analysis (TAC R00514)

Program review status: Complete: Letters, S. C. Black (NRC) to O. D. Kingsley (TVA), September 7 and October 31, 1989; NUREG-1232, Vol. 4; SSER 6, Section 3.7.

Implementation status: 100% (certified by letter, J. H. Garrity (TVA) to NRC, December 2, 1991); staff concurrence in SSER 9, Section 3.7.1.

NRC inspections: Complete: Inspection Reports 50-390, 391/89-21 (May 10, 1990); 50-390, 391/90-20 (September 25, 1990); audit report by L. B. Marsh, October 10, 1990.

(16)(a) Civil Calculation Program (TAC R00514)

A number of civil calculation categories are required by the Design Baseline and Verification Program CAP and constitute parts of the applicant's corrective actions. This program is regarded as complementary to but not part of the Seismic Analysis CAP. Staff efforts consist mainly of audits performed at the site and in the office (no program review).

Implementation status: Final calculations transmitted by letter, W. J. Museler (TVA) to NRC, July 27, 1992.

NRC audits: Memorandum (publicly available), T. M. Cheng to P. S. Tam, January 23, 1992; letter, P. S. Tam (NRC) to D. A. Nauman (TVA), January 31, 1992; letters, P. S. Tam (NRC) to M. O. Medford (TVA),

May 26 and December 18, 1992; 50-390, 391/93-07 (February 19, 1993); to come.

(17) Vendor Information Program (TAC M71921)

Program review status: Complete: Letter, P. S. Tam (NRC) to O. D. Kingsley (TVA), September 11, 1990 (Appendix I of SSER 5); Appendix I of SSER 11.

Implementation status: Full implementation expected by September 1993.

NRC inspections: Inspection Report 50-390, 391/91-08 (May 30, 1991); 50-390, 391/91-29 (December 27, 1991); to come.

(18) Welding (TAC M72106)

Program review status: Complete: Inspection Reports 50-390, 391/89-04 (August 9, 1989); 50-390, 391/90-04 (May 17, 1990); NUREG-1232, Vol. 4; letter, P. S. Tam (NRC) to D. A. Nauman (TVA), March 5, 1991.

Implementation status: 100% (certified by letter, W. Museler (TVA) to NRC, January 9, 1993); staff concurrence to come.

NRC inspections: Inspection Reports 50-390, 391/89-04 (August 9, 1989); 50-390, 391/90-04 (May 17, 1990); 50-390, 391/90-20 (September 25, 1990); 50-390, 391/91-05 (May 28, 1991); 50-390, 391/91-18 (October 8, 1991); 50-390, 391/91-23 (November 21, 1991); 50-390, 391/91-32 (February 10, 1992); 50-390, 391/92-20 (August 12, 1992); 50-390, 391/92-28 (October 9, 1992); 50-390, 391/93-02 (February 2, 1993); 50-390, 391/93-19 (March 15, 1993); to come.

1.13.2 Special Programs

(1) Concrete Quality (TAC M63596)

Program review status: Complete: NUREG-1232, Vol. 4.

Implementation status: 100% (certified by letter, E. Wallace (TVA) to NRC, August 31, 1990); staff concurrence in SSER 7, Section 3.8.2.1.

NRC inspections: Complete: NUREG-1232, Vol. 4; Inspection Reports 50-390, 391/89-200 (December 12, 1989); 50-390, 391/90-26 (January 8, 1991).

(2) Containment Cooling (TAC M77284)

Program review status: Complete: NUREG-1232, Vol. 4; letter, P. S. Tam (NRC) to D. A. Nauman (TVA), May 21, 1991 (Section 6.2.2 of SSER 7).

Implementation status: Full implementation expected by July 1993.

NRC inspections: To come.

(3) Detailed Control Room Design Review (TAC M63655)

Program review status: Complete: NUREG-1232, Vol. 4; Section 18.1 and Appendix L of SSER 6.

Implementation status: Full implementation expected by August 1993.

NRC inspections: To come.

(4) Environmental Qualification Program (TAC M63591)

Program review status: NUREG-1232, Vol. 4; review in progress, results will be published in Section 3.11 of a future SSER.

Implementation status: Full implementation by July 1993.

NRC inspections: To come.

(5) Master Fuse List (TAC M76973)

Program review status: Complete: NUREG-1232, Vol. 4; letter, P. S. Tam (NRC) to O. D. Kingsley (TVA), February 6, 1991; letter, P. S. Tam (NRC) to TVA Senior Vice President, March 30, 1992 (Appendix U of SSER 9).

Implementation status: 100% (certified by letter, W. Museler (TVA) to NRC, April 2, 1993); staff concurrence to come.

NRC inspections: Inspection Report 50-390, 391/86-24 (February 12, 1987); 50-390, 391/92-05 (April 17, 1992); 50-390, 391/92-09 (June 29, 1992); 50-390, 391/92-27 (September 25, 1992); to come.

(6) Mechanical Equipment Qualification (TAC M76974)

Program review status: NUREG-1232, Vol. 4; review in progress, results to be published in Section 3.11 of a future SSER.

Implementation status: Full implementation expected by July 1993.

NRC inspections: To come.

(7) Microbiologically Induced Corrosion (TAC M63650)

Program review status: Complete: NUREG-1232, Vol. 4; Appendix Q of SSER 8; Appendix Q of SSER 10.

Implementation status: Full implementation expected by May 1993.

NRC inspections: Inspection Reports 50-390, 391/90-09 (June 22, 1990); 50-390, 391/90-13 (August 2, 1990); 50-390, 391/93-01 (February 25, 1993); 50-390, 391/93-09 (March 26, 1993); to come.

(8) Moderate Energy Line Break Flooding (TAC M63595)

Program review status: Complete: NUREG-1232, Vol. 4; Section 3.6 of SSER 11.

Implementation status: Full implementation expected by October 1993.

NRC inspections: To come.

(9) Radiation Monitoring Program (TAC M76975)

Program review status: Complete: NUREG-1232, Vol. 4; this program covers areas addressed in Chapter 12 of the SER and SSERs.

Implementation status: Full implementation expected by November 1993.

NRC inspections: To come.

(10) Soil Liquefaction (TAC M77548)

Program review status: Complete: NUREG-1232, Vol. 4; letter, P. S. Tam (NRC) to TVA Senior Vice President, March 19, 1992; Section 2.5 of SSER 9.

Implementation status: 100% (certified by letter, W. J. Museler (TVA) to NRC, July 27, 1992); staff concurrence in SSER 11, Section 2.5.4.4.

NRC inspections: Complete: Inspection Reports 50-390, 391/89-21 (May 10, 1990); 50-390, 391/89-03 (May 11, 1989); audit report by L. B. Marsh (October 10, 1990); audit report, P. S. Tam (NRC) to D. A. Nauman (TVA), January 31, 1992; audit report, P. S. Tam (NRC) to M. O. Medford (TVA), May 26, 1992 and December 18, 1992; 50-390, 391/92-45 (February 17, 1993),

(11) Use-as-Is CAQs (TAC M77549)

Program review status: Complete: NUREG-1232, Vol. 4.

Implementation status: 100% (certified by letter, W. J. Museler (TVA) to NRC, July 24, 1992); staff concurrence in Inspection Report 50-390, 391/93-10 (March 19, 1993).

NRC inspections: Complete: Inspection Reports 50-390, 391/90-19 (October 15, 1990); 50-390, 391/91-08 (May 30, 1991); 50-390, 391/93-10 (March 19, 1993).

2 SITE CHARACTERISTICS

2.5 Geology and Seismology

2.5.4 Stability of Subsurface Materials and Foundations

2.5.4.4 Liquefaction Potential

In NUREG-1232, Volume 4, "Safety Evaluation Report on Tennessee Valley Authority: Watts Bar Nuclear Performance Plan," the staff stated that it will report the acceptability of TVA's implementation of the various corrective action programs (CAPs) and special programs (SPs) in the licensing SSERs.

By letter dated July 27, 1992, TVA informed the staff that it has completed the Soil Liquefaction SP, thereby resolving the original concerns regarding liquefaction potential defined by this SP.

The staff reviewed the programmatic aspects of the Soil Liquefaction SP in NUREG-1232, Volume 4, and Section 2.5.4 of SSER 9 and found the program acceptable. The staff also reviewed TVA's implementation in Inspection Reports 50-390/89-03, 89-21, and 92-45, and audit reports by L. B. Marsh dated October 10, 1990, and P. S. Tam dated January 31, 1992, May 26, 1992, and December 18, 1992.

On the basis of its reviews and inspections, the staff concurs with TVA that the Soil Liquefaction SP has been acceptably implemented for Unit 1.

3 DESIGN CRITERIA – STRUCTURE, COMPONENTS, EQUIPMENT, AND SYSTEMS

3.6 Protection Against Dynamic Effects Associated With the Postulated Rupture of Piping

In Sections 3.6.1 and 9.3.3 of the SER, the staff evaluated and found acceptable the plant design for protection against postulated piping failures outside containment. This included protection from the environmental effects, including flooding caused by postulated cracks in moderate energy systems. The staff stated that the design was in accordance with the acceptance criteria of Standard Review Plan (SRP) Section 3.6.1 and, therefore, met General Design Criterion 4 with respect to protection against piping failures outside containment.

Subsequent to that, the applicant discovered that there was inadequate documentation to conclude that the plant was designed to mitigate the flooding effects of postulated moderate energy line breaks (MELBs) outside containment. This was addressed in the applicant's Watts Bar Nuclear Performance Plan submitted on May 22, 1989, and identified as the Special Program on Moderate Energy Line Break Flooding. In Section 3.3.8 of NUREG-1232, Volume 4, "Safety Evaluation Report on Tennessee Valley Authority: Watts Bar Nuclear Performance Plan," the staff stated that the applicant committed to perform an MELB flooding analysis, and that the staff will provide an evaluation of that analysis in a supplement to the Watts Bar licensing SER, NUREG-0847.

By letter dated June 30, 1992, the applicant submitted the information to address the MELB flooding, including proposed FSAR changes. The letter included a detailed flooding analysis for a specific plant area as an example of the implementation of the methodology used to perform the flooding analysis for the entire plant. The flood protection is basically provided by design features supported by engineering evaluations. The inadequate documentation problem discussed in NUREG-1232, Volume 4 was related to the TVA engineering analyses not being comprehensively documented in all cases for the MELB flooding analysis. The applicant's June 30, 1992, letter serves to verify previous design work, and provides the necessary documentation that demonstrates adequate plant design against MELB flooding events.

The staff has reviewed the applicant's June 30, 1992, submittal regarding flooding effects from MELBs outside containment, and determined that the results have confirmed the staff's original evaluation as given in the Watts Bar SER, Sections 3.6.1 and 9.3.3. The applicant's analysis was performed in accordance with SRP Section 3.6.1 and is, therefore, acceptable. By Amendment 72 the applicant has updated FSAR Section 3.6.1 in accordance with the proposed changes documented in its June 30, 1992, letter. Thus, the evaluation and conclusion in the SER on this subject are still valid. This effort was tracked by TAC M63595.

3.7 Seismic Design

3.7.2 Seismic System Analysis

3.7.2.12 Comparison of Responses--Set A versus Set B

Outstanding Issue 19(g) was identified in SSER 6. The following discussion is provided as a basis for resolution of this issue.

This issue addresses seismic design adequacy of the Watts Bar plant. As a part of Seismic Analysis Corrective Action Program (CAP, see Section 1.13), TVA committed to perform a series of re-evaluations of the seismic design of the plant including reconstitution of the calculations. The comparison of sets A and B was made for the purpose of screening the buildings that have to be re-evaluated and upgraded if required. This was accomplished by comparing the results of the plant evaluation using new criteria and methodology (Set B) to the results of the original plant evaluation (Set A). If Set A results bound those of Set B, no re-evaluation was needed.

During the August 6-9, 1990, Watts Bar site audit (report dated October 10, 1990), the staff reviewed and accepted the comparison of the two sets of evaluation for the Watts Bar plant. TVA's comparison resulted in identifying the buildings that need to be re-evaluated and upgraded, if needed. The buildings requiring re-evaluation were listed in a table entitled, "Matrix of Required Seismic Evaluation of Existing Structures, Systems and Components." This table is contained in TVA site document RIM No. B26 900809-105. The audit report concluded that "the review of the TVA comparison of the Set A and Set B criteria seismic analyses did not yield any new issue and, therefore, the staff considers this item closed."

Since the 1990 audit, there have been several additional staff audits and an inspection (reports dated January 23, January 31, May 26, and September 21, 1992) at the Watts Bar plant as well as additional in-house reviews of the open items identified during the audits. In reviewing the civil-structure calculations, the staff and its consultants found no issues outstanding regarding the implementation of the Seismic Analysis CAP. The staff notes that, as a result of implementation of the Seismic Analysis CAP and other civil CAPs, there were numerous instances of actual modifications to such commodities as piping, cable tray, and conduits.

Based on the 1990 audit, where the staff found acceptable the comparison of two sets of calculation and selection of the buildings to be re-evaluated, and also based on the subsequent additional audits where implementation of the re-evaluation is found to be satisfactory, the staff concludes that the issue designated as Outstanding Issue 19(g) in SSER 6 has been resolved.

5 REACTOR COOLANT SYSTEM AND CONNECTED SYSTEMS

5.2 Integrity of Reactor Coolant Pressure Boundary

5.2.5 Reactor Coolant Pressure Boundary Leakage Detection

In the SER, the staff indicated that valve stem leakage is directed either to the reactor coolant drain tank or to the pressurizer relief tank. In FSAR Amendment 69, the applicant made a clarification that some valves may have their leakoff line connections plugged after the packing has been upgraded with graphite packing rings. This configuration will reduce stem leakage to essentially zero. Expected valve stem leakage is still collected in drain tank or relief tank as described in the SER. Therefore, the staff's conclusions in the SER are not affected. This review was tracked by TACs M82644 and M82645.

5.3 Reactor Vessel

5.3.1 Reactor Vessel Materials

The following evaluation has been issued to TVA by a letter dated March 11, 1993, under TAC M77896. If any material conflicts with the safety evaluation in that letter, the material below supersedes:

By letter dated July 17, 1992, the applicant submitted information on reactor vessel fluence as required by the revised 10 CFR 50.61, "Fracture Toughness Requirements For Protection Against Pressurized Thermal Shock (PTS) Events." Additional information was submitted on January 14, 1993. The submitted information discusses the fast neutron fluence methodology and the results with respect to the requirements of 10 CFR 50.61. The PTS rule addresses the pressure vessel material properties as well as vessel irradiation (fluence).

The revised Westinghouse reports enclosed in the January 14, 1993, letter provided the required information. The basic neutron transport calculations were carried out in (R,θ) geometry using a benchmarked two-dimensional discrete ordinates code using the SAILOR cross-section library. The SAILOR library is based on the ENDF/B-IV data set. Anisotropic scattering was treated with a P_3 expansion of the cross-section, and the angular discretization was modeled with an S_8 angular quadrature. The source distribution from the reactor stretch power rating of 3565 MWt was normalized to the midplane power density using an axial peaking factor of 1.2. Finally the out-in fuel management was assumed, which tends to maximize the source strength and produces conservative results.

The staff reviewed the Watts Bar Final Safety Analysis Report and a TVA letter of November 30, 1988, and found that the controlling beltline material from the standpoint of susceptibility to PTS was identified for both units as the intermediate shell forgings. The material properties of the controlling material, the associated margin, and chemistry factor are summarized in the following table:

Item	Unit 1 TVA info.	Unit 1 NRC eval.	Unit 2 TVA info.	Unit 2 NRC eval.
Copper content, %	.17	.17	.05	.05
Nickel content, %	.80	.80	.78	.78
Initial RT_{NDT}, °F	47	47	14	14
Chemistry factor, °F	132	132	31	31
Margin, F	34	34	34	34

The controlling materials are the base metals in the intermediate shells in Units 1 and 2. The justifications given for the copper and nickel contents and the RT_{NDT} are acceptable. The margin has been derived from consideration of the bases for these values, following the PTS rule. Assuming that the reported values of fluence are correct, Equation 1 of the PTS rule governs, and the chemistry factor is as shown above for each unit.

The fluence values obtained in combination with the approved material properties (table above) result in RT_{PTS} values of 32 effective full-power years of operation (48, if the operating licenses were to be extended to 60 calendar years). These results are within the screening criteria of 10 CFR 50.61.

The chemistry factor, fluence factor, and margin terms that were used to determine the RT_{PTS} at end of the licensed plant life are contained in the PTS rule, and were derived from statistical analysis of surveillance test data from U.S. commercially operated nuclear power plants. Surveillance data are received by the staff from licensees when materials that are irradiated in capsules in the reactor vessel are periodically removed and tested. These data are reviewed and a file (Power Reactor-Embrittlement Data Base) is maintained by Oak Ridge National Laboratory. The base metal data now indicate that greater margin, approximately 56 °F, will be needed to ensure that base metal does not exceed the PTS screening criterion. A staff contractor is currently reviewing the data base to update the chemistry factor, the fluence factor, and the margin terms in the PTS rule.

The staff finds that the methods used conform with the staff's recommendations on fluence estimates, and the parameter values used would lead to conservative fluence estimates. In addition, the final RT_{PTS} values are within the screening criteria of 10 CFR 50.61. Thus, the staff finds that the Watts Bar reactor vessels acceptably satisfy the requirements of 10 CFR 50.61.

However, based on surveillance data from other reactor vessels, the margin term for base metal in the PTS rule may be nonconservative and future flux reduction may be needed. The need for flux reduction will be confirmed by the withdrawal and testing of surveillance specimens for 10 CFR Part 50, Appendix H requirements, and is outside the scope of this safety evaluation.

5.4 Component and Subsystem Design

5.4.3 Residual Heat Removal System

In SSER 10, the staff published its review findings regarding natural circulation cooling. In the seventh complete paragraph on page 5-5, the staff made a statement which reads: "The boron concentration in the BIT at Watts Bar is...." The statement should read "The boron concentration in the boric acid storage tank at Watts Bar is slightly higher than that in the BIT at Diablo Canyon (21,000 ppm nominal)." This correction does not alter the conclusion reached in SSER 10.

6 ENGINEERED SAFETY FEATURES

6.3 Emergency Core Cooling System

6.3.1 System Design

In Section 6.3.2.2 of the FSAR and by Amendment 69, the applicant revised the design code for the emergency core cooling system piping from USA Standard B31.1.0, 1967, "Power Piping Code," to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, 1971 Edition through Summer 1973 Addenda. This change is acceptable because the ASME Code is the code of record for Watts Bar Nuclear Plant. This acceptance does not change the conclusion the staff made in the SER and previous SSERs. This effort was tracked by TACs M82644 and M82645.

6.4 Control Room Habitability

In the SER, the staff indicated that isolation of the control room automatically occurs on a number of signals. In SSER 9, Section 9.4.1, the staff corrected the SER to reflect the FSAR as updated to Amendment 65, that automatic isolation of the control room occurs on actuation of a safety injection signal from either unit or upon detection of high radiation or smoke concentrations in the outside air supply stream. The staff has reviewed the FSAR as updated to Amendment 69, and determined that the information is still current. Hence, this information is being provided in this SSER to make it consistent with Section 9.4.1 of SSER 9. This does not affect the conclusions reached in the SER or any of its supplements. This effort was tracked by TACs M82644 and M82645.

9 AUXILIARY SYSTEMS

9.1 Fuel Storage Facility

9.1.3 Spent Fuel Pool Cooling and Cleanup System

In the SER, the staff completed its review of this system. However, by letter dated October 2, 1992, the applicant revised a commitment made in a letter dated October 28, 1981, regarding testing of spent fuel pool cooling pumps. Instead of testing all three pumps per American Society of Mechanical Engineers Boiler and Pressure Vessel Code Section XI and completing a monthly flow verification, the applicant now performs functional testing of the pumps in accordance with routine preventive maintenance instructions, and a 10-minute run after completion of motor lubrication, inspection, and cleaning. In the SER, the staff stated that "periodic testing of components will be performed in accordance with plant procedures," without specifically referring to ASME Code Section XI. The staff verifies that testing of these pumps in accordance with Section XI is not needed. Hence the applicant's revised commitment is acceptable, and does not change the staff's original conclusion in the SER. This effort was tracked by TACs M84747 and M84748.

9.4 Heating, Ventilation, and Air Conditioning Systems

9.4.5 Engineered Safety Features Ventilation Systems

In SSER 10, the staff stated that the applicant committed to investigate the potential for external blockage of the air intake structure by a missile impact, and will report its evaluation and any resulting design change in a future submittal before fuel is loaded. By letter dated December 21, 1992, the applicant provided the needed information.

The structural design of the additional diesel generator building (ADGB) includes a missile shield that is installed just below the roof air intake for the 480-V auxiliary board room (i.e., the missile shield is inside the ADGB). Although the design adequately prevents missiles from entering the building via the intake opening, it cannot prevent the opening from being blocked by a missile of appropriate size and trajectory. This could occur if either the missile itself lodged in the opening, or the missile crushed the sheet metal rain hood above the opening so that the opening was effectively sealed. If this were to occur, airflow through the 480-V auxiliary board room could be greatly reduced or even stopped completely. While there are no large heat sources in the 480-V auxiliary board room, the reduced or stopped airflow could lead to overheating of the motor control centers in the room. This, in turn, could trip power to the fifth diesel generator support equipment, making the diesel generator inoperable.

The applicant's evaluation determined that additional administrative controls are adequate to prevent overheating of the room in the ADGB. Tornado winds are the only credible means to generate a missile of appropriate size and trajectory which could block the air intake. The small probability of a tornado striking the Watts Bar site, when combined with the probability of its producing such a missile, make the likelihood of ADGB air blockage extremely

remote. The applicant stated that the cost of modifying the existing missile shield or redesigning the ventilation system for the 480-V auxiliary board room is not warranted. Instead, the applicant has revised its abnormal operating procedures to require that, in the event of a tornado, the door between the 480-V auxiliary board room and the ADGB air intake room (which provides air to support diesel combustion) be blocked open. The staff has reviewed the applicant's evaluation and concludes that the low probability of blockage, together with the revised administrative procedures which will provide adequate ventilation in the event of an air intake blockage fully resolve the staff's concern. On the basis of its review, the staff concludes that the design meets the requirements of General Design Criteria 2 and 4 as they relate to protection against missiles generated by natural phenomena, and is, therefore, acceptable.

The above effort was tracked by TACs M82032 and M82033.

9.5 Other Auxiliary Systems

9.5.4 Emergency Diesel Engine Fuel Oil Storage and Transfer System

In Section 9.5.4.2 of SSER 9, the staff clarified the capacity of the 7-day fuel oil storage tank and quoted the storage capacity of each tank as 68,000 gallons. In FSAR Amendment 69, TVA revised the capacity to 70,260 gallons for each diesel generator. The revised capacity still exceeds the amount needed for a 7-day supply and, therefore, does not affect the staff's evaluation and conclusions given in the SER or any of its supplements. The minimum number of gallons required for 7 days of operation will be specified in the plant Technical Specifications, which constitutes Appendix A of the operating license. This effort was tracked by TACs M82644 and M82645.

9.5.5 Emergency Diesel Engine Cooling Water System

In the SER, the staff stated that the engine coolant would be maintained between 115 and 125°F when the engine is idle. As noted in FSAR Amendment 70, the immersion heaters are controlled to maintain the coolant temperature between approximately 125 and 155°F in accordance with the manufacturer's recommendations. This clarification is being made to maintain the accuracy of the SER and does not alter any of the staff's conclusions previously reached in the SER or its supplements. This effort was tracked by TACs M83322 and M83323.

15 ACCIDENT ANALYSIS

15.3 Limiting Accidents

15.3.6 Anticipated Transients Without Scram (ATWS)

Status of Salem ATWS Event Issues

On July 8, 1983, the NRC issued Generic Letter (GL) 83-28 as a result of the ATWS events at Salem Nuclear Generating Station. This letter addressed actions to be taken by licensees and applicants to ensure that a comprehensive program of preventive maintenance and surveillance testing is implemented for the reactor trip breakers in pressurized-water reactors.

The staff completed its review of all of the applicant's submittals in response to GL 83-28 and found them acceptable. The following list was published in SSER 10, but Item 4.3 was inadvertently omitted. Hence it is published again in this SSER to serve as a complete summary of the staff's efforts on GL 83-28.

- Item 1.1, Post-Trip Review (Program and Procedure) – letter from P. S. Tam (NRC) to O. D. Kingsley (TVA), dated August 13, 1990 (TACs M77285 and M77286).
- Item 1.2, Post-Trip Review (Data and Information Capability) – Inspection Report 50-390, 391/86-04, dated May 28, 1986.
- Item 2.1, Equipment Classification and Vendor Interface (Reactor Trip System Components) – letter from P. S. Tam (NRC) to O. D. Kingsley (TVA), dated June 18, 1990 (TAC M63610).
- Item 2.2, Part 1, Equipment Classification Program – letter from S.C. Black (NRC) to O.D. Kingsley (TVA), dated June 1, 1989; Part 2 – letter from F. J. Hebdon (NRC) to O. D. Kingsley (TVA), dated, September 7, 1990 (TACs M76312 and M76313).
- Items 3.1.1 and 3.1.2, Post-Maintenance Testing of Trip System Components – Inspection Report 50-390, 391/86-04, dated May 28, 1986 (TACs M64345 and M64346).
- Items 3.1.3 and 3.2.3, Post-Maintenance Testing in Technical Specifications That Could Degrade Safety – letter from P. S. Tam (NRC) to O. D. Kingsley (TVA), dated July 2, 1990 (TACs M77138 and M77139).
- Items 3.2.1 and 3.2.2, Post-Maintenance Testing of All Other Components – Inspection Report 50-390, 391/86-04, dated May 28, 1986.
- Item 4.1, Trip System Reliability (Vendor-Related Modifications) – Inspection Reports 50-390/84-53 and 50-391/84-42, dated August 1, 1984 (TACs M77017 and M77018).

- Items 4.2.1 and 4.2.2, Preventive Maintenance for Trip Breakers – letter from P. S. Tam (NRC) to M. O. Medford (TVA), dated June 18, 1992 (TACs M77019 and M77020).

- Items 4.2.3 and 4.2.4, Trip Breaker Life Testing and Periodic Replacement – review terminated by the staff on March 23, 1992 (TACs M77086 and M77087).

- Item 4.3, Shunt Attachment to Reactor Trip Breaker – SSER 3 Section 15.3.6, and letter from P. S. Tam (NRC) to O. D. Kingsley (TVA), dated June 18, 1990; resolution of this issue eliminated proposed License Condition 40 (TAC M64347).

- Item 4.5.1, Reactor Trip System Reliability–Functional Testing – NRC memorandum (available in the Public Document Room) from P. S. Tam to F. J. Hebdon, dated October 9, 1990 (TAC M64349).

- Items 4.5.2 and 4.5.3, Reactor Trip System On-Line Testing – letter from P. S. Tam (NRC) to O. D. Kingsley (TVA), dated June 28, 1990 (TACs M64350 and R00186).

APPENDIX A

CHRONOLOGY OF RADIOLOGICAL REVIEW OF WATTS BAR NUCLEAR PLANT,

UNITS 1 AND 2, OPERATING LICENSE REVIEW

NRC Letters and Summaries

September 2, 1992	Letter, P. S. Tam to M. O. Medford (TVA) informing of site review (September 21 and 22, 1992) of the corrective action program on cable issues.
September 21, 1992	Letter, S. A. Varga to M. O. Medford (TVA) transmitting Inspection Report 50-390/92-201, regarding Integrated Design Inspection.
September 23, 1992	Letter, F. J. Hebdon to M. O. Medford (TVA) accepting TVA's third annual Employee Concerns Special Program report.
October 6, 1992	Meeting summary by P. S. Tam of routine licensing status meeting on September 21, 1992.
October 7, 1992	Letter, P. S. Tam to M. O. Medford (TVA) accepting the special program on moderate energy line break flooding.
October 13, 1992	Letter, F. J. Hebdon to M. O. Medford (TVA) transmitting copies of SSER 10.
October 26, 1992	Letter F. J. Hebdon to M. O. Medford (TVA) transmitting safety evaluation on Revision 3 of topical report TVA-NPOD89-A, "Nuclear Power Organization Description."
October 28, 1992	Meeting summary by P. S. Tam of routine licensing status meeting on October 23, 1992.
October 30, 1992	Letter, P. S. Tam to M. O. Medford, accepting TVA's response to Bulletin 88-11, "Pressurizer Surge Line Thermal Stratification."
November 3, 1992	Meeting summary by F. J. Hebdon of management meeting on October 23, 1992.
November 10, 1992	Letter, P. S. Tam to M. O. Medford, advising of site review of implementation status of cable corrective action program to take place December 7-8, 1992.
November 16, 1992	Letter, J. W. N. Hickey to E. G. Wallace (TVA) transmitting renewed Materials License Nos. SNM-1861 and SNM-1873.

November 19, 1992	Meeting summary by P. S. Tam of routine licensing status meeting on November 17, 1992.
November 20, 1992	Letter, P. S. Tam to M. O. Medford, requesting additional information on Outstanding Issue 20(a), "Feedwater Check Valve Slam".
December 2, 1992	Letter, P. S. Tam to M. O. Medford, requesting additional information on fire barrier test program.
December 3, 1992	Letter, P. S. Tam to M. O. Medford, informing of fire barrier tests to be witnessed by NRC staff members.
December 15, 1992	Letter, P. S. Tam to M. O. Medford, requesting additional information on the Fire Protection Program.
December 16, 1992	Letter, P. S. Tam to M. O. Medford, transmitting evaluation of TVA's test program on shallow undercut anchors.
January 4, 1993	Meeting summary by P. S. Tam of routine licensing status meeting on December 21, 1992.
January 11, 1993	Letter, P. S. Tam to M. O. Medford, informing of upcoming site audit of FSAR Chapter 8 concerning electric power.
January 11, 1993	Meeting summary by P. S. Tam of management meeting of January 5, 1992.
January 12, 1993	Letter, P. S. Tam to M. O. Medford, transmitting staff position on use of alternate quality assurance records.
January 26, 1993	Letter, P. S. Tam to M. O. Medford, requesting additional information on stability analysis of underground barriers for essential raw cooling water pipelines.

TVA Letters

July 17, 1992	Letter, W. J. Museler to NRC, submitting draft FSAR pages to address pressurized thermal shock.
September 1, 1992	Letter, M. O. Medford to NRC submitting Revision 0 to "Watts Bar Nuclear Plant, Unit 1 Probabilistic Risk Assessment (PRA) Individual Plant Examination."
September 8, 1992	Letter, W. J. Museler to NRC, forwarding revised request for proposed alternative for construction and installation requirements of ASME Section III, Subsection NC/ND, Paragraph 7153.
September 21, 1992	Letter, W. J. Museler to NRC, responding to the U-bolt design issue documented in the September 21, 1992, Integrated Design Inspection report.

September 22, 1992	Letter, W. J. Museler to NRC, forwarding supplemental discussion of civil design calculation per discussion in the September 21, 1992, Integrated Design Inspection report.
September 28, 1992	Letter, W. J. Museler to NRC, transmitting supplemental information on the shallow undercut anchor test program.
October 2, 1992	Letter, W. J. Museler to NRC, providing revised information on TMI (NUREG-0737) Item II.B.1, reactor coolant system vents.
October 2, 1992	Letter, W. J. Museler to NRC, submitting revised information on FSAR Section 9.1.3 regarding spent fuel pool cooling testing.
October 5, 1992	Letter, W. J. Museler to NRC, addressing Deficiency 15 in the September 21, 1992, Integrated Design Inspection report.
October 9, 1992	Letter, W. J. Museler to NRC, withdrawing request of October 23, 1991, regarding use of ASME Code Case N-491.
October 13, 1992	Letter, W. J. Museler to NRC, responding to several issues documented in the September 21, 1992, Integrated Design Inspection report.
October 16, 1992	Letter, W. J. Museler to NRC, forwarding test plan on Thermo-Lag fire retardant materials.
October 19, 1992	Letter, W. J. Museler to NRC, providing implementation schedule on Generic Letter 89-10 regarding motor-operated valve testing and surveillance.
October 26, 1992	Letter, W. J. Museler to NRC, providing additional information on Westinghouse Eagle-21 process control system.
November 2, 1992	Letter, W. J. Museler to NRC, transmitting Revision 5 of the Design Baseline and Verification Program Plan.
November 5, 1992	Letter, W. J. Museler to NRC, providing draft FSAR change pages to support installation of Westinghouse Eagle-21 process protection system.
November 13, 1992	Letter, M. O. Medford to NRC, transmitting changes to Revision 2 of the TVA Quality Assurance Program.
November 30, 1992	Letter, W. J. Museler to NRC, submitting Amendment 72 of the FSAR.
November 30, 1992	Letter, W. J. Museler to NRC, submitting final report on temperature evaluation of the main steam valve room.

December 2, 1992	Letter, W. J. Museler to NRC, providing requested information on the volume control tank.
December 21, 1992	Letter, W. J. Museler to NRC, providing additional information to address blockage of fifth diesel generator building air intake by tornado missiles.
December 22, 1992	Letter, W. J. Museler to NRC, providing additional information on U-bolt supports.
December 22, 1992	Letter, W. J. Museler to NRC, providing implementation status and record plans of the QA records corrective action program.
December 26, 1992	Letter, W. J. Museler to NRC, providing additional information on TMI Item II.D.1, Safety/Relief Valve Testing.
January 9, 1993	Letter, W. J. Museler to NRC, certifying that the Corrective Action Program on Welding has been fully implemented.
January 11, 1993	Letter, W. J. Museler to NRC, Providing additional information on Outstanding Issue 20(a), "Feedwater Check Valve Slam".
January 13, 1993	Letter, W. J. Museler to NRC, providing requested additional information on FSAR Chapter 14.
January 14, 1993	Letter, W. J. Museler to NRC, transmitting information on neutron fluence used in pressurized thermal shock analysis.
January 20, 1993	Letter, M. J. Burzynski to NRC, transmitting Revision 3 of the TVA QA Program.
January 27, 1993	Letter, W. J. Museler to NRC, providing additional information on station blackout.
January 28, 1993	Letter, W. J. Museler to NRC, providing implementation status and record plans for the QA record corrective action program.
January 28, 1993	Letter, W. J. Museler to NRC, requesting exemption from certain provisions of 10 CFR 50, Appendix G.

APPENDIX B

BIBLIOGRAPHY

SAILOR RSIC Data Library Collection

DLC-76, "Coupled Self-Shielding, 47 Neutron Group, 20 Gamma Ray, P_3, Cross Section Library for Light Water Reactors," Oak Ridge National Laboratory.

APPENDIX E

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APPENDIX I

SAFETY EVALUATION OF CORRECTIVE ACTION PROGRAM PLAN

VENDOR INFORMATION

Appendix I was originally issued in SSER 5. Since its issuance, TVA submitted (by letter of February 4, 1993) Revision 4 to the corrective action program. Appendix I is reissued here. This version supersedes that in SSER 5.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
REVISION 4 OF VENDOR INFORMATION
CORRECTIVE ACTION PROGRAM PLAN
WATTS BAR NUCLEAR PLANT UNIT 1
DOCKET NO. 50-390

TVA identified a number of problems with its vendor information program at Watts Bar Nuclear Plant (WBN) through condition-adverse-to-quality (CAQ) reports, employee concerns, and TVA and NRC audit findings. Specific problems identified include: (1) vendor information that was inadequately evaluated for implementation, (2) vendor information that did not match the plant configuration, (3) vendor information that was inconsistent with related TVA-developed design input/output documents, (4) incorrect or out-of-date vendor documents, (5) inadequate vendor document control program, (6) manuals lost or uncontrolled, and (7) installations not approved by the TVA Nuclear Engineering (NE) group.

TVA identified the root cause of these problems as: (1) vendor documents were not considered as documents requiring configuration control; (2) inadequate procedural requirements to govern the receipt, review, distribution, filing, control, maintenance, and use of information; and (3) a lack of attention to detail. The Vendor Information (VI) CAP was established to resolve and prevent recurrence of problems with vendor information at WBN.

1 EVALUATION

The VI CAP was established to provide reasonable assurance that vendor technical documents for safety-related equipment at WBN are current, complete, and appropriately updated for the life of the plant. The CAP will ensure that information in these documents is appropriately used as input to TVA design output documents, plant instructions and procedures, and the plant as-built configuration.

1.1 Vendor Technical Documents/Vendor Technical Manuals

The CAP provides for the identification of sets of vendor documentation defined as vendor technical documents (VTDs). VTDs contain vendor technical information necessary to support safety-related equipment installation, operation, maintenance, and testing. These VTDs are consolidated into vendor technical manuals (VTMs), and reviewed by the Engineering group. Control of the "Approved for Use" VTMs is accomplished by Document Control and Records Management (DCRM) and made available for use by site organizations. Deviations from engineering requirements will be approved by Engineering. These activities assure that:

- Specific components to which each manual applies are identified.

- Manuals are complete and up to date.

- Information is provided in the manual for the identification of engineering requirements which may be contained within the manual.

- TVA design documents are revised when appropriate to reference or incorporate upgraded vendor technical information in the vendor manual.

1.2 Drawings

Vendor-supplied drawings that provide information to support safety-related plant activities are approved by TVA. These drawings are included in the TVA Document Control Change System (DCCS) and are maintained and controlled in accordance with WBN's drawing control procedures. In instances where copies of vendor drawings are contained in VTMs, the drawings are considered as "information only" copies. Approved vendor drawings, which are controlled in DCCS, are used for safety-related work.

Indicating that vendor drawings are considered as "Information Only" provides some control in limiting the use of unapproved or out-of-date drawings by well-trained, knowledgeable plant personnel. However, vendor manual drawings that are available to the general staff and to others are being used in the field, regardless of the administrative controls. Unless positive controlled access to the drawings is maintained, approved vendor drawings, controlled in the document control system, do not provide acceptable control of the access or use of vendor manual drawings.

1.3 Reconciliation of Plant Procedures/Instructions

Once "Approved for Use" VTMs are issued or revised (or both), they are reviewed by affected plant organizations. These organizations evaluate plant instructions and procedures (e.g., operating procedures, maintenance instructions, inservice test/inspection procedures) and revise them, if necessary, to incorporate current information.

1.4 Confirmation of Plant Adequacy

The VI CAP provides for the confirmation of the adequacy of the installed configuration for vendor-supplied features. Included in this confirmation is a review of WBN activities of the Vertical Slice Review, Special Programs, and other CAPs. These reviews determine the extent of verification of vendor requirements under these activities and the components and attributes involved. The review also identifies any problems related to vendor information and the corrective action taken.

Revision 4 also clarifies the scope of the program to limit the coverage to Q-list components that are specifically itemized. This excludes reactor protection equipment and relays from the program as well as electrical cables, terminal blocks, and piping supports. The exclusion of reactor protection equipment and relays, specifically required by GL 83-28, "Generic Implications of Salem ATWS Events," is not acceptable. Additionally, updated and correct vendor information on safety-related relays is needed by many organizations including engineering, instrumentation and control, electrical maintenance, and the relay group.

TVA analyzes the data gathered during this review and identifies those areas/attributes for which plant adequacy is confirmed. Areas/attributes that do not conform with vendor engineering data are further analyzed for extent of condition and safety significance. A confirmation process is performed for those areas/attributes related to vendor engineering requirements that are not covered by analysis or other programs. This process includes a review of vendor documents against design input and output requirements. Any conflicts or omissions are identified and analyzed to determine the need to perform a physical confirmation of the adequacy of plant features.

1.5 Identified Inconsistencies

As inconsistencies are identified between vendor technical information in upgraded manuals or existing vendor manuals and installed equipment, open item reports (OIRs) are prepared, tracked, and controlled in an open item management system. Inconsistencies requiring a design change document are entered into the WBN design control system and tracked to completion. Hardware modifications are to be implemented as required. If an OIR is determined to be a CAQ, it is tracked and controlled by means of the corrective action process.

1.6 Recurrence Control

Included as part of this CAP is the establishment of methods to prevent recurrence of deficiencies with vendor information. The controls consist of the enhancement of site-level instructions and procedures to improve the control and maintenance of vendor information. TVA procedures addressing the processing and control of vendor information have been revised and strengthened. Project and site procedures have been developed to implement the corporate guidance and requirements relative to vendor manuals and other vendor information. The design control procedures have been developed to provide assurance that vendor documents are revised when affected by plant modifications. Training is being offered in new and revised procedures controlling the maintenance and application of vendor technical information.

2 CONCLUSIONS

The staff review of the VI CAP Plan determined that the described plan establishes methods for (1) resolving identified deficiencies with vendor information at WBN, (2) coordinating vendor problems with other WBN CAPs and Special Programs to ensure vendor problems are resolved, (3) confirming plant adequacy relative to vendor information, (4) identifying organizational responsibilities for the implementation of the VI CAP, (5) providing for recurrence control to prevent future problems with vendor information, and (6) documenting findings at the completion of the CAP.

Inadequacies in Revision 4 of the VI CAP Plan include the exemption of reactor protection equipment and relays from the scope of the vendor information program, as well as the confirmation of plant adequacy and the lack of providing positive controls for preventing the use of uncontrolled vendor manual drawings as input for design, maintenance, or modification work activities.

In conclusion, the staff finds that, with the exceptions mentioned above, Revision 4 to the VI CAP Plan establishes acceptable program guidelines for resolving WBN problems in the area of vendor information. With proper

implementation, the CAP offers reasonable assurance that vendor technical documents or safety-related equipment will be current, complete, and appropriately updated for the life of the plant and that information in these documents will be used as input to TVA design output documents, plant instructions and procedures, and the plant as-built configuration. Items left often in this safety evaluatin will be addressed in future inspection reports related to the VI CAP.

3 REFERENCES

Volume 4 of the Tennessee Valley Authority Nuclear Performance Plan, May 1989.

TVA letter to the NRC, December 14, 1988, enclosing the WBN Vendor Information Corrective Action Program Plan, Revision 1.

TVA letter to the NRC, March 15, 1990, enclosing the WBN Vendor Information Corrective Action Program Plan, Revision 3.

TVA letter to the NRC, February 4, 1993, enclosing Revision 4 to the Watts Bar Nuclear Plant Corrective Action Program for Vendor Information.

Principal Contributor: Frederick R. Allenspach
Thomas Foley

Dated: April 16, 1993

NRC FORM 335 (2-89) NRCM 1102, 3201, 3202

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Docket Nos. 50-390 and 50-391

11. ABSTRACT *(200 words or less)*
Supplement No. 11 to the Safety Evaluation Report for the application filed by the Tennessee Valley Authority for license to operate Watts Bar Nuclear Plant, Units 1 and 2, Docket Nos. 50-390 and 50-391, located in Rhea County, Tennessee, has been prepared by the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission. The purpose of this supplement is to update the Safety Evaluation of (1) additional information submitted by the applicant since Supplement No. 10 was issued, and (2) matters that the staff had under review when Supplement No.10 was issued.

12. KEY WORDS/DESCRIPTORS *(List words or phrases that will assist researchers in locating the report.)*
Safety Evaluation Report (SER)
Watts Bar Nuclear Plant
Docket Nos. 50-390/50-391

13. AVAILABILITY STATEMENT
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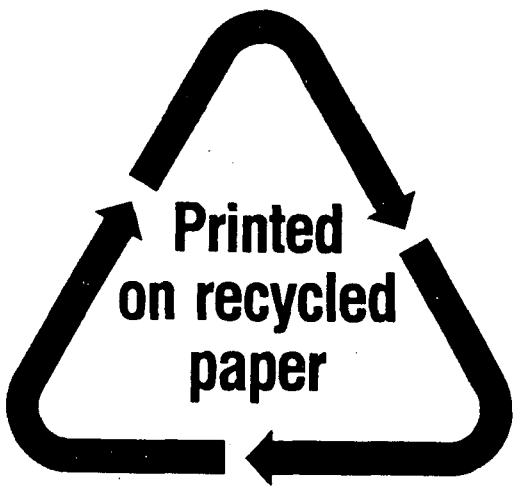

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