June 30, 2008

Mr. William R. Campbell, Jr.
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 1 - ISSUANCE OF AMENDMENT REGARDING REACTOR TRIP SYSTEM AND ENGINEERED SAFETY FEATURES ACTUATION SYSTEM COMPLETION TIMES, BYPASS TEST TIMES, AND SURVEILLANCE TEST INTERVALS (TAC NO. MD5880)

Dear Mr. Campbell:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 68 to Facility Operating License No. NPF-90 for Watts Bar Nuclear Plant, Unit 1. This amendment is in response to your application dated June 8, 2007, as supplemented by letters dated December 26, 2007, and March 31, 2008.

The amendment revises several Technical Specification sections to allow relaxations of various Reactor Trip System/Engineered Safety Feature (RTS/ESF) logic completion times, bypass test times, allowable outage times, and surveillance testing intervals previously reviewed and approved by NRC under Westinghouse Topical Reports WCAP-14333-P-A, "Probabilistic Risk Analysis of RPS [reactor protection system] and ESFAS [ESF Actuation System] Test Times and Completion Times," and WCAP-15376-P-A, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times." The amendment also incorporates TS Task Force (TSTF) Change Travelers TSTF-169, "Deletion of Condition 3.3.1.N," and TSTF-311, "Revision of Surveillance Frequency for TADOT [Trip Actuation Device Operational Test] on Turbine Trip Functional Unit."

A copy of the safety evaluation is also enclosed. Notice of issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Patrick D. Milano, Senior Project Manager
Watts Bar Special Projects Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosures: 1. Amendment No. 68 to NPF-90
2. Safety Evaluation

cc w/enclosures: See next page

A copy of the safety evaluation is also enclosed. Notice of issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Patrick D. Milano, Senior Project Manager
Watts Bar Special Projects Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosures: 1. Amendment No. 68 to NPF-90
2. Safety Evaluation

cc w/enclosures: See next page

DISTRIBUTION:

PUBLIC	RidsNrrDraApla	RidsNrrDeEicb	RidsRgn2MailCenter
LWPB Reading File	RidsNrrPMPMilano	G. Singh	RidsOgcRp
RidsNrrDorlLwpb	RidsNrrLABClayton	C. Doutt	G. Hill (2 hard copies)
RidsNrrDorlDpr	RidsNrrDirsItsb	RidsAcrsAcnw&mMailCenter	

ADAMS Accession No:ML081620043 Package No:ML081620033 TS No:ML081620049

OFFICE	LWPB/PM	LWPB/LA	EICB/BC	APLA/BC	ITSB/BC	OGC	LWPB/BC
NAME	PMilano	BClayton	WKemper memo	MRubin memo	RElliott	DRoth nlo	LRaghavan
DATE	06/30/08	06/ 30 /08	02/08/08	05/19/08	06/ 27 /08	06/26/08	06/ 30 /08

OFFICIAL RECORD COPY

cc:

Mr. Gordon P. Arent
New Generation Licensing Manager
Tennessee Valley Authority
5A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Ashok S. Bhatnagar
Senior Vice President
Nuclear Generation Development
and Construction
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Vice President
Nuclear Support
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. H. Rick Rogers
Vice President
Nuclear Engineering & Technical Services
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

General Counsel
Tennessee Valley Authority
6A West Tower
400 West Summit Hill Drive
Knoxville, TN 37902

Mr. John C. Fornicola, Manager
Nuclear Assurance
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Larry E. Nicholson, General Manager
Performance Improvement
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Michael D. Skaggs
Site Vice President
Watts Bar Nuclear Plant
Tennessee Valley Authority
P. O. Box 2000
Spring City, TN 37381

Mr. Michael A. Purcell
Senior Licensing Manager
Nuclear Power Group
Tennessee Valley Authority
4X Blue Ridge
1101 Market Street
Chattanooga, TN 37402-2801

Ms. Beth A. Wetzel, Manager
Corporate Nuclear Licensing and
Industry Affairs
Tennessee Valley Authority
4X Blue Ridge
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Masoud Bajestani, Vice President
Watts Bar Unit 2
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, TN 37381

Mr. Michael K. Brandon, Manager
Licensing and Industry Affairs
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, TN 37381

Mr. Michael J. Lorek, Plant Manager
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, TN 37381

Senior Resident Inspector
Watts Bar Nuclear Plant
U.S. Nuclear Regulatory Commission
1260 Nuclear Plant Road
Spring City, TN 37381

County Executive
375 Church Street
Suite 215
Dayton, TN 37321

County Mayor
P. O. Box 156
Decatur, TN 37322

Mr. Lawrence E. Nanney, Director
Division of Radiological Health
Dept. of Environment & Conservation
Third Floor, L and C Annex
401 Church Street
Nashville, TN 37243-1532

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-390

WATTS BAR NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 68
License No. NPF-90

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by the Tennessee Valley Authority (the licensee) dated June 8, 2007, as supplemented on December 26, 2007 and March 31, 2008, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in Title 10 Code of Federal Regulations (10 CFR) Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-90 is hereby amended to read as follows:

   (2) Technical Specifications and Environmental Protection Plan

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 68, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. TVA shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance, and shall be implemented no later than 120 days from the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Lakshminarasimh Raghavan, Chief
Watts Bar Special Projects Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to License No. NPF-90 and
the Technical Specifications

Date of Issuance: June 30, 2008

ATTACHMENT TO LICENSE AMENDMENT NO. 68

FACILITY OPERATING LICENSE NO. NPF-90

DOCKET NO. 50-390

Replace page 3 of Operating License No. NPF-90 with the attached page 3.

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the area of change.

Remove	Insert
3.3-2	3.3-2
3.3-3	3.3-3
3.3-5	3.3-5
3.3-6	3.3-6
3.3-7	3.3-7
3.3-8	3.3-8
3.3-9	3.3-9
3.3-10	3.3-10
3.3-11	3.3-11
3.3-12	3.3-12
3.3-14	3.3-14
3.3-17	3.3-17
3.3-25	3.3-25
3.3-26	3.3-26
3.3-27	3.3-27
3.3-28	3.3-28
3.3-29	3.3-29
3.3-30	3.3-30
3.3-31	3.3-31
3.3-55	3.3-55

(4) TVA, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required, any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis, instrument calibration, or other activity associated with radioactive apparatus or components; and

(5) TVA, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect, and is subject to the additional conditions specified or incorporated below.

(1) Maximum Power Level

TVA is authorized to operate the facility at reactor core power levels not in excess of 3459 megawatts thermal.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A as revised through Amendment No. 68 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. TVA shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Safety Parameter Display System (SPDS) (Section 18.2 of SER Supplements 5 and 15)

Prior to startup following the first refueling outage, TVA shall accomplish the necessary activities, provide acceptable responses, and implement all proposed corrective actions related to having the Watts Bar Unit 1 SPDS operational.

(4) Vehicle Bomb Control Program (Section 13.6.9 of SSER 20)

During the period of the exemption granted in paragraph 2.D.(3) of this license, in implementing the power ascension phase of the approved initial test program, TVA shall not exceed 50% power until the requirements of 10 CFR 73.55(c)(7) and (8) are fully implemented. TVA shall submit a letter under oath or affirmation when the requirements of 73.55(c)(7) and (8) have been fully implemented.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 68 TO FACILITY OPERATING LICENSE NO. NPF-90

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-390

1.0 INTRODUCTION

By letter dated June 8, 2007 (Reference 1), as supplemented by letters dated December 26, 2007 (Reference 2), and March 31, 2008 (Reference 3) (Agencywide Documents Access and Management System Accession Nos. ML071660106, ML073650082, ML080920828, respectively), the Tennessee Valley Authority (the licensee) submitted a request for changes to the Watts Bar Nuclear Plant, Unit 1 (WBN-1), Technical Specifications (TSs). The December 26, 2007, and March 31, 2008, supplements provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on July 31, 2007 (72 FR 41789).

The proposed changes would revise various TS sections to allow relaxations of reactor trip system (RTS) and engineered safety feature actuation system (ESFAS) channel logic completion times, bypass test times, allowable outage times, and surveillance testing intervals. The licensee proposed to adopt changes previously approved by the staff in Westinghouse Topical Report WCAP-14333-P-A, Revision 1, "Probabilistic Risk Analysis of the RPS [reactor protection system] and ESFAS Test Times and Completion Times," issued October 1998, as approved by the Nuclear Regulatory Commission (NRC) in a letter dated July 15, 1998. Implementation of the proposed changes is in accordance with TS Task Force (TSTF) Change Traveler TSTF-418, Revision 2, "RPS and ESFAS Test Times and Completion Times (WCAP-14333)." The NRC-approved TSTF-418, Revision 2, by letter dated April 2, 2003 (ADAMS No. ML030920633).

In addition, the licensee proposed to adopt changes approved by the staff in WCAP-15376-P-A, Revision 1, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times," dated March 2003, as approved by the NRC in a letter dated December 20, 2002. Implementation of the proposed changes is in accordance with TSTF-411, Revision 1, "Surveillance Test Interval Extension for Components of the Reactor Protection System (WCAP-15376)." The NRC-approved TSTF-411, Revision 1, by letter dated August 30, 2002 (ADAMS No. ML022460347).

The licensee also proposed to implement changes approved in TSTF-169, "Deletion of Condition 3.3.1.N," and TSTF-311, "Revision of Surveillance Frequency for TADOT [trip actuating device operational test] on Turbine Trip Functional Unit." These TSTFs were incorporated into NUREG-1431, "Standard Technical Specifications for Westinghouse Plants," Revisions 2 and 3.

2.0 BACKGROUND

The Pressurized-Water Reactor Owners Group (PWROG), formerly the Westinghouse Owners Group, Technical Specifications Optimization Program (TOP) evaluated changes to surveillance test intervals (STIs) and completion times (CTs, also called allowed outage times) for the analog channels, logic cabinets, master and slave relays, and reactor trip breakers (RTBs). The methodology evaluated increases in surveillance intervals, test and maintenance out-of-service times, and the bypassing of portions of the RPS during test and maintenance. In 1983, the PWROG submitted Westinghouse Topical Report WCAP-10271-P, "Evaluation of Surveillance Frequencies and Out-of-Service Times for the Reactor Protection Instrumentation System," which provided a methodology for justifying revisions to a plant's TSs for the RPS. The PWROG stated in WCAP-10271 that plant staff devoted significant time and effort to perform, review, document, and track surveillance activities that, in many instances, may not be necessary because of the high reliability of the equipment. Part of the justification for the changes was their anticipated small impact on plant risk.

By letter dated February 21, 1985, the NRC staff accepted WCAP-10271, including its Supplement 1, with certain conditions. In 1989, the NRC staff issued a safety evaluation report (SER) for WCAP-10271, Supplement 2, which approved similar relaxations for the ESFAS. An additional supplemental SER issued in 1990 provided consistency between RTS and ESFAS STIs and CTs. The NRC subsequently adopted the TS changes proposed in WCAP-10271 into NUREG-1431, "Standard Technical Specifications Westinghouse Plants," Revision 0, issued September 1992. In this regard, the licensee implemented WCAP-10271 and its supplements during the initial WBN-1 licensing and issuance of the WBN-1 TSs.

After the approval of WCAP-10271 and its supplements, the PWROG submitted Westinghouse Topical Report WCAP-14333-P, "Probabilistic Risk Analysis of RPS and ESFAS Test Times and Completion Times," in May 1995. WCAP-14333-P provided justification for the following TS relaxations beyond those approved in WCAP-10271:

- Increase the bypass test times and CTs for both the reactor trip system (RTS) and ESFAS solid-state and relay protection system designs for the analog channels, increase the CT from 6 hours to 72 hours and the bypass test time from 4 hours to 12 hours for the logic cabinets, master relays, and slave relays, increase the CT from 6 hours to 24 hours.

- When the logic cabinet and RTB both cause their train to be inoperable when in test or maintenance, allow bypassing of the RTB for the period of time equivalent to the bypass test time for the logic cabinets, provided that both are tested at the same time and the plant design is such that both the RTB and the logic cabinet cause their associated electrical trains to be inoperable during test or maintenance.

The NRC staff accepted WCAP-14333 by letter dated July 15, 1998. Following the approval of WCAP-14333, the PWROG submitted WCAP-15376, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times," to the NRC staff on November 8, 2000. The NRC staff subsequently approved this topical report by letter dated December 20, 2002.

WCAP-15376 specifically evaluated the analog channels, logic cabinets, master relays, and RTBs. WCAP-15376 evaluated both the solid-state protection system (SSPS) and the relay protection system. WCAP-15376 provided justification for the following TS relaxations:

- Additional extension of the STIs for components of the RPS and ESFAS beyond those previously approved in WCAP-10271.

- Extension of the STI, CT, and bypass test times for the RTBs.

3.0 REGULATORY EVALUATION

3.1 Description of System

The proposed TS modifications affect the RPS (i.e., RTS and ESFAS). The RTS is designed to initiate a reactor trip when the system exceeds limits to permissible operation. The ESFAS is designed to actuate emergency systems for accidents that challenge the normal control and heat removal systems.

The RPS comprises several major functions, including nuclear and process instrumentation, logic, reactor trip, and ESFAS actuation. Instrumentation includes sensors, power supplies, signal processing, and bistable outputs and typically consists of three or four channels. Instrumentation signals (i.e., bistable outputs) feed relays that input into the logic portion of the RPS. The logic (i.e., logic cabinets) includes two redundant and independent logic blocks consisting of two trains (A and B) of RPS logic where the input coincidence for various trip functions is determined. Either logic train initiates the ESFAS function through master and slave relays.

In addition, the RPS includes actuation paths from the Train A and Train B RPS logic to the RTBs. Normally, an RTB receives its signal from its associated RPS logic train. The system has bypass breakers for when a breaker is out of service. In this configuration, the bypass breaker is associated with the logic train of the operable RTB. The RPS utilizes two normally closed RTBs and two normally open bypass breakers. Train A RPS logic actuates RTB A, and Train B logic actuates RTB B. Opening of either RTB will disconnect power from the control rods, causing a reactor trip.

WBN-1 utilizes an SSPS for the logic portion of the RPS.

3.2 Proposed TSs Changes

The licensee proposed the following revisions to the TSs as listed in Section 2.0 of Enclosure 1 to the June 8, 2007, application.

3.2.1 TS Condition and Surveillance Requirement (SR) Changes Based on TSTF-411 and TSTF-418 (see TS Table 3.3.1-1 for RTS Functions and Table 3.3.2-1 for ESFAS Functions)

1. Change bypass time and completion times for TS 3.3.1 Condition D and associated Required Actions. Power Range Neutron Flux - High (Function 2a).

2. Change bypass time and completion times for TS 3.3.1 Condition E and associated Required Actions. Power Range Neutron Flux - Low (Function 2b) and Power Range Neutron Flux - High Positive Rate (Function 3a).

3. Change bypass time and completion times for TS 3.3.1 Condition M and associated Required Actions. Undervoltage for reactor coolant pumps (RCPs) (Function 11) and Underfrequency for RCPs (Function 12).

4. Change bypass time and completion times for TS 3.3.1 Condition N and associated Required Actions. Reactor Coolant Flow - Low (Function 10).

5. Change bypass time and completion times for TS 3.3.1 Condition O and associated Required Actions. Turbine Trip - Low Fluid Oil Pressure (Function 14a).

6. Change completion times for TS 3.3.1 Condition P Required Actions. Safety Injection (SI) Input from ESFAS (Function 15) and Automatic Trip Logic (Function 19).

7. Change bypass time and completion times and delete Note 2 for TS 3.3.1 Condition Q and associated Required Actions. Reactor Trip Breakers (Function 17).

8. Change bypass time and completion times for TS 3.3.1 Condition U and associated Required Actions. Steam Generator (SG) Water Level Low-Low (Function 13).

9. Change bypass time and completion times for TS 3.3.1 Condition V and associated Required Actions. SG Water Level Low-Low - Vessel AT (Functions 13a and 13b).

10. Change bypass time and completion times for TS 3.3.1 Condition W and associated Required Actions. Overtemperature ΔT (Function 6), Overpower ΔT (Function 7), and Pressurizer Pressure - High (Function 8b).

11. Change bypass time and completion times for TS 3.3.1 Condition X and associated Required Actions. Pressurizer Pressure - Low (Function 8a) and Pressurizer Water Level - High (Function 9).

12. Change completion times for TS 3.3.1 Condition Y Required Actions. Turbine Trip - Turbine Stop Valve Closure (Function 14b).

13. Change SR 3.3.1.4 TADOT Frequency. RTBs (Function 17) and RTB Undervoltage and Shunt Trip Mechanisms (Function 18).

14. Change SR 3.3.1.5 Actuation Logic Test Frequency. Automatic Trip Logic Function 19.

15. Change SR 3.3.1.7 COT [Channel Operational Test] Frequency. Instrumentation Functions 2a, 2b, 3a, 6, 7, 8a, 8b, 9, 10, 13, 13a, and 13b.

16. Change completion times for TS 3.3.2 Condition C Required Actions. Automatic Actuation Logic and Actuation Relays for Safety Injection (Function ib), Containment Spray (Function 2b), Containment Isolation - Phase A (Function 3a(2)), Containment Isolation - Phase B (Function 3b(2)), and Automatic Switchover to Containment Sump (Function 7a).

17. Change bypass time and completion times for TS 3.3.2 Condition D and associated Required Actions. Safety Injection on Containment Pressure - High (Function 1c), Safety Injection on Pressurizer Pressure - Low (Function 1d), Safety Injection on Steam Line Pressure - Low (Function 1e), Steam Line Isolation on Steam Line Pressure - Low (Function 4d(1)), and Steam Line Isolation on Steam Line Pressure – Negative Rate - High (Function 4d(2)).

18. Change bypass time and completion times for TS 3.3.2 Condition E Required Actions. Containment Spray on Containment Pressure - High High (Function 2c), Containment Isolation - Phase B on Containment Pressure - High High (Function 3b(3)), and Steam Line Isolation on Containment Pressure - High High (Function 4c).

19. Change completion times for TS 3.3.2 Condition G Required Actions. Automatic Actuation Logic and Actuation Relays for Steam Line Isolation (Function 4b) and Auxiliary Feedwater (Function 6a).

20. Change completion times for TS 3.3.2 Condition H Required Actions. Automatic Actuation Logic and Actuation Relays for Turbine Trip and Feedwater Isolation (Function 5a).

21. Change bypass time and completion times for TS 3.3.2 Condition I and associated Required Actions. Turbine Trip and Feedwater Isolation on SG Water Level High-High (Function 5b)

22. Change bypass time and completion times for TS 3.3.2 Condition K and associated Required Actions. Automatic Switchover to Containment Sump on Refueling Water Storage Tank Level - Low coincident with SI and Containment Sump Level - High (Function 7b).

23. Change bypass time and completion times for TS 3.3.2 Condition M and associated Required Actions. Auxiliary Feedwater on SG Water Level Low-Low (Function 6b).

24. Change bypass time and completion times for TS 3.3.2 Condition N and associated Required Actions. Auxiliary Feedwater on SG Water Level Low-Low - Vessel ΔT (Functions 6b(1) and 6b(2)).

25. Change bypass time and completion times for TS 3.3.2 Condition 0 and associated Required Actions. Turbine Trip and Feedwater Isolation on Main Steam Valve Vaults Water Level - High (Functions 5d and 5e).

26. Change SR 3.3.2.2 Actuation Logic Test Frequency. Automatic Actuation Logic and Actuation Relays Functions 1b, 2b, 3a(2), 3b(2), 4b, 5a, 6a, and 7a.

27. Change SR 3.3.2.3 Master Relay Test Frequency. Automatic Actuation Logic and Actuation Relays Functions 1b, 2b, 3a(2), 3b(2), 4b, 5a, 6a, and 7a.

28. Change SR 3.3.2.4 COT Frequency. Instrumentation Functions 1c, 1d, 1e, 2c, 3b(3), 4c, 4d(1), 4d(2), 5b, 6b, 6b(1), 6b(2), 7b, 8b(l), and 8b(2).

29. Change SR 3.3.6.2 Actuation Logic Test Frequency. Automatic Actuation Logic and Actuation Relays Function 2.

30. Change SR 3.3.6.3 Master Relay Test Frequency. Automatic Actuation Logic and Actuation Relays Function 2.

3.2.2 TS Changes Based on TSTF-169

1. Change TS 3.3.1 Condition N description and Required Action N.2 to indicate applicability to both Reactor Coolant Flow - Low single loop (Function 10a) and two loop trip (Function 10b) functions which are being combined by this change into a single Function 10.

2. Combine TS 3.3.1 Reactor Coolant Flow - Low single loop and two loop trip Functions 10a and 10b into a single Function 10 and delete associated Notes (g) and (h).

3.2.2 TS Change Based on TSTF-311

Change SR 3.3.1.14 TADOT Frequency. Turbine Trip - Low Fluid Oil Pressure and Turbine Stop Valve Closure (Functions 14a and 14b).

3.3 Regulatory Requirements and Guidance

Part 50 to Title 10 of the *Code of Federal Regulations* (10 CFR Part 50) establishes the fundamental regulatory requirements with respect to the domestic licensing of nuclear production and utilization facilities.

Section 50.36(d)(3), “Technical Specifications,” of 10 CFR requires a licensee’s TSs to have SRs for testing, calibration, and inspection to assure that the necessary quality of systems and components is maintained, that facility operations remain within safety limits, and that the Limiting Conditions of Operation will be met. Although 10 CFR 50.36 does not specify specific TS requirements, the rule implies that required actions for failure to meet the TS test bypass times, CTs, and STIs must be based on reasonable protection of the public health and safety. Therefore, the NRC staff must have reasonable assurance that the proposed TS changes will not adversely affect the performance of required safety functions in accordance with the design basis accident analysis in Chapter 15 of the licensee’s final safety analysis report (FSAR) with the proposed test bypass times, CTs, and STIs.

Section 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" (Maintenance Rule), of 10 CFR requires licensees to monitor the performance or condition of systems, structures, and components (SSCs) against licensee-established goals in a manner sufficient to provide reasonable assurance that SSCs are capable of fulfilling their intended functions. The implementation and monitoring program guidance of Section 2.3 of Regulatory Guide (RG) 1.174, Revision 1, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," issued November 2002, and Section 3 of RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," issued August 1998, states that monitoring performed in conformance with the Maintenance Rule can be used when it is sufficient for the SSCs affected by the risk-informed application. In addition, 10 CFR 50.65(a)(4), as it relates to the proposed surveillance, bypass test times, and CTs, requires the assessment and management of the increase in risk that may result from the proposed maintenance activity.

Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 establishes the minimum requirements for the principal design criteria for the design, fabrication, construction, testing, and performance of SSCs important to safety. In this regard, General Design Criterion (GDC) 13, "Instrumentation and Control," states that the licensee shall provide appropriate controls to maintain these variables and systems within prescribed operating ranges. Further, GDC 21, "Protection System Reliability and Testability," states that the design of the protection system shall provide for high functional reliability and inservice testability commensurate with the safety functions to be performed. The design of the protection system shall permit periodic testing of its functioning when the reactor is in operation, including the capability to test channels independently to determine failures and losses of redundancy that may have occurred.

RG 1.174 describes a risk-informed approach with associated acceptance guidelines for licensees to assess the nature and impact of proposed permanent licensing basis changes by considering engineering issues and applying risk insights.

RG 1.177 describes an acceptable risk-informed approach and additional acceptance guidance geared toward the assessment of proposed permanent TS CT changes. RG 1.177 identifies a three-tiered approach for the licensee's evaluation of the risk associated with a proposed CT TS change, as discussed below:

- Tier 1 assesses the risk impact of the proposed change in accordance with acceptance guidelines consistent with the Commission's Safety Goal Policy Statement, as documented in RGs 1.174 and 1.177. The first tier assesses the impact on operational plant risk based on the change in core damage frequency (ΔCDF) and change in large early release frequency (ΔLERF). It also evaluates plant risk while equipment covered by the proposed CT is out of service, as represented by incremental conditional core damage probability (ICCDP) and incremental conditional large early release probability (ICLERP). Tier 1 also addresses probabilistic risk assessment (PRA) quality, including the technical adequacy of the licensee's plant-specific PRA for the subject application. Tier 1 also considers the cumulative risk of the present TS change in light of past (related) applications or additional applications under review along with uncertainty/sensitivity analysis with respect to the assumptions related to the proposed TS change.

- Tier 2 identifies and evaluates any potential risk-significant plant equipment outage configurations that could result if equipment, in addition to that associated with the proposed application, is taken out of service simultaneously, or if other risk-significant operational factors, such as concurrent system or equipment testing, are also involved. The purpose of this evaluation is to ensure that appropriate restrictions are in place such that risk-significant plant equipment outage configurations will not occur when equipment associated with the proposed CT is implemented.

- Tier 3 addresses the licensee's overall configuration risk management program (CRMP) to ensure that adequate programs and procedures are in place for identifying risk-significant plant configurations resulting from maintenance or other operational activities and that the licensee takes appropriate compensatory measures to avoid risk-significant configurations that may not have been considered during the Tier 2 evaluation. Compared with Tier 2, Tier 3 provides additional coverage to ensure that the licensee identifies risk-significant plant equipment outage configurations in a timely manner and appropriately evaluates the risk impact of out-of-service equipment before performing any maintenance activity over extended periods of plant operation. Tier 3 guidance can be satisfied by the Maintenance Rule (Section (a)(4)), subject to the guidance provided in RG 1.177, Section 2.3.7.1, and the adequacy of the licensee's program and PRA model for this application. The purpose of the CRMP is to ensure that the licensee will appropriately assess, from a risk perspective, equipment removed from service before or during the proposed extended CT.

RGs 1.174 and 1.177 also describe acceptable implementation strategies and performance monitoring plans to help ensure that the assumptions and analyses used to support the proposed TS changes will remain valid. The monitoring program should include means to adequately track the performance of equipment that, when degraded, can affect the conclusions of the licensee's evaluation for the proposed licensing basis change. RG 1.174 states that monitoring performed in accordance with the Maintenance Rule can be used when such monitoring is sufficient for the SSCs affected by the risk-informed application.

Section 19.2, "Review of Risk Information Used to Support Permanent Plant-Specific Changes to the Licensing Basis: General Guidance," of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (hereafter referred to as the SRP), provides general guidance for evaluating the technical basis for proposed risk-informed changes. SRP Section 16.1, "Risk-Informed Decision Making: Technical Specifications," provides more specific guidance related to risk-informed TS changes, including CT changes as part of risk-informed decisionmaking. SRP Section 19.1, "Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," addresses the technical adequacy of a baseline PRA used by a licensee to support license amendments for an operating reactor. SRP Section 19.2 states that a risk-informed application should be evaluated to ensure that the proposed changes meet the following five key principles:

(1) The proposed change meets the current regulations, unless it explicitly relates to a requested exemption or rule change.

(2) The proposed change is consistent with the defense-in-depth philosophy.

(3) The proposed change maintains sufficient safety margins.

(4) When proposed changes increase CDF or risk, the increase(s) should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.

(5) The licensee should monitor the impact of the proposed change using performance measurement strategies.

4.0 TECHNICAL EVALUATION

The staff has reviewed the licensee's analyses in support of its proposed application dated June 8, 2007, as supplemented by letters dated December 26, 2007, and March 31, 2008.

4.1 Background of TS Changes as Described in TSTFs

Westinghouse Topical Report WCAP-14333 provided the justification for increasing the completion and the bypass test time for RTS and ESFAS. A summary of the changes that were justified in WCAP-14333 is listed below:

WCAP-14333 RTS and ESFAS Completion Time and Bypass Test Time Changes		
Component	Completion Time (CT)	Bypass Test Time
Analog Channels	6+6 hours to 72+6 hours	4 hours to 12 hours
Logic Cabinets	6+6 hours to 24+6 hours	No change
Master and Slave Actuation Relays	6+6 hours to 24+6 hours	No change

WCAP-14333 was reviewed by the NRC staff and its acceptance was documented in an SER issued on July 15, 1998. To apply this topical report, a licensee must conduct a plant-specific review, including the CRMP insights (for Tier 2 and Tier 3 analyses) to confirm that insights are incorporated into the decision making process before taking the equipment out of service. The changes were subsequently incorporated in TSTF-418, Revision 2 and NUREG-1431, Revision 3.

Similarly, WCAP-15376 provided the justification for increasing the completion and bypass time for the RTBs and for increasing the surveillance test intervals for the RTBs, instrumentation channels, logic cabinets, and master relays of the RPS instrumentation. The changes justified in WCAP-15376 are summarized below:

WCAP-15376 RTS and ESFAS Surveillance Test Interval and Completion Time Changes – Solid State Protection System		
Component	Surveillance Test Interval (STI)	Completion Time and Bypass Time
Analog Channels	3 months to 6 months	No change
Logic Cabinets	2 months to 6 months	No change
Master Relays	2 months to 6 months	No change
Slave Relays	No change	No change
RTBs	2 months to 4 months	AOT*: 1 hour to 24 hours. Bypass Time: 2 hours to 4 hours.

* AOT stands for Allowed Outage Time

WCAP-15376 was reviewed by the NRC staff and its acceptance was documented in an SER issued on December 20, 2002. To apply this topical report, a licensee must conduct a plant-specific review that includes the incorporation of configuration risk management program insights (for Tier 2 and Tier 3 analyses) into the decision making process. The changes in WCAP-15376 were subsequently incorporated in TSTF-411, Revision 1 and NUREG-1431, Revision 3.

TSTF-169 was proposed to delete TS 3.3.1, Condition N to handle the inconsistencies between the 22 hour total AOT (due to sequential actions N.1 and M.1 for Condition P-8) and the WCAP-10271 evaluated outage time of 12 hours. Condition N represents, “One Reactor Coolant Flow - Low (Single Loop) channel inoperable.” Action N.1 requires that the inoperable channel be placed in the tripped condition within 6 hours or the power be reduced to < P-8 in 10 hours. If the channel cannot be tripped, the applicability of two-loop function is entered (below P-8) and action M.1 again requires the channel to be tripped within 6 hours or power reduced to below P-7 (per M.2) in 12 hours. Since the equipment is common for single loop and two-loop operation the allowable outage times would be combined for a total of 22 hours, which has not been evaluated. Incorporation of TSTF-169 will eliminate the 22 hour AOT inconsistency. TSTF-169 was approved by the NRC on October 31, 2000, and incorporated in NUREG-1431, Revision 0.

TSTF-311 proposed revising the surveillance frequency for the TADOT on Turbine Trip for Function 16. This surveillance requirement applies to the Turbine Trip function due to Low Fluid Oil Pressure (3 channels are required to be operable) and Turbine Stop Valve Closure (4 channels must be operable). Before this change the testing was to be conducted prior to reactor startup. TSTF-311 revises the test frequency for the Turbine Trip - Low Fluid Oil Pressure trip and Turbine Trip - Turbine Stop Valve Closure functions to be consistent with the applicability for these Functions (above P-9 or 50 percent RTP). The test frequency is being revised to "Prior to exceeding the P9 interlock whenever the unit has been in MODE 3, if not performed in the previous 31 days." The Turbine Trip functions are not required to provide a reactor trip until reactor power is above the P-9 logic setpoint. Testing in MODE 1 prior to 50 percent RTP ensures these functions will be OPERABLE when required. These functions can be tested at power with minimal perturbations to plant systems. TSTF-311 was approved by NRC on April 21, 2002, and incorporated in NUREG-1431, Revision 2.

4.2 Summary Description of the TS Changes Proposed by Licensee

The following table summarizes the proposed WCAP-14333 changes, as applicable to WBN-1.

RPS/ESFAS Components	CT		Bypass Test Time	
	Current (Hour)	Proposed (Hour)	Current (Hour)	Proposed (Hour)
Analog Channels	6+6[1]	72+6	4	12
Logic Cabinets	6+6	24+6	4	No Change
Master Relays	6+6	24+6	4	No Change
Slave Relays	6+6	24+6	4	No Change
RTBs	6	No Change[2]	2	No Change[2]

1. The +6 hours is the time allowed for the specified mode change.

2. WCAP-14333 does not directly revise the RTB CT and bypass test times, and it is assumed that the bypass test times for the RTBs and the logic cabinets are separate and independent. However, WCAP-14333 assumes that with either a logic cabinet or RTB in test or maintenance their associated train is also unavailable. Based on this, the analysis presented in WCAP-14333 includes a provision to accept a bypass test time of the RTBs equivalent to the bypass test time for the logic cabinets provided that: (1) both are tested concurrently, and (2) the plant design is such that both the RTB and the logic cabinet cause their associated electrical trains to be inoperable during test or maintenance. Therefore, the RTB bypass test time is extended to 4 hours for this maintenance configuration. With the implementation of WCAP-15376, the RTB bypass test time is increased to 4 hours, consistent with the logic cabinet bypass test time.

The following table summarizes the proposed WCAP-15376 changes, as applicable to WBN-1.

RPS Component	STI		CT		Bypass Test Time	
	Current (Month)	Proposed (Month)	Current (Hour)	Proposed (Hour)	Current (Hour)	Proposed (Hour)
Logic Cabinets	2	6	No Change Requested		No Change Requested	
Master Relays[1]	2	6				
Analog Channels	3	6				
RTBs	2	4	1	24	2	4

1. Applicable to SSPS plants only.

4.3 Review of Methodology

In accordance with SRP Sections 19.1, 19.2, and 16.1, the staff reviewed the licensee's incorporation of WCAP-14333 and WCAP-15376 using the three-tiered approach and the five key principles of risk-informed decisionmaking presented in RGs 1.174 and 1.177 and the SER conditions and limitations for WCAP-14333 and WCAP-15376.

4.4 Key Information Used in the Review

The key information used in the staff's review comes from Enclosures 1 and 4 of the application dated June 8, 2007, as supplemented by the request for additional information (RAI) responses dated December 26, 2007, and March 31, 2008; TSTF-411, Revision 1, and TSTF-418, Revision 2; as approved by SERs dated August 30, 2002, and April 2, 2003, respectively; and the NRC staff's SERs on WCAP-14333 and WCAP-15376. The NRC staff also referred to

previous SERs related to WCAP-10271 and the licensee's individual plant examination (IPE) and individual plant examination of external events (IPEEE) assessments.

4.5 Traditional Engineering Evaluation

The proposed changes do not involve changes to actuation setpoints, setpoint tolerance, testing acceptance criteria, or channel response times. No hardware changes are proposed or required to implement these changes at the plant. The licensee has stated that this amendment request will allow more time for maintenance and testing activities, provide additional operational flexibility, and reduce the potential for forced outages to comply with the current RTS/ESFAS instrumentation TSs. The licensee explained that industry information has shown that a significant number of reactor trips are related to instrumentation test and maintenance activities, indicating that the TSs should provide sufficient time to complete these activities in an orderly and efficient manner.

The traditional engineering evaluation addresses key principles 1, 2, 3, and 5 of the staff's philosophy of risk-informed decisionmaking, which concern compliance with current regulations, evaluation of defense in depth, evaluation of safety margins, and performance measurement strategies. Key principle 4 is evaluated in Section 4.6.1 of this SE.

With respect to key principles 1, 2, and 3, the NRC staff previously performed a generic evaluation of WCAP-14333 and WCAP-15376. The NRC staff's review of the changes found that WCAP-14333 and WCAP-15376 were consistent with the accepted guidelines of RG 1.174 and RG 1.177, and NRC staff guidance as outlined in NUREG-0800, "Standard Review Plan." From traditional engineering insights, the NRC staff found that the proposed changes continue to meet the regulations, have no impact on the defense-in-depth philosophy, and would not involve a significant reduction in the margin of safety.

With respect to key principle 5, RGs 1.174 and 1.177 also establish the need for an implementation and monitoring program to ensure that extensions to TS CTs, bypass test times, and surveillance intervals do not degrade operational safety over time and that no adverse degradation results from unanticipated degradation or common-cause mechanisms. The purpose of an implementation and monitoring program is to ensure that the impact of the proposed TS change continues to reflect the reliability and availability of SSCs impacted by the change. RG 1.174 states that monitoring performed in conformance with the Maintenance Rule can be used when such monitoring is sufficient for the SSCs affected by the risk-informed application.

4.6 Staff Technical Evaluation (Probabilistic Risk Assessment)

4.6.1 Key Principle 4: Risk Evaluation

The changes proposed by the licensee employ a risk-informed approach to justify changes to CTs, bypass test times, and STIs. The risk metrics, ΔCDF, ΔLERF, ICCDP, and ICLERP, developed in the topical report and that the licensee used to evaluate the impact of the proposed changes are consistent with those presented in RGs 1.174 and 1.177.

To determine that WCAP-14333 and WCAP-15736 are applicable to WBN-1, the licensee addressed the conditions and limitations of the staff SERs and the implementation guidance

developed by the PWROG that compares plant-specific data to the generic analysis assumptions. The evaluation compared the general baseline assumptions, including surveillance, maintenance, calibration, actuation signals, procedures, and operator actions, to confirm that the generic evaluation assumptions used in the topical reports are also applicable to WBN-1.

The following paragraphs discuss the licensee's evaluation of the SER conditions and limitations of WCAP-14333 and WCAP-15376.

(1) A licensee should confirm the applicability of the WCAP-14333 and WCAP-15376 analyses for its plant.

In Enclosure 4 of the licensee's submittal, Tables 1 through 5 provide the evaluation for WCAP-14333 and WCAP-15376. The evaluation included a comparison of parameters and assumptions with WBN-1 plant-specific data. Data included plant-specific signals, component test and maintenance intervals, procedures, and anticipated transient without scram (ATWS) information. As stated in the staff SER for WCAP-15376, the estimates for LERF were based on the reference plant having a large dry containment and the assumption that the only contributions to LERF would be from containment bypass or core damage events with the containment not isolated. Containment failure events were not specifically considered in WCAP-15376. Therefore the staff SER for WCAP-15376 requested that a plant–specific assessment should be performed for plants referencing WCAP-15376 to assess any impacts to the proposed TS changes. The licensee evaluated containment failures and determined that the conditional large early release probability with respect to an ATWS event is less than that for all core damage events and therefore not a significant contributor to large early release probability.

Based on the evaluation presented in Section 4.6.2, Tier 1, of this SE, the staff considers the condition satisfied for WBN-1.

(2) Under WCAP-14333 and WCAP-15376, the licensee should address the Tier 2 and Tier 3 analyses, including risk significant configuration insights, by confirming that these insights are incorporated into its CRMP decisionmaking process before taking equipment out of service.

Based on the evaluation presented in Section 4.6.3 (Tier 2) and Section 4.6.4 (Tier 3) of this SE, the licensee addressed both Tier 2 and Tier 3 risk significant configurations and confirmed these insights are incorporated into the WBN-1 CRMP. Therefore, the staff considers this condition satisfied for WBN-1.

(3) The licensee should evaluate the risk impact of concurrent testing of one logic cabinet and associated RTB on a plant-specific basis to ensure conformance with the WCAP-15376 evaluation, including the guidance of RGs 1.174 and 1.177.

The licensee showed that the generic analysis presented in WCAP-15376 is applicable to WBN. WCAP-15376 did not specifically evaluate or preclude concurrent testing of one logic cabinet and associated RTB. Based on this, the staff questioned the applicability of the topical report to this particular maintenance configuration. In response to a staff RAI on WCAP-15376, the PWROG provided generic risk estimates

that assumed concurrent testing. The resulting ICCDP estimate was higher than the WCAP-15376 results but within the acceptance guidelines of RG 1.177. Based on the applicability of WCAP-15376 to WBN-1 and an ICCDP estimate within the acceptance guidelines of RG 1.177, the staff considers Condition 3 to be satisfied.

(4) To ensure consistency with the reference plant, the licensee should confirm that the model assumptions for human reliability in WCAP-15376 are applicable to the plant-specific configuration.

Enclosure 4, table 5 of the licensee's submittal confirmed that the assumptions regarding human reliability used in WCAP-15376 are applicable to WBN-1. This review concluded that for the operator actions identified in WCAP-15376, plant procedures, training and sufficient time are available consistent with the assumptions in WCAP-15376. Based on the above, the staff considers Condition 4 to be satisfied.

(5) For future digital upgrades with increased scope, integration, and architectural differences beyond those of Eagle 21, the staff finds that the generic applicability of WCAP-15376 to a future digital system is not clear and should be considered on a plant-specific basis. WBN-1 design is based on the SSPS and Eagle 21, therefore this condition is not applicable to the implementation of WCAP-15376 at WBN-1.

(6) WCAP-15376 included an additional condition based on the PWROG response to a staff RAI that committed each plant to review its plant-specific setpoint calculation methodology to ensure that the extended STIs do not adversely impact the plant-specific setpoint calculations and assumptions for instrumentation associated with the extended STIs.

The additional condition requires that the licensees are to perform plant-specific reviews of RPS and ESFAS setpoint uncertainty calculations and assumptions, including instrument drift, to determine the impact of extending the surveillance frequency of the COT from 92 days to 184 days. WBN-1 has performed this plant specific evaluation and the results are summarized below.

The rack drift terms used in the applicable WBN-1 RTS and ESFAS setpoint calculations are documented in WCAP-12096. For the Eagle 21 process protection channels, the calculations include a conservative one-year drift allowance. Based on the use of a conservative drift allowance in the setpoint calculation and the continuous auto-calibration of the Eagle 21 channels, the NRC staff finds that the setpoint calculations for the Eagle 21 channels are not impacted by the increase in the COT surveillance frequency.

The rack drift value used for the Power Range Nuclear Instrumentation System (NIS) racks is a generic value for analog channels. In support of the COT extension from 92 days to 184 days, WBN-1 analyzed drift data for NIS TS reactor trip and permissive functions using a large population (more than 500 data points) of as-found and as-left values from COT performances over more than four fuel cycles. Typically, no adjustments were required for long intervals (i.e., since the bistable setting was found to be within the as-left tolerance, it was left in the as-found state, in some instances for as long as three cycles without adjustment). In no case did the as-found value exceed the

acceptable as-found allowance. In only two cases did the as-found values exceed the acceptable as-left allowance, thereby requiring adjustment to within the as-left allowance, and in both instances, the as-found value was still within the acceptable as-found allowance. The data shows that drift is minimal for these channels and is well within the uncertainty allowance. Therefore, it is concluded that increasing the COT surveillance interval will have no impact on the Power Range NIS setpoint calculation. On this basis, the changes justified in WCAP-15376-P-A can be applied to WBN-1.

Based on the above, the staff concludes that the proposed changes are acceptable and the licensee continues to meet the requirements of 10 CFR 50.36 for setpoints.

4.6.2 Tier 1: Probabilistic Risk Assessment Capability and Insights

The first tier evaluates the impact of the proposed changes on plant operational risk based on the implementation of WCAP-14333 and WCAP-15376 at WBN-1. The Tier 1 staff review involves: (1) evaluation of the technical adequacy of the PRA and its application to the proposed changes, and (2) evaluation of the PRA results and insights based on the licensee's proposed application.

PRA Technical Adequacy

WCAP-14333 and WCAP-15376 provided a generic PRA model for the evaluation of the CT, test bypass time and STI extensions. Although the WCAP-14333 and WCAP-15376 SERs accepted the use of a representative model as generally reasonable, the application of the representative model and the associated results to a specific plant introduces a degree of uncertainty because of modeling, design, and operational differences. Therefore, each licensee adopting WCAP-14333 and WCAP-15376 will need to confirm that the topical report analyses and results are applicable to its plant.

The staff reviewed the information provided in the proposed application and the findings and conditions of the staff WCAP-14333 and WCAP-15376 SER. WCAP-14333 and WCAP-15376 do not require the use of the WBN-1 PRA or plant-specific estimates of ΔCDF, ΔLERF, ICCDP, or ICLERP in the implementation of either topical report. However, in its SER for WCAP-14333 and WCAP-15376, the staff found that the applicability of the generic PRA analysis for the proposed CT, bypass test time, and STI changes to other Westinghouse plants may not be representative based on design variations in actuated systems and the contribution to plant risk from accident classes impacted by the proposed change. The licensee reviewed the scope and detail of the WBN-1 PRA using the representative topical report PRA parameters to demonstrate the plant-specific applicability of the proposed CT, bypass test times, and STI changes. The licensee compared actuation logic; component test, maintenance, and calibration times/intervals; at-power maintenance; ATWS; total internal events CDF; transient events; operator actions; RTS trip actuation signals; and ESFAS actuation signals to plant specific values. Based on the comparison to the implementation guidelines and staff SER conditions and limitations for WCAP-14333 and WCAP-15376, the licensee concluded that WCAP-14333 and WCAP-15376 are applicable to WBN-1.

Peer Review

The IPE for WBN-1 was submitted in 1992, with Revision 1 to the IPE issued in 1994. Revision 2 to the WBN-1 PRA was issued in 1999, with Revision 2A issued in 2000 and Revision 3 dated June 2005. The PWROG conducted a peer review on a draft Revision 3 of the WBN-1 PRA in April 2001 with the final report issued in November 2002. The peer review rated WBN-1 PRA elements at a minimum of Grade 2. Although the licensee has not resolved all the peer review facts and observations (F&Os), no A or B F&Os were noted for the reactor trip or ESFAS signals associated with this application. Revision 4 of the WBN-1 PRA has been completed and reflects the plant configuration and data as of June 24, 2007. Therefore, the staff concludes that the PRA is technically adequate for this application.

The licensee's PRA program risk management and PRA are controlled and updated per TVA procedures. The WBN-1 PRA model was compared to the representative PRA model used in WCAP-14333 and WCAP-15376 to confirm applicability to WCAP-14333 and WCAP-15376. The NRC staff notes that the licensee did not identify any plant specific design or operability issue that would invalidate the generic results and the staff concludes that the generic results are applicable to WBN-1.

PRA Results and Insights

Cumulative Risk

WCAP-15376 evaluated the cumulative CDF risk from pre-TOP (WCAP-10271 not incorporated) to WCAP-15376 implementation. For this case, the cumulative impact on the CDF for 2-out-of-4 logic was within the RG 1.174 acceptance guidelines of less than 1E-6/year, representing a very small change. The cumulative impact on CDF for 2-out-of-3 logic was slightly above the RG 1.174 acceptance guideline for a very small change, but within the acceptance guidelines for a small change. For WBN-1, the cumulative risk is limited from the TOP condition (WCAP-10271 incorporated in plant licensing) to WCAP-15376 implementation. Since the proposed change for WBN-1 is from TOP to WCAP-15376, the change in cumulative risk is expected to be less than the WCAP-15376 estimates.

The licensee evaluated plant-specific design or operational modifications that are not reflected in the WBN-1 PRA. The licensee's RAI response confirmed that there have not been any modifications to the RTB or ESFAS that impact the proposed implementation of WCAP-14333 and WCAP-15376.

External Events

In the SER for WCAP-14333, the risk impact from external events was qualitatively considered for fires and seismic events. The staff concluded that the proposed changes will have only a very small impact on the risk from external events. The licensee also evaluated the proposed WCAP-14333 and WCAP-15376 RPS and ESFAS CTs, test bypass times, and STIs for their potential impact on external events including fire, seismic, and high winds, floods, and other (HFO) events for WBN-1. The proposed changes will increase the unavailability of the affected SSC by increasing the CT for the analog cabinets, logic cabinets, master relays, slave relays, and RTBs. To be important for an external event, the external event must occur while the SSC is in the extended CT. Based on the initial low risk from these external events and the small

increase in unavailability, the staff concludes the change in risk and the ICCDP should remain very small and would not cause the RG 1.174 and RG 1.177 acceptance guidance to be exceeded. The following paragraphs discuss the contribution to total risk for these events.

Fires

The licensee performed the fire risk evaluation for the WBN-1 using the Electric Power Research Institute fire-induced vulnerability evaluation (FIVE) method. The IPEEE reports the results of the fire risk evaluation as follows:

- 7.0E-6/year for WBN-1

For the individual fire areas encompassing the RTBs or the SSPS the licensee estimated the fire risk for these areas to be less than 1E-6. Both of the SSPS RTB fire areas are equipped with automatic detection and suppression systems.

Seismic Events

The licensee based the WBN-1 seismic analysis on a seismic margins assessment (SMA) for the IPEEE submittal per NUREG-1407. Therefore, the licensee did not quantify an estimate of the seismic contribution to plant CDF. The IPEEE seismic margin evaluation identified no vulnerabilities in the WBN-1 IPEEE, except for minor issues that were resolved. No plant improvements were identified. In the IPEEE the review level earthquake assigned to WBN-1 was 0.3g peak ground acceleration (PGA). The high confidence of a low probability of failure (HCLPF) was found to be greater than 0.3g PGA. The IPEEE did not identify equipment or components with a seismic capacity below the reference level earthquake. The safe shutdown equipment list comprises equipment that can provide two success paths for safe shutdown for both a transient and a small loss-of-coolant accident (LOCA). In addition, the seismic analysis concluded that no seismic low ruggedness relays (bad relay types) were installed in unacceptable configurations. In addition, the relays installed in the SSP or reactor trip switchgear were of the correct relay type and seismic qualification.

The staff SER for WCAP-14333 concluded that for plants adopting WCAP-14333 the proposed CT and bypass test times would have a very small impact on external event risk including seismic. The instrumentation STI and RTB CT and bypass test time extensions proposed by WCAP-15376 are also expected to have a very small impact on seismic event risk.

To gain additional perspective on the seismic contribution for the proposed CT, bypass test time, and STI changes the staff considered a non-recoverable loss of offsite power (LOSP) at an assumed 0.1g PGA for switchyard transformer ceramic insulators. No other seismic related failures would be expected because the plant was assessed against a 0.3g HCLPF capability for safe shutdown paths. For core damage to occur, additional non-seismic failures of other equipment would be required. The staff then estimated the frequency of a seismically-induced non-recoverable LOSP for an assumed 0.1g PGA to be 1.3E-3/year. Using the CT and bypass test times proposed by WCAP-14333 and WCAP-15376, it is estimated that WBN-1 would be in the proposed CT and bypass test times approximately 1 percent of the year. Therefore, the probability of a seismically-induced LOSP while in the proposed CT or test bypass time test configuration is estimated to be 1.3E-5/year. Combined with a failure of the other train (approximately 1E-2), the ICCDP is estimated to be less than 1E-7/year, which demonstrates

that the impact of the proposed CT, bypass test times, and STI changes on seismic risk is very small.

High Winds, Floods, and Other External Events

Although not a 1975 SRP plant, the licensee evaluated HFO events using the progressive screening approach described in NUREG-1407, "Procedure and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities," issued June 1991, and GL 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities," Supplement 4, dated November 23, 1988, demonstrated that WBN-1 met the 1975 SRP criteria. In accordance with NUREG-1407, if a plant meets the SRP criteria, licensees can screen out HFO external events as significant contributors to total CDF. Based on the IPEEE HFO evaluation results and conclusions, and the licensee's RAI responses, the external CDF contribution from HFO events was considered small. Therefore, the impact of the proposed CT, bypass test time and STI changes due on HFO risk is also expected to be small.

Total Risk Contribution

Given the typically conservative nature of the FIVE analysis methodology and the estimation of the seismic risk, the staff finds that the total CDF is not expected to be higher than 1E-4/year.

4.6.3 Tier 2: Avoidance of Risk-Significant Plant Configurations

A licensee should provide reasonable assurance that risk-significant plant equipment outage configurations will not occur when specific plant equipment is taken out of service in accordance with the proposed TS change.

Based on WCAP-14333, WCAP-15376, and licensee evaluations, including the functional units not evaluated generically by WCAP-14333, the licensee identified the following Tier 2 conditions as regulatory commitments:

For WCAP-14333:

- To preserve ATWS mitigation capability, activities that degrade the ability of the AFW system, reactor coolant system (RCS), pressure relief systems (pressurizer power operated relief valves (PORVS) and safety valves), ATWS mitigation system actuation circuitry (AMSAC), or turbine trip should not be scheduled when a logic train is inoperable for maintenance.

- To preserve LOCA mitigation capability, one complete emergency core cooling system train that can be actuated automatically must be maintained when a logic train is inoperable for maintenance.

- To preserve reactor trip and safeguards actuation capability, activities that cause master relays or slave relays in the available train to be unavailable and activities that cause analog channels to be unavailable should not be scheduled when a logic train is inoperable for maintenance.

- Activities in electrical systems (e.g., AC and DC power) and cooling systems (e.g., essential service water and component cooling water) that support the systems or functions listed in the first three bullets should not be scheduled when a logic train is inoperable for maintenance. That is, one complete train of a function noted above must be available.

- To preserve capabilities to prevent large early releases, activities that degrade the ability of the containment spray systems, air return fans, and ice condenser should not be scheduled when a logic train is operable for maintenance.

For WCAP-15376

- The probability of failing to trip the reactor on demand will increase when a RTB train is removed from service; therefore, systems designed for mitigating an ATWS event should be maintained and available. Reactor coolant system (RCS) pressure relief (pressurizer PORVS) and safety valves, AFW flow (for RCS heat removal), AMSAC, or turbine trip should not be scheduled when an RTB is inoperable for maintenance.

- Due to the increased dependence on the available reactor trip train when one logic train or RTB train is inoperable for maintenance, activities that cause master relays or slave relays in the available train to be unavailable and activities that cause analog channels to be unavailable should not be scheduled when an RTB is inoperable for maintenance.

- Activities in electrical systems (e.g., AC and DC power) that support the systems or functions listed in the first two bullets should not be scheduled when an RTB is unavailable.

The licensee evaluated concurrent component outage configurations and confirmed the applicability of the Tier 2 restrictions for WBN-1. Based on the above, the staff finds the licensee's Tier 2 analysis supports the implementation of WCAP-14333 and WCAP-15376 at WBN-1 and satisfies the condition of the staff SERs for WCAP-14333 and WCAP-15376 regarding Tier 2.

4.6.4 Tier 3: Risk-Informed Configuration Risk Management Program

Risk assessment of online configurations for WBN-1 is controlled under plant procedures Standard Programs and Practices 7.1, "Work Control Process," and Technical Instruction TI-124, "Equipment to Plant Risk Matrix," to determine the risk significance for equipment outage configurations." The maintenance plan documents the allowable combinations of systems and component groups that can be worked simultaneously online or during plant shutdown. Work is scheduled based on established maintenance and outage periods including established maintenance frequencies and are designed to minimize on-line maintenance risk. Corrective maintenance is also evaluated with respect to surveillance and preventive maintenance activities. The licensee stated that procedure TI-124 will be modified to reflect the Tier 2 risk outage configurations identified above.

A risk assessment is performed prior to work being performed and includes emergent work activities. The WBN-1 risk assessment guidelines use the results of the WBN-1 PRA and also

consider TS, weather and offsite power conditions. If the risk of performing a maintenance activity cannot not be determined through the work control process an additional risk assessment is performed by engineering.

The NRC staff finds that the licensee's program to control risk is capable of adequately assessing the activities being performed to ensure that high-risk plant configurations do not occur and/or compensatory actions are implemented if a high-risk plant configuration or condition should occur. As such, the licensee's program provides for the assessment and management of increased risk during maintenance activities as required by the Maintenance Rule (Section (a)(4)) and satisfies the RG 1.177 guidelines for a CRMP for the proposed change.

4.6.5 Implementation and Monitoring Program

RGs 1.174 and 1.177 also establish the need for an implementation and monitoring program to ensure that extensions to TS STI, CT, or bypass test times do not degrade operational safety over time and that no adverse effects occur from unanticipated degradation or common-cause mechanisms. The purpose of an implementation and monitoring program is to ensure that the impact of the proposed TS change continues to reflect the reliability and availability of SSCs impacted by the change. In addition, the application of the three-tiered approach in evaluating the proposed CT and bypass test times provides additional assurance that the changes will not significantly impact the key principle of defense in depth.

The licensee monitors the reliability and availability of the RTS and ESFAS instrumentation under 10 CFR 50.65 the Maintenance Rule. The licensee has established RTS and ESFAS performance criteria including component level criteria for the SSPS trains. The licensee component level criteria will be revised to reflect the reliability assumptions in the topical reports. The unavailability assumptions of the SSPS and RTBs were found to be within the topical report assumptions. WBN-1 satisfies the RG 1.174 and RG 1.177 guidelines for an implementation and monitoring program for the proposed change.

4.7 Comparison with Regulatory Guidance

The proposed changes conform to TSTF-411, Revision 1, and the analysis performed in WCAP-15376, as approved by the NRC staff, including limitations and conditions identified in the NRC staff SERs. Additional proposed changes conform to TSTF-418, Revision 2, and the analysis performed in WCAP-14333, as approved by the NRC staff, including limitations and conditions identified in the NRC staff SER. As such, the implementation of WCAP-14333 and WCAP-15376 at WBN-1 is within the RG 1.174 and RG 1.177 acceptance guidance for ΔCDF, ΔLERF, ICCDP, and ICLERP.

4.8 Deviations from Approved TSTF Changes

4.8.1 TSTF-411 (WCAP-15376)

TSTF-411 Revision 1 change in frequency for SR 3.3.1.8, which applies to the source and intermediate range flux instrumentation, was not included in the proposed change because the Gamma-Metrics equipment used at WBN-1 for the source and intermediate ranges was not

evaluated in the WCAP. This TSTF deviation is acceptable because it does not apply to WBN-1.

4.8.2 TSTF-418 (WCAP-14333)

TSTF-418 Revision 2, Inserts 1, 2 and 3 were not included in the proposed change based on the following justification:

- As stated in the TSTF reviewer's note, the Insert 1 note should be used for plants with installed bypass test capability. This insert only applies to Condition D and Function 2.a, Power Range Neutron Flux High. Since this function does not have installed bypass capability at WBN-1, Insert 1 does not apply.

- Similarly, the Insert 2 note is also for plants with installed bypass test capability. WBN-1 did not implement this change for functions which do not have installed bypass test capability (e.g., Condition E and Function 2.b, Power Range Neutron Flux Low). For those functions that do have installed bypass test capability at WBN-1, the applicable conditions already include the Insert 2 note (e.g., Condition W/Function 8.b).

- For 3.3.1 Condition Q, Reactor Trip Breakers (Function 17) for WBN-1 is based on Condition O, Function 19 of TSTF-411. Based on Note 3, Insert 6 with 4 hours of bypass time applies and WBN-1 has implemented this note.

- WBN-1 TS does not have a reactor trip function for RCP Breaker Position (Function 3.3.1-11 in TSTF-418) or the applicable Conditions L (existing) and M (proposed, Insert 3A of TSTF-418). Therefore, this condition does not apply to WBN-1.

Since the above notes are used based on the installed bypass capability and the reactor trip function for the RCP Breaker Position is not used in WBN-1, these TSTF deviations are acceptable.

4.8.3 TSTF-169

Under TSTF-169, the single-loop and two-loop reactor coolant flow- low trip functions (10a and 10b) are combined into one function, with the Condition N for the single loop function being deleted. The remaining Conditions of 3.3.1 were renumbered in the TSTF. However, the licensee proposed to implement this change by retaining Condition N for the function, which would be revised to combine the single-loop and two-loop reactor coolant flow- low trip functions into one function and would revise Required Action N.2 to reduce power below the P-7 permissive interlock setpoint. Condition X (pertaining to one channel being inoperable) is no longer applicable to this function. Condition X, however, is still applicable to other Functions. Because the changes proposed in this TSTF deviation accomplish the purpose of TSTF-169, the NRC staff finds the proposed method for accomplishing the TSTF to be acceptable.

4.8.4 TSTF-311

No deviations.

4.9 Functions Not Generically Evaluated in WCAP-14333 and WCAP-15376

Insert 7 of TSTF-411 Revision 1 and Insert 14 of TSTF-418 Revision 2 state that in order to apply TS relaxations to plant-specific functions not evaluated generically, licensees must submit plant-specific evaluations for NRC review and approval. Section 4.0 of TSTF-418 states that several utilities completed plant-specific evaluations to demonstrate that the changes in WCAP-10271 and its supplements are applicable to functions not generically evaluated. As noted in Section 11.0 of both WCAP-14333 and WCAP-15376, as well as in TSTF-418, the changes approved in these WCAPs are also applicable to those plant-specific functions for which evaluations have been performed to demonstrate applicability of WCAP-10271. Therefore, for those cases, additional plant-specific evaluations are not required to demonstrate applicability of WCAP-14333 and WCAP-15376 to these plant-specific functions. As stated by the licensee, the initial issue of the WBN-1 TS included the changes which were justified in WCAP-10271 and its supplements. An evaluation of the applicability of the generic analyses to the WBN-1 RTS and ESFAS functions was performed and has been documented in a plant-specific document (Reference 9 of TS Bases 3.3.1 and Reference 10 of TS Bases 3.3.2 as cited in the application). This applicability evaluation documented an additional evaluation of those WBN-1 functions which were not generically evaluated in WCAP-10271 and demonstrated applicability of the WCAP-10271 analyses to certain plant-specific functions. These plant-specific evaluations included the Eagle 21 digital process protection system and, therefore, the changes in WCAP-14333 and WCAP-15376 are also applicable to Eagle 21.

Based on the above, the changes in WCAP-14333 and WCAP-15376 are applicable to the following plant-specific functions that were not generically evaluated: (1) Reactor Trip on SG Water Level Low-Low with Trip Time Delay (Function 3.3.1-13), (2) Auxiliary Feedwater actuation on SG Water Level Low-Low with Trip Time Delay (Function 3.3.2-6b), (3) the Automatic Switchover to Containment Stump on Refueling Water Storage Tank Level Low coincident with SI and Containment Sump Level High (Function 3.3.2-7b), and (4) Feedwater Isolation on Main Steam Valve Vaults Water Level High (Functions 3.3.2-5d and 5e).

4.10 Staff Findings and Conditions

The staff finds that the licensee has demonstrated the applicability of WCAP-14333 and WCAP-15376 to WBN-1 and has met the limitations and conditions as outlined in the staff SERs. The staff found the risk impacts for ΔCDF, ΔLERF, ICCDP, and ICLERP as estimated by WCAP-14333 and WCAP-15376 to be applicable to WBN-1 and within the acceptance guidelines for RG 1.174 and RG 1.177. The licensee's Tier 2 analysis evaluated concurrent outage configurations and confirmed the applicability of the risk-significant configurations identified by the staff SER limitations and conditions and topical report analysis to ensure control of these configurations. The licensee's Tier 3 CRMP is consistent with the RG 1.177 CRMP guidelines and the Maintenance Rule (Section (a)(4)) for the implementation of WCAP-14333 and WCAP-15376. The licensee monitors the reliability and availability of the RTS and ESFAS components under the Maintenance Rule (Section (a)(1)). Therefore, the staff finds the TS revisions proposed by the licensee are consistent with the CTs, bypass test times, and STIs approved for WCAP-14333 and WCAP-15376 and meet the SER conditions and limitations for WCAP-14333 and WCAP-15376.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, an official of the Tennessee Bureau of Radiological Health was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (72 FR 41789). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public. Therefore, on the basis of the above review and justification, the staff concludes that the requests proposed in TVA's April 25, 2007 submittal are acceptable.

8.0 REFERENCES

1. Letter from J. D. Smith, TVA, to the NRC, "Watts Bar Nuclear Plant (WBN) Unit 1 - Technical Specification Change TS-07-04, Reactor Trip System/Engineered Safety Feature Logic, Reactor Trip Breaker allowable Outage Time, and Surveillance Testing Interval Relaxations," dated June 8, 2007.

2. Letter from M. K. Brandon, TVA to the NRC, "Technical Specification Change TS-07-04, Reactor Trip System/Engineered Safety Feature Logic, Reactor Trip Breaker allowable Outage Time, and Surveillance Testing Interval Relaxations – Response to Request for Additional Information," dated December 26, 2007.

3. Letter from M. K. Brandon, TVA to the NRC, “Technical Specification Change TS-07-04, Reactor Trip System/Engineered Safety Feature Logic, Reactor Trip Breaker allowable Outage Time, and Surveillance Testing Interval Relaxations – Response to Request for Additional Information,” dated December 31, 2008.

Principle Contributors: Clifford Doutt
Gursharan Singh

Date: June 30, 2008