UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 27, 2009

Mr. Preston D. Swafford
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 1 - ISSUANCE OF AMENDMENT REGARDING THE APPLICATION TO IMPLEMENT BEACON CORE POWER DISTRIBUTION AND MONITORING SYSTEM (TAC NO. ME1698)

Dear Mr. Swafford:

The Commission has issued the enclosed Amendment No. 82 to Facility Operating License No. NPF-90 for Watts Bar Nuclear Plant, Unit 1. This amendment is in response to your application dated July 9, 2009.

The amendment revises Technical Specification (TS) 1.1, "Definitions"; TS 3.1.8, "Rod Position Indication"; TS 3.2.1, "Heat Flux Hot Channel Factor"; TS 3.2.4, "Quadrant Power Tilt Ratio (QPTR)"; and TS 3.3.1, "Reactor Trip System (RTS) Instrumentation."

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

Sincerely,

John G. Lamb, 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. 82 to NPF-90
2. Safety Evaluation

cc w/encls: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-390

WATTS BAR NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 82
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 July 9, 2009, 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. 82 , 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 October 31, 2010.

FOR THE NUCLEAR REGULATORY COMMISSION

L. 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: October 27, 2009

ATTACHMENT TO LICENSE AMENDMENT NO. 82

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
1.1-2	1.1-2
3.1-17	3.1-17
3.1-18	3.1-18
3.2-4	3.2-4
3.2-12	3.2-12
3.3-11	3.3-11

(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. 82 , 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.

LEAKAGE (continued)	3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary-to-secondary LEAKAGE); b. Unidentified LEAKAGE All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE; c. Pressure Boundary LEAKAGE LEAKAGE (except primary-to-secondary LEAKAGE) through a nonisolable fault in an RCS component body, pipe wall, or vessel wall.
MASTER RELAY TEST	A MASTER RELAY TEST shall consist of energizing each master relay and verifying the OPERABILITY of each relay. The MASTER RELAY TEST shall include a continuity check of each associated slave relay.
MODE	A MODE shall correspond to any one inclusive combination of core reactivity condition, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.
OPERABLE-OPERABILITY	A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).
PDMS	The Power Distribution Monitoring System (PDMS) is a real-time three dimensional core monitoring system. The system utilizes existing core instrumentation data and an on-line neutronics code to provide surveillance of core thermal limits.
PHYSICS TESTS	PHYSICS TESTS shall be those tests performed to measure the fundamental nuclear characteristics of the reactor core and related instrumentation. These tests are:

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 Rod Position Indication

LCO 3.1.8 The Analog Rod Position Indication (ARPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each inoperable rod position indicator per group and each demand position indicator per bank.

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------NOTE---------- Rod position monitoring by Required Actions A.2.1 and A.2.2 may only be applied to one inoperable ARPI and shall only be allowed: (1) until the end of the current cycle, or (2) until an entry into MODE 5 of sufficient duration, whichever occurs first, when the repair of the inoperable ARPI can safely be performed. Required Actions A.2.1, A.2.2 and A.2.3 shall not be allowed after the plant has been in MODE 5 or other plant condition, for a sufficient period of time, in which the repair of the inoperable ARPI could have safely been performed. --- A. One ARPI per group inoperable for one or more groups.	A.1 Verify the position of the rods with inoperable position indicators by using either the movable incore detectors or the PDMS. OR A.2.1 Verify the position of the rod with the inoperable position indicator by using either the movable incore detectors or the PDMS. AND	Once per 8 hours 8 hours AND Once every 31 days thereafter AND 8 hours, if rod control system parameters indicate unintended movement

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.2 Review the parameters of the rod control system for indications of unintended rod movement for the rod with an inoperable position indicator. AND	16 hours AND Once per 8 hours thereafter
	A.2.3 Verify the position of the rod with an inoperable position indicator by using either the movable incore detectors or the PDMS. OR	8 hours, if the rod with an inoperable position indicator is moved greater than 12 steps. AND Prior to increasing THERMAL POWER above 50% RTP and within 8 hours of reaching 100% RTP
	A.3 Reduce THERMAL POWER to less than or equal to 50% RTP.	8 hours
B. One or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of the rod's position.	B.1 Verify the position of the rods with inoperable position indicators by using either the movable incore detectors or the PDMS. OR	4 hours
	B.2 Reduce THERMAL POWER to less than or equal to 50% RTP.	8 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.2.1.2	----------NOTE---------- If $F^W_Q(Z)$ is within limits and measurements indicate Maximum over z $\left[\frac{F^C_Q(Z)}{K(Z)}\right]$ has increased since the previous evaluation of $F^C_Q(Z)$: a. Increase $F^W_Q(Z)$ by the appropriate factor specified in the COLR and reverify $F^W_Q(Z)$ is within limits; or b. Repeat SR 3.2.1.2 once per 7 EFPD using either the movable incore detectors or the PDMS until two successive power distribution measurements indicate Maximum over z $\left[\frac{F^C_Q(Z)}{K(Z)}\right]$ has not increased. --- Verify $F^W_Q(Z)$ is within limit.	Once after initial fuel loading and each refueling prior to THERMAL POWER exceeding 75% RTP AND (continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.4.1	----------NOTES---------- 1. With input from one power range neutron flux channel inoperable and THERMAL POWER < 75% RTP, the remaining three power range channels can be used for calculating QPTR. 2. SR 3.2.4.2 may be performed in lieu of this Surveillance if adequate power range neutron flux channel inputs are not OPERABLE. --- Verify QPTR is within limit by calculation.	7 days AND Once within 12 hours and every 12 hours thereafter with the QPTR alarm inoperable
SR 3.2.4.2	----------NOTE---------- Only required to be performed if input from one or more power range neutron flux channels are inoperable with THERMAL POWER ≥ 75% RTP. --- Verify QPTR is within limit using either the movable incore detectors or the PDMS.	Once within 12 hours AND 12 hours thereafter

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.3.1.3	----------NOTES---------- 1. Adjust NIS channel if absolute difference is ≥ 3%. 2. Required to be performed within 96 hours after THERMAL POWER is ≥ 15% RTP. ---------- Compare results of the incore detector or PDMS measurements to NIS AFD.	31 effective full power days (EFPD)
SR 3.3.1.4	----------NOTE---------- This Surveillance must be performed on the reactor trip bypass breaker prior to placing the bypass breaker in service. ---------- Perform TADOT.	62 days on a STAGGERED TEST BASIS
SR 3.3.1.5	Perform ACTUATION LOGIC TEST.	92 days on a STAGGERED TEST BASIS
SR 3.3.1.6	----------NOTE---------- Required to be performed within 6 days after THERMAL POWER is ≥ 50% RTP. ---------- Calibrate excore channels to agree with incore detectors or PDMS measurements.	92 EFPD

(continued)

UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 82 TO FACILITY OPERATING LICENSE NO. NPF-90

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-390

1.0 INTRODUCTION

By application, dated July 9, 2009 (Agencywide Documents Access and Management System Accession No. ML091940191), the Tennessee Valley Authority (TVA, the licensee) requested changes to Facility Operating License No. NPF-90 for the Watts Bar Nuclear Plant (WBN), Unit 1. The licensee proposed to revise Technical Specification (TSs) 1.1, "Definitions"; TS 3.1.8, "Rod Position Indication"; TS 3.2.1, "Heat Flux Hot Channel Factor"; TS 3.2.4, "Quadrant Power Tilt Ratio (QPTR)"; and TS 3.3.1, "Reactor Trip System (RTS) Instrumentation."

The proposed changes are to allow use of the Westinghouse proprietary computer code, the Best Estimate Analyzer for Core Operations - Nuclear (BEACON). The new BEACON power distribution monitoring system (PDMS) would augment the functional capability of the neutron flux mapping system for the purposes of power distribution surveillances at WBN Unit 1. Certain required actions, for when a Limiting Condition for Operation (LCO) is not met, and certain surveillance requirements (SRs) would be changed to refer to power distribution measurements or measurement information of the core.

Notice of this amendment was given in the *Federal Register* on August 25, 2009 (74 FR 42930).

2.0 BACKGROUND

The BEACON system was developed by Westinghouse to improve operational support for pressurized-water reactors (PWRs). It is a core monitoring and support package that uses Westinghouse standard instrumentation in conjunction with an analytical methodology for online generation of three-dimensional power distributions. The system provides core monitoring, core measurement reduction, core analysis, and core predictions. Since BEACON does not have any direct inputs to the reactor protection system, BEACON will not affect any of the accident analyses in the WBN Unit 1 licensing basis. Furthermore, as stated in its application, TVA will not use BEACON to relax the requirement to limit the transient initial conditions via power distribution control.

In Enclosures 3 and 5, respectively, to its application, TVA identified changes to the TSs Bases and to the Technical Requirements Manual (TRM). The changes to the TRM provide additional detail not given in the licensee's evaluation of the proposed amendment in Attachment 1 to its application, and the U.S. Nuclear Regulatory Commission (NRC) staff reviewed this information as part of its review of the license amendment request. The changes to the TS Bases would be made by the licensee in accordance with TS 5.6, "Technical Specifications Bases Control Program," at the time that the amendment is implemented, if approved. These changes were reviewed to determine whether the NRC staff had any disagreements with the identified changes based on the proposed amendment.

3.0 REGULATORY EVALUATION

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TSs as part of the license. The TSs ensure the operational capability of structures, systems, and components that are required to protect the health and safety of the public.

The NRC regulatory requirements related to the content of the TS are contained in Section 50.36 of Title 10 of the *Code of Federal Regulations* (10 CFR 50.36), which requires that the TS include items in the following categories:

(1) Safety limits, limiting safety systems settings, and limiting control settings;

(2) LCOs;

(3) SRs;

(4) Design features; and

(5) Administrative controls.

However, the rule does not specify the particular requirements to be included in a plant's TSs. As stated in 10 CFR 50.36(c)(2)(i), the "[l]imiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications..." SRs are, in accordance with 10 CFR 50.36(c)(3), "requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."

As required by 10 CFR 50.36(c)(2)(ii), an LCO must be included in the TSs for any item meeting one of the following four criteria:

Criterion 1: Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

Criterion 2: A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Criterion 3: A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Criterion 4: A structure, system, or component which operating experience or probabilistic safety assessment has shown to be significant to public health and safety.

Those items that do not fall within or satisfy any of the above criteria do not need to be included in Section 3 of the TSs. The PDMS instrumentation does not meet any of the criteria of 10 CFR 50.36(c)(2)(ii) for inclusion in the TSs. Therefore, the licensee will include the PDMS instrumentation in the TRM. The TRM contains plant-specific administrative controls on equipment, similar to TS controls, but which are maintained by the licensee in accordance with 10 CFR 50.59.

There are no specific regulatory requirements on PDMS, such as the Westinghouse Electric Company (WEC) BEACON system; however, the use of such systems by licensees in monitoring the power distribution in the reactor core during power operation must be consistent with the safe operation of the plant. The NRC staff must reach such a conclusion in approving the use of the BEACON system at WBN Unit 1.

4.0 TECHNICAL EVALUATION

4.1 Proposed TS Changes

In its application, the licensee proposed the following changes to TS 1.1, TS 3.1.8, TS 3.2.1, TS 3.2.4, and TS 3.3.1:

1. For TS 1.1, the definition of "PDMS" will be added to avoid using a commercial product name or trademark in the TSs.

2. For TS 3.1.8, replace the phrase "movable incore detectors" by the phrase "either the movable incore detectors or the PDMS" in Required Actions A.1, A.2.1, A.2.3, and B.1.

3. For TS 3.2.1, replace the phrase "until two successive flux maps" by the phrase "using either the movable incore detectors or the PDMS until two successive power distribution measurements" in SR 3.2.1.2.

4. For TS 3.2.4, replace the phrase "the movable incore detectors" by the phrase "either the movable incore detectors or the PDMS" in SR 3.2.4.2.

5. For TS 3.3.1:

   a) Replace the phrase "measurements to NIS [nuclear instrumentation system] AFD [axial flux distribution]" with the phrase "or PDMS measurements to NIS AFD" in SR 3.3.1.3.

   b) Replace the word "measurements" with the phrase "or PDMS measurements" in SR 3.3.1.6

4.2 Staff Evaluation

TVA is proposing the changes to the TSs to allow the use of a PDMS at WBN Unit 1. The PDMS would be an enhancement to its core power distribution measurement and indication capability. The core power distribution information that is to be referred to in the proposed changes to TSs 3.1.8, 3.2.1, 3.2.4, and 3.3.1 would be information from either (1) the existing incore detector system or (2) the newly defined PDMS.

The PDMS to be used is the BEACON system (i.e., the BEACON PDMS), which was developed by Westinghouse to improve the monitoring support for Westinghouse-designed PWRs, such as WBN Unit 1. The BEACON PDMS is a core monitoring and support package, which uses Westinghouse standard instrumentation in conjunction with an analytical methodology for on-line generation of three-dimensional power distributions to provide core monitoring, core measurement reduction, core analysis, and core predictions. The BEACON PDMS is calibrated by the existing incore detector system.

The BEACON system is described in the Westinghouse topical report WCAP-12472-P, "BEACON: Core Monitoring and Operations Support System," which was approved as WCAP-12472-P-A by the NRC staff for Westinghouse reactors in its letter, dated February 16, 1994 (ADAMS Accession Number ML092050097). The topical report WCAP-12472-P-A contains this NRC letter. The topical report had conditions specified in Section 4.0, "Technical Position," of the Brookhaven National Laboratory Technical Evaluation Report (TER), dated November 18, 1993, "Technical Evaluation of the BEACON Core Monitoring and Operations Support System Topical Report WCAP-12472-P," which was attached to the NRC staff's letter dated February 16, 1994. These conditions are the following:

1. In the cycle-specific applications of BEACON, the power peaking uncertainties $U_{\Delta h}$ and U_Q must provide 95-percent probability upper tolerance limits at the 95-percent confidence level,

2. In order to ensure that the assumptions made in the BEACON uncertainty analysis remain valid, the generic uncertainty components may require reevaluation when BEACON is applied to the plant or core designs that differ sufficiently to have a significant impact on the WCAP-12472-P database, and

3. The BEACON technical specifications should be revised to include the changes described in Section 3.6 of the TER concerning Specifications 3.1.3.1 and 3.1.3.2, and the Core Operating Limits Report (COLR). The technical specifications applicable when BEACON is inoperable should be included in the BEACON specifications and not the COLR. Specifications 3.1.3.1 and 3.1.3.2 should be revised to address misaligned rods

and shutdown margin, to require determination of control rod positions when a rod position or demand position is inoperable, and to apply to both Modes 1 and 2 of reactor operation.

In addressing the above conditions in Attachment 1 to its application, TVA stated the following:

Criterion 1: Although not specifically described in this submittal [the application for WBN Unit 1], cycle-specific BEACON calibrations performed before startup and at beginning-of-cycle conditions will ensure that power peaking uncertainties provide 95% probability upper tolerance limits at the 95% confidence level. These calibrations are to be performed using Westinghouse[-]approved methodology. Until these calibrations are complete, more conservative default uncertainties will be applied. These calibrations will be documented and retained as records.

Criterion 2: WBN Unit 1 utilizes a Westinghouse 4-loop nuclear steam supply system (NSSS) with Westinghouse movable incore instrumentation. All fuel is presently of Westinghouse manufacture. Although WBN Unit 1 utilizes tritium producing burnable absorber rods (TPBARS) in its core design, the TPBARs behave similarly to standard burnable poisons. However, to model the isotopic chains for tritium, WBN Unit 1 will use the PHOENIX-L and ANC-L codes, which are WBN Unit 1-specific updates to the standard PHOENIX and ANC codes and specifically approved for use at WBN Unit 1. This use does not change the ANC methodology.

During the review of the Westinghouse topical report WCAP-12472-P, the NRC requested additional information on how BEACON treats core loadings with fuel designs from multiple fuel vendors, and the impact to the BEACON uncertainty analysis. Westinghouse responded that for all BEACON applications, the previous operating cycle is examined to establish reference uncertainties. This examination accounts for loading of fuel supplied by multiple vendors by comparing a BEACON model to actual operating data over the cycle. At the beginning of cycle, thermocouple data is verified and calibration/uncertainty components are updated as necessary. In addition, the initial flux mapping at the start of the cycle ensures model calibration factors that reflect the actual fuel in the reactor before the BEACON system is declared operable.

Criterion 3: WCAP-12472-P describes an application of BEACON (i.e., BEACON-DMM) where the core operating limits are changed. As noted previously [in its application], TVA is proposing only to use BEACON as a core TS monitor for conformance to WBN Unit 1's existing limits and the TVA license amendment request does not seek to the use BEACON-DMM. The TVA license amendment request is seeking to use the BEACON-TSM application of BEACON. Therefore, the issue addressed by this criterion is not applicable to this license amendment request.

The NRC staff reviewed the licensee's responses to the three criteria and concludes that the responses are acceptable. The licensee has not proposed changes to the COLR or the core safety limits for WBN Unit 1, and the proposed changes to TS 1.1, TS 3.1.8, TS 3.2.1, TS 3.2.4,

and TS 3.3.1 are to allow the core power distribution to be determined at WBN Unit 1 by either (1) the existing movable incore detector system or (2) the BEACON system; the proposed core power distribution measurements cover both. Also, as stated by the licensee, the BEACON PDMS is considered inoperable, and thus is not used, below 25 percent rated thermal power (RTP) because the accuracy of the calculated core power distribution may not be bounded by the uncertainties in WCAP-12472-P. Based on this, the NRC staff concludes that the licensee has acceptably addressed the above NRC criteria and it is acceptable for the licensee to use the BEACON system described in WCAP-12472-P at WBN Unit 1.

In its application, the licensee stated that it intended to use BEACON to augment the functional capability of its core flux mapping system for the purpose of power distribution surveillances. Although WCAP-12472-P discusses an application of BEACON in which there is continuous flux monitoring by control room operators, the licensee is proposing a more conservative application of BEACON in which the core power distribution limits themselves remain unchanged. The licensee intends to use the BEACON PDMS as the primary method for performing power distribution measurements and surveillances, and to use the flux mapping system as an alternative for such purposes, when the reactor power is greater than 25-percent RTP. At less than or equal to 25-percent RTP, or when the PDMS is inoperable, the existing movable incore detector system would be used.

In Enclosure 4 to its application, the licensee addressed whether the PDMS needed to have an LCO added to the TSs to state that the system is required to be operable. The licensee concluded that an LCO for the PDMS was not required.

The PDMS instrumentation provides the capability to monitor core parameters at more frequent intervals than is currently required by the TSs. The PDMS combines inputs from currently installed plant instrumentation and design data for each fuel cycle, and does not modify or eliminate existing plant instrumentation. It provides a means to monitor continuously the power distribution limits including limiting peaking factors and quadrant power tilt ratio. The PDMS is used for periodic measurement of the core power distribution to confirm operation within design limits, and for periodic calibration of the excore detectors, and it does not initiate any automatic protection action. The PDMS instrumentation does not change any of the key safety parameter limits or levels of margin as considered in the reference design-basis evaluations. These limits are not revised by this license amendment, and can be determined independently of the operability of the PDMS. The PDMS itself does not meet any of the 10 CFR 50.36(c)(2)(ii) selection criteria (listed in Section 2.0 of this safety evaluation) for inclusion in the TSs. Therefore, the NRC staff concludes that 10 CFR 50.36 does not require the PDMS to have an LCO in the TSs.

Based on its review of the proposed changes to TSs 1.1, 3.1.8, 3.2.1, 3.2.4, and 3.3.1, which are identified in Section 4.1 above, the NRC staff concludes that replacing the current TS references to incore detectors and neutron flux maps with the proposed references to core power distribution measurements or measurement information (from either the movable incore detector system or the BEACON system) is consistent with the technical requirements of the NRC-approved WCAP-12472-P, and, therefore, the proposed changes are acceptable. Based on this conclusion, the NRC staff further concludes that the proposed changes meet 10 CFR 50.36 and, therefore, the proposed amendment is acceptable.

The NRC staff reviewed the identified changes to the TS Bases and TRM in Enclosures 3 and 5, respectively, of the application. Based on its review, the NRC staff has no disagreements with identified changes to the TS Bases and TRM. The changes to the TS Bases will be made in accordance with TS 5.6, "Technical Specifications (TS) Bases Control Program."

5.0 STATE CONSULTATION

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

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes requirements 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 amendment involves no significant hazards consideration, and there has been no public comment on such finding 74 FR 42930, dated August 25, 2009. 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 amendment.

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 the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principle Contributor: Benjamin Parks

Date: October 27, 2009

Mr. Preston D. Swafford
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 1 - ISSUANCE OF AMENDMENT REGARDING THE APPLICATION TO IMPLEMENT BEACON CORE POWER DISTRIBUTION AND MONITORING SYSTEM (TAC NO. ME1698)

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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 PMilano for/

John G. Lamb, 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. 82 to NPF-90
2. Safety Evaluation

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