July 24, 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 EMERGENCY TECHNICAL SPECIFICATION (TS) CHANGE REQUEST ADDING CONDITION C TO TS 3.7.8 (TAC NO. MD9263)

Dear Mr. Campbell:

The Commission has issued the enclosed Amendment No. 69 to Facility Operating License No. NPF-90 for Watts Bar Nuclear Plant, Unit 1. This amendment is in response to your emergency amendment request dated July 24, 2008, which was submitted under the provisions of Section 50.91(a)(5) to Title 10 of the *Code of Federal Regulations*.

This amendment allows the implementation of a temporary alteration (TA) that will be used to restore Train A of the essential raw cooling water (ERCW) to a functional condition and provide additional time to restore the operability of at least one of the inoperable ERCW pumps. Additionally, this amendment adds a temporary CONDITION and a Note to Technical Specification 3.7.8, “Essential Raw Cooling Water,” reflecting the restoration of functionality of Train A ERCW by the TA. These changes are approved on a one-time basis and expire on July 31, 2008, at 2:46 pm.

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

Sincerely,

/RA/ EBrown for

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. 69 to NPF-90
2. Safety Evaluation

cc w/enclosures: See next page

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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-390

WATTS BAR NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 69
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 24, 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. 69, 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 immediately.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/ RNelson for

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: July 24, 2008

ATTACHMENT TO LICENSE AMENDMENT NO.69

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
3.7-19	3.7-19
3.7-20	3.7-20
	3.7-20a

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 69 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 July 24, 2008, the Tennessee Valley Authority (TVA, or the licensee) submitted a request for approval of a temporary alteration (TA) to the control logic of two emergency raw cooling water (ERCW) pumps and a change to the Watts Bar Nuclear Plant, Unit 1 (WBN), Technical Specifications (TSs). Specifically, the licensee is requesting approval of a modification of the C-A and D-A ERCW pump control circuitry to allow both ERCW pumps on the 6900 volt (V) Shutdown Board (SDB) 2A-A to simultaneously sequence onto the SDB following a loss of offsite power (LOOP).

On June 7, 2008, during performance of 0-SI-67-901-A, "ERCW Pump A-A and C-A Quarterly Performance Test," the A-A ERCW pump failed to meet acceptance criteria for total developed head. The A-A ERCW pump was removed from service for pump refurbishment with an anticipated restoration date of August 19, 2008. With only the A-A ERCW pump out of service, no entry into TS LCO 3.7.8 is required. With the unexpected failure of the B-A ERCW pump at 1446 hours on July 21, 2008, WBN entered the 72-hour ACTION for Limiting Condition Operation (LCO) 3.78, "Emergency Raw Cooling Water (ERCW)." The estimate for the repair of either pump was greater than the 72-hour allowed outage time (AOT), therefore the licensee is requesting approval of this one-time TA and TS change to July 31, 2008.

2.0 REGULATORY EVALUATION

Section 182a of the Atomic Energy Act (the Act) requires applicants for nuclear power plant operating licenses to include TS as part of the license. The TS ensure the operational capability of structures, systems and components that are required to protect the health and safety of the public. The regulatory requirements related to the content of the TS are contained in Title 10 *Code of Federal Regulations* Section (10 CFR) Section 50.36. That regulation requires that the TSs include items in the following specific categories: (1) Safety limits, limiting safety systems settings, and limiting control settings (50.36(d)(1)); (2) Limiting Conditions for Operation (50.36(d)(2)); (3) Surveillance Requirements (50.36(d)(3)); (4) design features (50.34(d)(4)); and (5) administrative controls (50.36(d)(5)).

Section 50.36(d)(2) of 10 CFR states in part:

> Limiting 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 until the condition can be met.

Section 50.63 of 10 CFR, "Loss of all alternating current power," requires that each light-water cooled nuclear power plant licensed to operate be able to withstand for a specified duration and recover from a station blackout.

Section 50.65 of 10 CFR, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," requires that preventive maintenance activities must not reduce the overall availability of the systems, structures and components.

General Design Criterion (GDC) 17, "Electric power systems," of Appendix A,"General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, requires, in part, that nuclear power plants have onsite and offsite electric power systems to permit the functioning of structures, systems, and components that are important safety. The safety function for each system (assuming the other system is not functioning) will be able to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated events. The onsite system is required to have sufficient independence, redundancy, and testability to perform its safety function, assuming a single failure. The offsite power system is required to be supplied by two physically independent circuits that are designed and located so as to minimize, to the extent practical, the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. In addition, this criterion requires provisions to minimize the probability of losing electric power from the remaining electric power supplies as a result of loss of power from the unit, the offsite transmission network, or the onsite power supplies.

Appendix A of 10 CFR Part 50, GDC 18, "Inspection and testing of electric power systems," requires that electric power systems that are important to safety must be designed to permit appropriate periodic inspection and testing.

Section 3.1.2 of the WBN Updated Final Safety Analysis Report (UFSAR) describes the extent of conformance of the WBN design with the GDC published as Appendix A to 10 CFR Part 50, in July 1971. GDC 44 - Cooling Water, specifies that a system to transfer heat from structures, systems, and components important to safety, to an ultimate heat sink shall be provided. The system safety function shall be to transfer the combined heat load of these structures, systems, and components under normal operating and accident conditions.

Suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

Section 3.2.1.4 of the WBN UFSAR states that the seismic Category I ERCW system consists of two independent trains, each of which is capable of providing all necessary heat sink requirements. Section 9.2.1.3, "Safety Evaluation," of the WBN UFSAR states:

> The ERCW system has eight pumps (four pumps per train). However, minimum combined safety requirements for one 'accident' are met by only two pumps on the same plant train. Sufficient redundancy, separation and independence of piping and components are provided to ensure that cooling is maintained to vital loads at all times despite the occurrence of a random single failure.

Section 9.2.1.3 of the WBN UFSAR also states:

> The safety-related portion of the ERCW system is designed such that total loss of either train or the loss of offsite power and an entire plant shutdown power train will not prevent safe shutdown of the plant under any credible condition.

WBN UFSAR Figures 9.2.1 through 9.2.4.B provide mechanical flow diagrams for the ERCW system.

Regulatory Guide (RG) 1.9, Revision 3, “Application and Testing of Safety-Related Diesel Generators in Nuclear Power Plants,” provides guidance that NRC staff considers acceptable to comply with the Commission’s regulations for safety-related emergency diesel generators (EDGs) intended for use as onsite emergency power sources for nuclear power plants - specifically, that the EDGs be selected with sufficient capacity, be qualified, and have the necessary reliability and availability for design-basis events.

3.0 TECHNICAL EVALUATION

3.1 Description of System

The ERCW System at WBN consists of an intake pumping station (IPS) structure, traveling screens, pumps, strainers, discharge overflow structure, valves and piping arranged in two trains. Each train contains four ERCW pumps that discharge to a train manifold, from which two separate headers (1A and 2A for Train A, and 1B and 2B for Train B) supply water to cool essential equipment in response to adverse plant operating conditions which impose safety-related performance requirements on the systems being served.

The four ERCW pumps are vertical, wet pit centrifugal type. The ERCW pumps and pump motors are housed in a Category I structure. The pump motors are weatherproof and are protected from environmental effects by various protective devices. The ERCW pumps utilize raw water from the discharge header downstream of the strainer for pre-lubrication of the line shaft bearings, throttle bushing, and shaft seals.

The WBN TS LCO 3.7.8 for the ERCW system requires that two ERCW trains be operable to provide the required redundancy to ensure that the system functions to remove post-accident heat loads, assuming that the worst case single active failure occurs, coincident with the loss of offsite power. The TS Bases for LCO 3.7.8 define an ERCW train as operable, in part, when

two operable ERCW pumps are aligned to automatically start from separate shutdown boards. Two ERCW pumps are required to automatically start to ensure adequate cooling to essential equipment, including the respective train EDGs.

3.2 Mechanical System Performance

The proposed change does not involve any mechanical changes to the ERCW system. The change to TS ACTION 3.7.8.A, TS BASES LCO 3.7.8, and UFSAR Section 9.2.1 relate to a physical change to the electrical alignment of Train A of the ERCW system such that the remaining two available Train A pumps would automatically start on the 2A-A EDG when required. The licensee concluded this electrical configuration would provide adequate cooling following a LOOP coincident with a design basis event (DBE).

Section 9.2.1.3 of the WBN UFSAR states that two ERCW pumps in one train satisfy the minimum combined flow requirements for one accident. The immediate availability of the C-A and D-A ERCW pumps satisfies the accident flow requirements for Train A, and those pumps alone provide adequate cooling in the event of a single failure affecting Train B of the ERCW system. The common power supply from shutdown board 2-A (and EDG 2A-A) is acceptable because the system remains capable of performing its safety function in the event of a single failure. A failure of shutdown board 2-A results in a complete loss of Train A of the ERCW system, but UFSAR Section 9.2.1.3 states that the unaffected Train B of the ERCW system is capable of supporting safe shutdown of the plant under any credible condition. Thus, total loss of either train or the loss of offsite power and an entire plant shutdown power train will not prevent safe shutdown of the plant under any credible condition. Therefore, the staff concludes that, with respect to mechanical system performance, the degraded ERCW system continues to satisfy its design basis.

The degradation that resulted in the need to refurbish the A-A ERCW pump and the failure of the B-A ERCW pump suggest a potential for consequential failures of additional ERCW pumps. Since similar degradation mechanisms could affect the redundant pumps, the NRC staff requested the licensee evaluate the potential for common-cause failure of the redundant ERCW pumps.

The licensee had not experienced an ERCW pump failure from commercial operation in May 1996 until June 2008 when the A-A ERCW pump failed to meet in-service test program required action criteria. The licensee had noted that this pump's performance had been slowly degrading, and the licensee had scheduled the A-A ERCW pump for overhaul later this year. The licensee reported that the pump has been partially disassembled and there are no indications of coupling or shaft failures in this pump. The licensee concluded the A-A ERCW pump performance degradation was most likely due to age-related wear, in part because this pump was last overhauled in October 1989. The licensee also noted that a crack in the discharge head circumferential weld may have contributed to pump performance degradation. A cause analysis is in progress.

The licensee observed this weld crack phenomena prior to WBN startup and actions taken to prevent recurrence include installation of rubber column bearings during pump overhaul and implementation of maintenance practices to control the pump impeller to bowl clearances to preclude pump to bowl interference due to differential expansion of the pump shafts and columns as water temperature changes. Rubber column bearings are installed on four of the

six available ERCW pumps including C-A and D-A ERCW pumps, and pump clearances are properly set on all ERCW pumps.

The failure of B-A ERCW pump on July 21, 2008, occurred during normal operation. This pump had satisfied in-service testing criteria during previous tests. Disassembly revealed that the coupling sleeve between the 5th and 6th column shafts above the pump had failed. The licensee identified a crack in the coupling sleeve initiating at or near key retaining bolts at the bottom of the sleeve, propagating longitudinally. Visual indications suggest a high cycle, low stress fatigue propagated the failure. The licensee stated that the root cause of this failure will not be determined until laboratory analysis is completed. The licensee had not determined the coupling sleeve age, but the licensee determined that the sleeve was removed and installed during the last B-A ERCW pump overhaul in September 1995. The licensee inspected the B-A ERCW pump for any discharge head weld cracks; the licensee identified no cracks. The licensee found no prior ERCW pump sleeve coupling failures at WBN based upon a review of available records since 1991.

Thus, the licensee found that the degradation mechanisms affecting the A-A and B-A ERCW pumps are different, and the licensee had implemented some corrective actions to address the apparent cause of the A-A pump degradation. The remaining pumps may be subject to degradation of the couplings, but the NRC staff found insufficient evidence to conclude that the probability of pump failure has substantially increased due to this potential degradation mechanism. Therefore, the NRC staff has reasonable assurance that the probability of additional failures of ERCW pumps remains sufficiently small that an assumed single failure is conservative and satisfies the intent of GDC-44 with respect to system reliability.

Based on the results of the review, the staff finds that the proposed increase in action completion time is consistent with the intent of GDC-44 because the ERCW system continues to be capable of performing its safety function assuming a single failure and there is reasonable assurance that the observed degradation of the ERCW system has not substantially increased the probability of an additional failure of an ERCW pump.

3.3 Control System Performance

As discussed above, to avoid overloading of the respective emergency diesel generators, the licensee has proposed a temporary modification to allow both the C-A and D-A ERCW pumps to be aligned to the 2A-A 6.9kV shutdown board, such that adequate cooling would be available to Train A equipment. The temporary modification would be accomplished by maintaining the ERCW selector switch in the D-A position. An electrical jumper will be placed across the transfer switches permissive contact for ERCW pump C-A. Additionally, the automatic start interlocks associated with the ERCW pumps C-A and D-A breaker contacts would be electrically bypassed. This configuration supports the auto-start of both the C-A and D-A ERCW pumps upon a LOOP.

The NRC staff reviewed the modification package and the associated control wiring diagrams. The licensee indicated that the jumper wiring consists of Class 1E materials and will be handled and installed in accordance with the licensees specifications for insulated cables rated up to 15,000 V. The modification package stated that connectors will be ring tongue type lugs such that the jumper can be securely maintained in its intended position. The jumper will be physically confined within the panel of the train components that it serves, and will not interact

with any cables or wires from a different division or train. Therefore, the NRC staff finds that as sufficient isolation and separation exist, the modification proposed should assure that the effects of natural phenomena, and of normal operating, maintenance, testing, and postulated accident conditions should not result in loss of any protection function.

Additionally the NRC staff reviewed the proposed modification against the separation criteria contained in Appendix R to 10 CFR Part 50. The existing safe shutdown analysis requires two of four ERCW pumps per train to be available for fire safe shutdown. Provided the C-A and D-A ERCW pumps remain available, ERCW Train A should not be impacted. The licensee indicated that the safe shutdown logic will not be impacted by this temporary modification, and that the electrical jumper would be confined to individual compartments. Given the configuration proposed, the NRC staff finds that the modified ERCW logic ensures adequate pumps are available and that the control logic remains consistent with the cable separation requirements of Appendix R to 10 CFR Part 50 Appendix R.

3.4 Electrical System Performance

The ERCW pumps are normally controlled from the main control room (MCR), or locally. Placing the control selector at the 6.9 kilo-Volt (kV) switch gear in the auxiliary position allows pump operation from the switch gear and gives a MCR alarm. To prevent auto loading of two ERCW pumps to the same shutdown board (designed for two unit operations), four pump selector switches are provided in MCR. During a LOOP event or Safety Injection System Condition, the selected pumps start automatically.

With the A-A and B-A ERCW pumps currently unavailable, the licensee has proposed implementing a temporary modification to allow both ERCW pumps C-A and D-A to sequence on to shutdown board 2A-A following a LOOP event. Shutdown board 2A-A is powered by the 2A-A EDG during LOOP events. The licensee stated that the 2A-A shutdown board is capable of handling the additional current.

Section 8.3.1.1 of WBN UFSAR states that each onsite EDG consists of two 16-cylinder Morrison-Knudsen Division engines (EMD 16-645E4 or E4B) directly connected to a 6.9kV Electric Products generator. The continuous rating of each set is 4400 kilo Watts (kW) at 0.8 power factor, 6.9kV, 3-phase, and 60 Hz. Each diesel-generator set also has an additional rating of 4840kW for 2 hours out of 24. The normal operating speed of the set is 900 rpm. The diesel-generator set uses a tandem arrangement; that is, each set consists of two diesel engines with a generator between them connected together to form a common shaft. The generator sets are physically separated, electrically isolated from each other, and located above the water level of the probable maximum flood.

Section 9.2.1 of the WBN UFSAR states that there are two independent power trains with two EDGs for each train, four of the eight ERCW pumps are assigned to Train A and four to Train B. The WBN UFSAR further states that each diesel generator is aligned to supply power to either of two specific ERCW pumps; the generator capacity is such that only one pump per generator can be loaded automatically.

Because of the absence of the WBN Unit 2 emergency core cooling pumps, due to WBN Unit 2 construction status, the licensee stated that there is adequate margin on the 2A-A diesel generator to accept the second ERCW pump. The licensee's evaluation determined that the

maximum transient kilo-Volt-Amperes (kVA) step load increase would be 7866 kVA when two ERCW pumps are started simultaneously. The licensee confirmed that a combination of initial testing and analytical evaluation methods were used to establish the transient capability of the diesel generator to start an 8700kVA load. This provides a 10 percent margin between the postulated load and the calculated transient capability of the diesel generator. The licensee's evaluation also determined that the maximum loading of diesel generator 2A-A is 1404 kW when diesel generator 1A-A is carrying accident loads. The second ERCW pump would result in an additional 747 kW steady state load, which would increase the total loading to 2151 kW, which the staff confirmed is below the 2A-A diesel generator's capability of 4400 kW. The licensee stated that the existing steady-state loading of diesel generator 2A-A is less than 60 percent of the diesel generator capability ratings (based on Unit 1 only operation). The licensee further stated that the total steady-state loading on diesel generator 2A-A will be maintained less than 60 percent of rated capability with the addition of the second ERCW pump.

The frequency and voltage of diesel generator 2A-A is expected to have stabilized within 5 seconds from diesel generator breaker closure following a LOOP. The simultaneous sequencing of two 747 kW motors 20 seconds after diesel generator breaker closure results in a voltage transient of less than 25 percent. The initial testing performed by the licensee established that the diesel generator was capable of recovering from this transient. For further assurance, the NRC staff verified that diesel generator 2A-A successfully passed its previous 24-hour endurance run (January 2007).

The NRC staff confirmed that the wiring changes being made by this modification are downstream of the start signal and do not impact the sequencing or start time of the pump after a LOOP. Therefore, both ERCW pumps will receive the same coincidental start signal with a 20-second delay. The NRC staff verified that this time delay is consistent with the load sequence listed in the WBN UFSAR.

In the submittal, the licensee stated that factory testing data provided a starting kVA value of 8700 kVA to maintain a voltage dip of less than or equal to 25 percent. In a July 24, 2008, conference call, the licensee was requested to demonstrate that the electrical equipment and components sequenced prior to the two ERCW pumps on 2A-A could successfully perform their safety function under transient conditions (i.e., 75 percent voltage at the 6.9 kV bus). During the conference call, the licensee indicated that the above condition was unanalyzed. After further discussion, additional information was provided in an email dated July 24, 2008, which demonstrated that the critical equipment important to safety and/or required to support operation of equipment that will be sequenced will continue to perform their intended safety function under transient conditions. It should be noted that the licensee identified several loads that remain unanalyzed under the transient condition identified above. These loads primarily include fans, room coolers, and air handling units that would trip if the voltage were to drop to where the contactor dropped out. The licensee stated that these loads would return upon voltage recovery and restart based on having a process demand signal, or be restarted in accordance with established procedures.

Based on this information, the NRC staff has adequate assurance that diesel generator 2A-A and its associated components can successfully perform the intended safety function under transient conditions (i.e., simultaneously start and maintain load of both ERCW pumps C-A and D-A at their current loading time sequence). Thus, the licensee has demonstrated that they will continue to meet GDC 17 in that the onsite electric power system shall be provided to permit

functioning of structures, systems, and components important to safety. Specifically, the licensee provided assurance that the safety function for each system (assuming the other system is not functioning) will be able to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated events.

The NRC staff confirmed that the temporary modification would not adversely impact breaker coordination or protective trip functions. The NRC staff's conclusion is based on all tripping functions of the protective relay devices being bypassed when the plant is in emergency mode with diesel generator 2A-A supplying the shutdown board loads, with exception of differential and mechanical overspeed. The licensee stated that the overcurrent relays on the emergency supply breaker provides an alarm function only and would not result in a breaker trip upon motor starting. Furthermore, no changes have been made to the individual ERCW starting or running performance characteristics that would result in any changes to the existing relay protection to the load supply breaker. The staff also confirmed that the diesel generator emergency supply cables are qualified for the application as they were analyzed for ampacity based on the running full load current value.

In response to a concern regarding the logic of diesel generator 1A-A with no loading of ERCW pumps, the licensee stated that all sequenced loads on the 6.9 kV Shutdown Board 1A-A and the respective 1A-A diesel generator have their own individual discrete time delay relay and control circuits that are not dependant on the logic of other sequenced loads. Therefore, since the load sequence timers of each individual sequenced load are independent of each other, there should be no adverse consequences associated with the load sequence logic.

The NRC staff verified that the licensee contacted its transmission operator to confirm that there were no planned outages in the vicinity of WBN that may impact grid stability. The licensee plans for the crew to confirm with the transmission operator each shift that the grid remains stable and that no maintenance activities have been initiated that may impact the grid.

The NRC staff evaluation of breaker coordination and protective trip devices, the design logic of diesel generator 1A-A, and the stability of the TVA offsite power supply, provides assurance that the proposed modifications meets the portion of GDC 17 regarding minimizing the probability of losing electric power from the remaining electric power supplies as a result of loss of power from the unit, the offsite transmission network, or the onsite power supplies.

As an additional safety precaution, the licensee has agreed to implement the following compensatory measures during the time period that ERCW is in the modified configuration:

- No ERCW pumps or diesel generators will be removed from service for elective maintenance.
- No Engineered Safety Feature (ESF) equipment that is supported by ERCW Train-B will be removed from service for elective maintenance.
- No activities will be performed in the WBN switchyard or the Watts Bar Hydro switchyard that could impact offsite power.
- Grid status will be monitored on a 12 hour basis.

Based on the above evaluation, the NRC staff finds the proposed changes to WBN TS provides reasonable assurance of the continued availability of the required electrical power to shut down the reactor and to maintain the reactor in a safe condition after an anticipated operational occurrence or a postulated design-basis accident. Furthermore, the NRC staff concludes that the proposed TS changes are in accordance with Sections 50.36 and 50.65 of 10 CFR, and meet the intent of GDC 17 and 18. Therefore, the staff finds the proposed changes acceptable.

3.5 Addition of CONDITION C to TS 3.7.8

The WBN TS contain an LCO for the ERCW System, LCO 3.7.8. Currently, there are two LCO 3.7.8 CONDITIONS. CONDITION A addresses the case when one is RCW train inoperable. With one train inoperable, it requires restoration of the inoperable ERCW train within 72 hours. CONDITION B applies when CONDITION A can not be met, and requires the plant to be placed in MODE 3 within 6 hours and MODE 5 with 36 hours.

Due to the inoperability of ERCW pumps A-A and B-A on July 21, 2008, the licensee proposed these changes to LCO 3.7.8. The licensee requested addition of a new condition, CONDITION C, to LCO 3.7.8. CONDITION C will apply when train A ERCW pumps, A-A and B-A are inoperable and train C-A and D-A pumps are operable. CONDITION C will apply until the B-A pump is declared operable or until July 31, 2008, whichever occurs first. The proposed required action for this condition is to align operable ERCW pumps C-A and D-A to concurrently autostart from the 2A-A 6.9 KV Shutdown Board within 72 hours and restore at least one of the inoperable pumps (A-A or B-A) to OPERABLE status within 10 days. The licensee also requested to change the Condition A to read: “One ERCW train inoperable, other than for CONDITION C.”

The format of the proposed changes to LCO 3.7.8 conforms to the format of NUREG-1431 Revision 3.0, “Standard Technical Specifications, Westinghouse Plants.”

CONDITION C provides an appropriate Condition as well as remedial actions and completion times to assure continued safe operation of the facility until LCO 3.7.8 can be met.

4.0 EMERGENCY CIRCUMSTANCES

In its June 24, 2008, letter, the licensee requested that this amendment be treated as an emergency amendment. In accordance with 10 CFR 50.91(a)(5), the licensee provided information regarding why this emergency situation occurred and how it could not be avoided.

The licensee provided the following explanation.

> The need to request this emergency TS change resulted from the failure of the B-A ERCW pump on July 21, 2008 at 1446 hours concurrent with the INOPERABILITY of the A-A ERCW pump due to maintenance (pump refurbishment). On June 7, 2008, during performance of 0-SI-67-901-A, ERCW Pump A-A and C-A Quarterly Performance Test, the A-A ERCW pump failed to meet acceptance criteria for total developed head. The A-A ERCW pump was removed from service for pump refurbishment with an anticipated restoration date of August 19, 2008. With only the A-A ERCW pump out of service, no entry into TS LCO 3.7.8 is required. With the unexpected failure of the B-A ERCW pump at 1446 hours on July 21, 2008, WBN entered the 72-hour actions for LCO 3.7.8.

As indicated previously, neither the A-A or B-A ERCW pumps can be repaired and made operable within the 72 hour AOT of Required Action A.1 of LCO 3.7.8. Due to the nature of the problem affecting a critical safety system, TVA has discussed with the NRC the options available to address the issue on July 21st, 22nd and 23rd. The discussions concluded that the best option available was an emergency TS change. The basis for this conclusion is that, once the proposed change is implemented, an extended AOT would be appropriate, since two pumps will be available and supplied from an emergency power source. Resolving the issue in this manner allows WBN to safely continue operation. Had the 72 hour AOT been allowed to expire without a pump being made operable, Required Action B would require the shutdown of the unit. This would be an unnecessary transient to the plant. In addition, the proposed change will allow continued safe operation during a time of high demand on the TVA power system and periodic power system alerts.

TVA could not have foreseen the need for this change request prior to the identification of the B-A ERCW pump coupling failure. The failure of the B-A ERCW pump shaft coupling was unexpected since there was no indication of problems with the pump prior to the time of failure.

Motor vibration has remained relatively stable while pump head has experienced minor variations with an overall slight declining trend. However, the last data point obtained on May 18, 2008 remained above the alert level with no indication of pending failure.

Therefore, TVA requests that this proposed amendment request be considered under emergency circumstances as described in 10 CFR 50.91(a)(5).

5.0 REGULATORY COMMITMENTS

In the July 24, 2008, submittal the licensee made the following commitments:

- No ERCW pumps or diesel generators will be removed from service for elective maintenance.
- No Engineered Safety Feature (ESF) equipment that is supported by ERCW Train-B will be removed from service for elective maintenance.
- No activities will be performed in the WBN switchyard or the Watts Bar Hydro switchyard that could impact offsite power.
- Grid status will be monitored on a 12 hour basis.

6.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92(c) state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility in accordance with the amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or,

(2) Create the possibility of a new or different kind of accident from any previously evaluated; or,

(3) Involve a significant reduction in a margin of safety.

The following analysis was provided by the licensee in its letter of July 24, 2008.

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

This temporary change results in the possibility that the failure of the 2A-A Diesel Generator (DG) would remove electrical power from both ERCW pumps operating on ERCW Train A. However, the overall effect on ERCW Train A is the same, since the ERCW pumps are considered 50 percent pumps. When offsite power is available, all four pumps per train may be placed in service. With the loss of offsite power only two pumps per train can normally be operated due to diesel generator capacity limitations (one per diesel generator). Since the pumps are sized so that the operation of two ERCW pumps on each plant train is required for the train to be operable, the loss of one pump results in the failure of the train to meet its design requirements, even with the normal diesel generator power alignments. This requires the redundant train to be in service to supply all cooling water required for the plant for unit cooldown, refueling, or post accident operations.

The proposed amendment request will permit Train A of the ERCW system to be in a degraded condition for an extended period of time. Even if Diesel Generator 2A-A failed to operate and the Train A pumps were subsequently out of service, the ERCW Train B would be able to perform its design basis functions, therefore maintaining the radiological barriers and maintaining the dose limits within the design basis requirements.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

This proposed amendment request change allows modification to the electrical power system that will permit the ERCW Pump C-A and D-A to be powered from the 2A-A DG. Currently there is an interlock that prohibits this action. Since the electrical loads on the 2A-A DG are low during Unit 1 only operation, DG 2A-A can provide power to both ERCW Pumps C-A and D-A subsequent to a loss of offsite power. If DG 2A-A should fail to operate, both ERCW Pumps C-A and D-A would be inoperable. However, during normal design conditions when the two Train A pumps are powered separately by DGs 1A-A and 2A-A, a loss of one of the diesel generators results in the train being inoperable; since each pump provides 50 percent of the cooling water load on the train. The design basis for the ERCW System is that either Train A or Train B be able to perform the design basis requirements of the ERCW system independently of the other train.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

The ERCW pumps are considered 50 percent pumps in that they are sized so that the operation of two pumps on each plant train will supply all cooling water requirements for the plant during all modes of operation. Also, one ERCW Train with two pumps in service shall be sufficient to supply all cooling water required for the plant for unit cooldown, refueling, or post accident operations. The ERCW pumps are normally controlled from the Main Control Room (MCR), or from local controls. Placing the control selector at the 6.9kV switch gear in the auxiliary position allows pump operation from the switch gear and gives a MCR alarm. During a loss of off-site power (LOOP), either ERCW Pump A-A or B-A is powered by Diesel Generator 1A-A and either Pump C-A or D-A is powered by Diesel Generator 2A-A. Due to the large load of the ERCW pump motors, only one ERCW Pump is loaded on each DG. To prevent auto loading of two ERCW pumps to the same Shutdown Board and its associated diesel generator during a loss of offsite power (LOOP), pump selector switches are provided in the Main Control Room (MCR). During a LOOP or Safety Injection Safety Condition, the lead selected pumps start automatically and pump status is indicated in the MCR and locally.

The proposed amendment request provides an alternative way of providing power to ERCW Pump C-A and ERCW Pump D-A during a LOOP. This is required due to the failures of ERCW Pump A-A and Pump B-A. As noted above, each ERCW Train requires two pumps to be in service to meet design basis plant conditions. Since both ERCW Pumps A-A and B-A are inoperable, only ERCW Pumps C-A and D-A are available. However, the current design limits ERCW pump operation to one ERCW pump per diesel generator, either Pump C-A or D-A when there is a loss of offsite power.

The proposed amendment request change will permit both ERCW Pumps C-A and D-A to be powered from Diesel Generator 2A-A during a loss of offsite power until ERCW Pump A-A or B-A is returned to service. This is possible during Unit 1 operation due to the low power demand on the 6.9 kV Shutdown Board 2A-A and DG 2A-A. The ERCW system remains operable as long as each train has two pumps available for operation on

each train. The variation from normal design is that both ERCW Pumps C-A and D-A will be powered from Diesel Generator 2A-A.

Because of the absence of the Unit 2 Emergency Core Cooling Pumps on 2A-A DG, there is an adequate margin to accept the second ERCW pump. The addition of the second ERCW Pump on 2A-A DG brings the loading up to 55 percent. The WBN Emergency Diesel Generators have an adequate transient step-change rating to accept simultaneous starts of the two ERCW Pumps. The 2A-A DG will load in three steps; 1) Closure of the DG breaker energizes the loads on the 6.9 kV Shutdown Board not shed by the load shedding circuit, 2) At 20 seconds from DG breaker closure, the two ERCW Pumps will start, 3) At 35 seconds from DG breaker closure, the Component Cooling Pump will start. The DG 2A frequency and voltage stabilizes well within 5 seconds following the time zero loading and has 15 seconds to the start of the two ERCW Pumps.

Applicable regulatory requirements will continue to be met and sufficient safety margins will be maintained. Based upon the redundant capabilities of the opposite train, the compensatory measures being taken, and the temporary alignment being proposed, the additional time for pump power alignment and pump restoration time is considered reasonable. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, TVA concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92 (c), and, accordingly, a finding of "no significant hazards consideration" is justified. The Commission agrees with the licensee's analysis and, thus, makes a final determination that the amendment does not involve a significant hazards consideration.

7.0 STATE CONSULTATION

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

8.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. 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 made a final no significant hazards finding with respect to this amendment. 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.

9.0 CONCLUSION

The Commission has concluded, based on the discussion provided in Sections 3.1 and 3.2 of this safety evaluation, 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.

Additionally, the Commission has concluded, based on the considerations discussed above, that (1) the amendment does not: (a) involve a significant increase in the probability or consequences of an accident previously evaluated; or, (b) create the possibility of a new or different kind of accident from any previously evaluated; or, (c) involve a significant reduction in a margin of safety and therefore, the amendment does not involve a significant hazards consideration; (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (3) such activities will be conducted in compliance with the Commission's regulations, and (4) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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