October 19, 1998

Mr. J. A. Scalice
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

SUBJECT: ISSUANCE OF AMENDMENT ON DIESEL GENERATOR SYSTEMS TESTING (TAC NO. M98919)

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment No. 12 to Facility Operating License No. NPF-90 for Watts Bar Nuclear Plant (WBN), Unit 1. This amendment is in response to your application dated June 5, 1997, as supplemented April 21 and August 12, 1998.

The requested changes would revise the Technical Specifications (TS) to allow testing of diesel generators, pursuant to Surveillance Requirement (SR) 3.8.1.14, during operational modes 1 or 2. The requested changes would also revise the TS to allow testing of the diesel generator batteries and associated battery chargers, pursuant to SRs 3.8.4.12, 3.8.4.13 and 3.8.4.14 during operational modes 1, 2, 3 or 4.

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

Sincerely,
Original signed by:

Robert E. Martin, Senior Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosures: 1. Amendment No. 12 to NPF-90
2. Safety Evaluation

cc w/enclosures: See next page

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Docket File	PUBLIC
WBN Rdg.	J. Zwolinski
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9810230061 3pp

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

October 19, 1998

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Sincerely,

Robert Martin

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Project Directorate II-3
Division of Reactor Projects - I/II
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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. 12
License No. NPF-90

1. That the Nuclear Regulator Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated June 5, 1997, as supplemented April 21 and August 12, 1998, 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 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 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:

9810230063 13pp

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 12 , 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, to be implemented no later than 30 days of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Frederick J. Hebdon, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
1. Operating License Changes
2. Changes to the Technical Specifications

Date of Issuance: October 19, 1998

ATTACHMENT TO AMENDMENT NO. 12

FACILITY OPERATING LICENSE NO. NPF-90

DOCKET NO. 50-390

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

Remove Pages	Insert Pages
3.8-12	3.8-12
3.8-28	3.8-28
3.8-29	3.8-29
B3.8-28	B3.8-28
B3.8-29	B3.8-29
----	B3.8-29a
B3.8-64	B3.8-64
B3.8-65	B3.8-65
B3.8-66	B3.8-66
B3.8-67	B3.8-67

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.13	----------NOTE---------- This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify each DG's automatic trips are bypassed on automatic or emergency start signal except: a. Engine overspeed; and b. Generator differential current.	18 months
SR 3.8.1.14	----------NOTES---------- 1. Momentary transients outside the load and power factor ranges do not invalidate this test. 2. For performance of this test in MODE 1, 2, 3 or 4, three DGs must be maintained operable and in a standby condition. 3. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify each DG operating at a power factor ≥ 0.8 and ≤ 0.9 operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 4620 kW and ≤ 4840 kW and ≥ 3465 kVAR and ≤ 3630 kVAR; and b. For the remaining hours of the test loaded ≥ 3960 kW and ≤ 4400 kW and ≥ 2970 kVAR and ≤ 3300 kVAR.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.12	----------NOTE---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify each diesel generator battery charger is capable of recharging its associated battery from a service or capacity discharge test while supplying normal loads.	18 months
SR 3.8.4.13	----------NOTES---------- 1. The modified performance discharge test in SR 3.8.4.14 may be performed in lieu of the service test in SR 3.8.4.13 once per 60 months. 2. This Surveillance is not performed in MODE 1, 2, 3, or 4 for required vital batteries. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads and any connected nonsafety loads for the design duty cycle when subjected to a battery service test.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.14	----------NOTE---------- This Surveillance is not performed in MODE 1, 2, 3, or 4 for required vital batteries. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.	60 months <u>AND</u> 12 months when battery shows degradation or has reached 85% of expected life with capacity < 100% of manufacturer's rating <u>AND</u> 24 months when battery has reached 85% of the expected life with capacity ≥ 100% of manufacturer's rating

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.14

Regulatory Guide 1.9 (Ref. 3), paragraph C2.2.9, requires demonstration once per 18 months that the DGs can start and run continuously for an interval of not less than 24 hours, ≥ 2 hours of which is at a load between 105% and 110% of the continuous duty rating and the remainder of the time at a load equivalent to 90-100% of the continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor of ≥ 0.8 and ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience. The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

This Surveillance is modified by three Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test. Note 2 establishes that this SR may be performed on only one DG at a time while in MODE 1, 2, 3, or 4. This is necessary to ensure the proper response to an operational transient (i.e., loss of offsite power, ESF actuation). Therefore, three DGs must be maintained operable and in a standby condition during performance of this test. In this configuration, the plant will remain within its design basis, since at all times safe shutdown can be achieved with two DGs in the same train.

Note 3 establishes that credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.14 (continued)

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

Prior to performance of this SR in Modes 1 or 2, actions are taken to establish that adequate conditions exist for performance of the SR. The actions include the performance of the following:

1. Verfication of the stability of the offsite power system in the vicinity of WBN. This action establishes that the power system is within "single contingency limits" and is capable of remaining stable upon the loss of any single component supporting the system.

2. Establishing of the expected weather conditions for the 24-hour testing period.

3. Postponement of the test, if a grid stability problem exists or if inclement weather such as severe thunderstorms or heavy snowfall is projected for the upcoming 24 hour period.

If during the performance of the test, a stability problem with the offsite power system arises or inclement weather (i.e., tornado watch or warning, heavy snowfall, etc.) is experienced, the testing is to be suspended.

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 10 seconds. The minimum voltage and frequency stated in the SR are those necessary to ensure the DG can accept DBA loading while maintaining acceptable voltage and frequency levels. Stable operation at the nominal voltage and frequency values is also essential to establishing DG OPERABILITY, but a

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.15 (continued)

time constraint is not imposed. This is because a typical DG will experience a period of voltage and frequency oscillations prior to reaching steady state operation if these oscillations are not dampened out by load application. This period may extend beyond the 10 second acceptance criteria and could be a cause for failing the SR. In lieu of a time constraint in the SR, WBN will monitor and trend the actual time to reach steady state operation as a means of ensuring there is no voltage regulator or governor degradation which could cause a DG to become inoperable. The 10 second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), Table 1.

The DG engines for WBN have an oil circulation and soakback system that operates continuously to preclude the need for a prelube and warmup when a DG is started from standby.

This SR is modified by a Note to ensure that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least 2 hours at full load conditions

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.12 (continued)

plant during these demand occurrences. Verifying the capability of the charger to operate in a sustained current limit condition ensures that these requirements can be satisfied.

The Surveillance Frequency is acceptable, given the plant conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these 18 month intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

For the DG DC electrical subsystem, this Surveillance may be performed in MODES 1, 2, 3, or 4 in conjunction with LCO 3.8.1.B since the DG DC electrical power subsystem supplies loads only for the inoperable diesel generator and would not otherwise challenge safety systems supplied from vital electrical distribution systems. If available, the C-S DG and its associated DC electrical power subsystem may be substituted in accordance with LCO Note 2. Additionally, credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

A battery service test is a special test of battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to worst case design duty cycle requirements based on Reference 10 and 12.

The Surveillance Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 6) and Regulatory Guide 1.129 (Ref. 11), which state that the battery service test should be performed during refueling operations or at some other outage, with intervals between tests, not to exceed 18 months.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.13

This SR is modified by two Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test once per 60 months. The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

A modified discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle.) This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test.

The reason for Note 2 is that performing the Surveillance may perturb the vital electrical distribution system and challenge safety systems. However, this Surveillance may be performed in MODES 1, 2, 3, or 4 provided that Vital Battery V is substituted in accordance with LCO Note 1. For the DG DC electrical subsystem, this surveillance may be performed in MODES 1, 2, 3, or 4 in conjunction with LCO 3.8.1.B since the supplied loads are only for the inoperable diesel generator and would not otherwise challege safety system loads which are supplied from vital electrical distribution systems. If available, the C-S DG and its associated DC electrical power subsystem may be substituted in accordance with LCO Note 2. Additionally, credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.13 (continued)

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.4.14

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for 3.8.4.13. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.14; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.14 while satisfying the requirements of SR 3.8.4.13 at the same time.

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 9) and IEEE-485 (Ref. 5). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 (Ref. 9), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is ≥ 10% below the manufacturer rating. These Frequencies are consistent with the recommendations in IEEE-450 (Ref. 9).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.14 (continued)

This SR is modified by a Note. The reason for the Note is that performing the Surveillance may perturb the vital electrical distribution system and challenge safety systems. However, this Surveillance may be performed in MODES 1, 2, 3, or 4 provided that Vital Battery V is substituted in accordance with LCO Note 1. For the DG DC electrical subsystem, this surveillance may be performed in MODES 1, 2, 3, or 4 in conjunction with LCO 3.8.1.B since the supplied loads are only for the inoperable diesel generator and would not otherwise challege safety system loads which are supplied from vital electrical distribution systems. If available, the C-S DG and its associated DC electrical power subsystem may be substituted in accordance with LCO Note 2. Additionally, credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

(continued)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 12 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 5, 1997, as supplemented April 21 and August 12, 1998, the Tennessee Valley Authority (TVA or the licensee) submitted a request for changes to the Watts Bar Nuclear Plant, Unit 1, (WBN) Technical Specifications (TS). The requested changes would revise the TS to allow testing of emergency diesel generators (EDGs), pursuant to Surveillance Requirement (SR) 3.8.1.14, during operational modes 1 or 2. The requested changes would also revise the TS to allow testing of the diesel generator batteries and associated battery chargers, pursuant to SRs 3.8.4.12, 3.8.4.13 and 3.8.4.14 during operational modes 1, 2, 3 or 4. The August 12, 1998 letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

2.0 EVALUATION

2.1 EDG 24 Hour Load Test

2.1.1 Discussion

The onsite Class 1E distribution system consists of two redundant and independent 6.9 kV shutdown boards in each unit. Each of these shutdown boards is supplied by a normal offsite source and an alternate offsite source and is backed up by its own EDG. Automatic transfer from the normal source to the alternate source occurs on 161 kV line or transformer faults. Direct transfer to the EDG occurs on loss of offsite power or degraded grid voltage conditions. Two EDGs in the same train are required to mitigate a design basis event in one unit. A fifth EDG is available as a substitute for any of the other four.

Currently, the plant's TS require that the operability of each EDG be demonstrated every 18 months by operating an EDG for 24 hours in parallel with an offsite source to develop a sufficient load. Because of the vulnerability that exists while an onsite emergency source is parallel with an offsite source, the current TS restrict this specific test to be performed only while the plant is not in Modes 1 or 2.

Enclosure

9810230066 Spp

The licensee has requested that this restriction be deleted from the TS thus allowing testing of the DGs to be performed outside of refueling outages and enabling focusing of outage efforts on essential activities.

The licensee has proposed the following specific changes to the plant's TS:

> Under SR 3.8.1.14 delete from current Note 2 "This Surveillance shall not be performed in Modes 1 or 2. However." Renumber as Note 3. This is an editorial change.
>
> Under SR 3.8.1.14 add "For performance of this test in Modes 1, 2, 3, or 4, three DGs must be maintained operable and in a standby condition" as new Note 2.

On Page B 3.8-28 under Bases SR 3.8.1.14, delete the third paragraph:

> "The 18-month frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3). Table 1, takes into consideration plant conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths."

In the fourth paragraph on Page B 3.8-28, under Bases SR 3.8.1.14, delete "two" and substitute "three" in the first sentence as an editorial change. From that paragraph delete:

> "The reason for Note 2 is that during operation with the reactor critical, performance of this surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety system."

and substitute:

> "Note 2 established that this SR may be performed on only one DG at a time while in Mode 1, 2, 3, or 4. This is necessary to ensure the proper response to an operational transient (i.e., loss of offsite power, ESF actuation). Therefore, three DGs must be maintained operable and in a standby condition during performance of this test. In this configuration, the plant will remain within its design basis, since at all times safe shutdown can be achieved with two DGs in the same train. Note 3 establishes that."

On Page B 3.8-29 under Bases SR 3.8.1.14, add:

> "Prior to performance of this SR in Modes 1 or 2, actions are taken to establish that adequate conditions exist for performance of the SR. The actions include the performance for the following:
>
> 1. Verification of the stability of the offsite power system in the vicinity of WBN. This action establishes that the power system is within "single contingency limits" and is capable of remaining stable upon the loss of any single component supporting the system.
>
> 2. Establishing of the expected weather conditions for the 24-hour testing period.
>
> 3. Postponement of the test, if a grid stability problem exists or if inclement weather such as severe thunderstorms or heavy snowfall is projected for the upcoming 24 hour period.

If during the performance of the test, a stability problem with the offsite power system arises or inclement weather (i.e., tornado watch or warning, heavy snowfall, etc.) is experienced, the testing is to be suspended."

2.1.2 EVALUATION

The staff has frequently expressed concern about the performance of the 24-hour EDG load test with the EDG in parallel to the offsite power system. This concern, which is based on the common-mode vulnerability of the offsite and onsite sources during the test duration, led to restricting the performance of this test to shutdown modes as specified in plant-specific TS and Standard TS.

If a fault or grid disturbance occurs while an EDG is connected in parallel with the offsite system, the availability of the EDG for subsequent emergency operation may be affected. In some plant designs, the EDG could trip as a result of overcurrent, lock out, and require local operator action to restore the EDG to service. In other cases, such as during a loss of offsite power, the response of the division or plant may be delayed because the EDG maintains its bus voltage. The EDG may also be subjected to protective trips which may not be bypassed in test conditions as they are in emergency demand situations.

Recently, the staff has reconsidered the concerns with parallel operation during endurance testing for several plants. The staff's acceptance of conducting the 24-hour endurance test with nuclear units at power was based on the existence of unique EDG design features and special provisions that ensure parallel operation of the EDG with the offsite system will not prevent the EDG from performing its assumed safety functions if required. The special design features and provisions are as follows:

(1) On an accident signal the EDG being tested will be separated from the offsite source when its output breaker trips and will be switched from the droop mode to the isochronous mode. If offsite power is available, the EDG continues to run in the standby mode. If offsite power is not available, the EDG continues to run, but its corresponding bus is deenergized when the offsite feeder breakers open on undervoltage. The isolation of the bus then allows the EDG's output breaker to reclose, energizing the bus and carrying the accident loads for that load group.

(2) During the 24-hour test of an EDG, no other EDG is operated in parallel with the offsite power system and the remaining redundant division(s) are supplied from a separate offsite source. This configuration ensures that only one EDG is susceptible to grid perturbations and that independent safe shutdown capability is maintained.

(3) Assuming a single failure of an EDG, adequate capacity is available from the remaining EDG(s) to power the remaining division(s) and the remaining division(s) will have the required equipment to mitigate the consequences of a design basis accident or loss of offsite power.

(4) The EDG will not be paralleled to the offsite power system during severe weather or unstable grid conditions.

(5) There is current surveillance testing that demonstrates on an 18-month frequency the capability of the EDG to revert to the ready-to-load status after a LOCA signal while

operating in the parallel test mode. Demonstration of this capability ensures that the EDG availability under accident conditions is not compromised as a result of testing.

At Watts Bar Unit 1, similar design features and special provisions exist. The EDG is equipped with a design feature that trips the output breaker of the EDG under test on a safety injection signal or a fault signal associated with the offsite power source. After an emergency start of the EDG being tested, the following actions occur:

(1) The EDG protective functions, except generator differential and engine overspeed, are blocked.

(2) The normal EDG stop switches are deactivated.

(3) The EDG governor shifts from the droop to the isochronous mode and speed controls are switched to a preset resistor to set generator output to 60 Hz.

(4) The voltage regulator also shifts to the isochronous mode and control circuits are switched to a fixed resistor to set to generator output to 6950 V.

Additionally, a surveillance requirement to demonstrate every 18 months that an EDG has the capability to revert from the test mode to the standby mode on a safety injection signal exists as SR 3.8.1.17 of the plant's TS.

The capability and independence of the offsite and onsite power sources when paralleled during testing have been previously discussed, evaluated, and found acceptable by the staff under Section 8.3.1.12 of Supplements 13 and 14 to NUREG-0847, "Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Units 1 and 2."

One EDG is tested in parallel to an offsite source at one time and the opposite train vital buses are connected to a separate offsite source during the 24-hour endurance test. If a loss of offsite power occurs during the EDG 24-hour test, the vital buses not associated with the test are separated from the offsite source and connected to their associated EDGs when the EDGs reach appropriate speed and voltage and thereby provide adequate capacity to mitigate the consequences of a design basis accident or loss of offsite power.

Commitments Being Relied Upon In Licensing Actions

One of the criteria that the staff relied upon in accepting the 24-hour endurance test with the associated nuclear unit at power is that the EDG will not be paralleled to the offsite power system during severe weather or unstable grid conditions. In a letter dated April 21, 1998, the licensee committed to add additional controls to surveillance testing procedures (0-SI-82-3, 0-SI-82-4, 0-SI-82-5, 0-SI-82-6) to ensure that the EDG will not be paralleled to the offsite power during severe weather or unstable grid conditions. These commitments are considered to be licensee commitments being relied upon in licensee action (CRULs).

In a teleconference on June 26, 1998, the staff requested the licensee to implement the CRULs in the plant technical specification bases. Specifically, the staff requested that the basis of procedure changes to be made in relation to the online testing of the EDG be discussed in the Bases for SR 3.8.1.14. Change to these commitments would thus be controlled pursuant to 10 CFR 50.59. In response to the staff's request, the licensee provided a set of marked-up and

revised pages of the TS Bases in a letter dated August 12, 1998 as discussed in section 2.1.1 above for Bases page B 3.8-29.

Summary

Based on the existence of unique EDG design features and special provisions that exist that ensure parallel operation of the EDG with the offsite system will not prevent the EDG from performing its safety functions if required, the staff concludes that, with the implementation of CRULs, the proposed TS change meets the staff guidelines discussed above and therefore is acceptable.

2.2 EDG BATTERY CHARGER AND BATTERY TESTS

2.2.1 DISCUSSION

The 125 Vdc Class 1E EDG control power subsystem provides power only for control and field flashing of the EDGs. Each EDG (including the fifth, spare EDG) has a separated and independent control power subsystem consisting of a battery, a battery charger, a distribution system, instrumentation, and protective devices.

Currently, the plant's TS require that the operability of each EDG control power subsystem battery charger be demonstrated every 18 months by verifying its capability to recharge its associated battery while supplying normal loads after a battery service or capacity discharge test. Also, the plant's TS require that the operability of each EDG control power subsystem battery be subjected to a service test every 18 months and a performance discharge test or modified performance test every 60 months (or more frequently under specified conditions). As currently written, the TS permit testing of the DG batteries and chargers only during Modes 5 and 6.

The licensee has requested that this restriction be modified to also allow these tests to be performed during Modes 1 through 4 by entering the limiting condition for operation (LCO) for the associated EDG.

The licensee has proposed the following specific changes to the plant's TS:

> Under the note for SR 3.8.4.12 (EDG control power subsystem battery charger recharging capability test), delete everything except:
>
> "Credit may be taken for unplanned events that satisfy this SR."

Under Bases SR 3.8.4.12 on Page B 3.8-64 delete the following paragraph:

> "This SR is modified by a Note. The reason for the Note is that performing the Surveillance may perturb the electrical distribution system and challenge safety systems. This Surveillance is normally performed during MODES 5 and 6 since it would require the DG DC electrical power subsystem to be inoperable during performance of the test. However, this Surveillance may be performed in MODES 1, 2, 3, or 4 provided the C-S DG and its associated DC electrical power subsystem is substituted in accordance with LCO Note 2. Credit may be taken for unplanned events that satisfy this SR Examples of unplanned events may include":

and substitute. :

"For the DG DC electrical subsystem, this Surveillance may be performed in MODES 1, 2, 3, or 4 in conjunction with LCO 3.8.1.B since the DG DC electrical power subsystem supplies loads only for the inoperable diesel generator and would not otherwise challenge safety systems supplied from vital electrical distribution systems. If available, the C-S DG and its associated DC electrical power subsystem may be substituted in accordance with LCO Note 2. Additionally, credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include":

Note 2 for SR 3.8.4.13 (vital and EDG control power subsystem battery service test), is revised to delete reference to EDG battery as follows:

"This Surveillance is not performed in MODE 1, 2, 3, or 4 for required vital batteries. Credit may be taken for unplanned events that satisfy this SR."

Under Bases SR 3.8.4.13 on Page B 3.8-66, delete the following paragraph:

"The reason for Note 2 is that performing the Surveillance may perturb the electrical distribution system and challenge safety systems. However, this Surveillance may be performed in MODES 1, 2, 3, or 4 provided that Vital Battery V or the C-S DG and its associated DC electrical power subsystem is substituted in accordance with Notes 1 or 2 respectively. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include":

and substitute:

"The reason for Note 2 is that performing the Surveillance may perturb the vital electrical distribution system and challenge safety systems. However, this Surveillance may be performed in MODES 1, 2, 3, or 4 provided that Vital Battery V is substituted in accordance with LCO Note 1. For the DG DC electrical subsystem, this surveillance may be performed in MODES 1, 2, 3, or 4 in conjunction with LCO 3.8.1.B since the supplied loads are only for the inoperable diesel generator and would not otherwise challenge safety system loads which are supplied from the vital electrical distribution systems. If available, the C-S DG and its associated DC electrical power subsystem may be substituted in accordance with LCO Note 2. Additionally, credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include":

The note for SR 3.8.4.14 (vital and EDG control power subsystem battery performance test) is revised to delete the reference to EDG battery as follows:

"This Surveillance is not performed in MODE 1, 2, 3, or 4 for required vital batteries. Credit may be taken for unplanned events that satisfy this SR."

Under Bases SR 3.8.4.14 on Page B 3.8-67 delete the following paragraph:

"This SR is modified by a Note. The reason for the Note is that performing the Surveillance may perturb the electrical distribution system and challenge safety systems.

However, this Surveillance may be performed in MODES 1, 2, 3, or 4 provided that Vital Battery V or C-S DG and its associated DC electrical power subsystem is substituted in accordance with Notes 1 or 2 respectively. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:"

and substitute

"This SR is modified by a Note. The reason for the Note is that performing the Surveillance may perturb the vital electrical distribution system and challenge safety systems. However, this Surveillance may be performed in MODES 1, 2, 3, or 4 provided that Vital Battery V is substituted in accordance with LCO Note 1. For the DG DC electrical subsystem, this surveillance may be performed in MODES 1, 2, 3, or 4 in conjunction with LCO 3.8.1.B since the supplied loads are only for the inoperable diesel generator and would not otherwise challenge safety system loads which are supplied from the vital electrical distribution systems. If available, the C-S DG and its associated DC electrical power subsystem may be substituted in accordance with LCO Note 2. Additionally, credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:"

In addition to providing the technical bases, the staff requested the licensee to evaluate how taking EDG batteries out of service for testing will be controlled in a safe manner. In response to the staff request, the licensee documented that the Technical Instruction (TI) 124 risk assessment methodology is used for online maintenance activities. For online maintenance, a risk assessment is performed prior to work window implementation and emergent work is evaluated against the assessed scope. The TI-124 risk assessment guidelines utilize the results of the WBN probabilistic safety analysis (PSA). Other safety considerations, such as TS, are also used to determine which system, component, and functional equipment group (FEG) combinations may be worked on line. In addition, an assessment of scheduled activities is performed before implementation of a work window. The assessment includes reviews for the following:

a. The schedule is evaluated against the risk base outlined in the WBN PSA.

b. Maximizing safety (reduce risk) when performing online work.

c. Avoidance of recurrent entry into a specific LCO for multiple activities. Activities that require entering the same LCO are combined to limit the number of times an LCO must be established, thus maximizing the equipment's availability.

d. If the risk associated with a particular activity cannot be determined, Nuclear Engineering is requested to perform a quantitative risk assessment.

For the diesel batteries, the online testing will be controlled by surveillance instructions (SIs). The online performance of these SIs are conservatively pre-analyzed, using the WBN-PSA, for risk based on the assigned FEG and other planned out-of-service FEG combinations within the work window, establishing a baseline risk for performance. When additional maintenance is planned to be performed in conjunction with the performance of the SI, a risk evaluation is performed to assess the risk due to the additional maintenance activities.

Additionally, to better understand the risk contribution of EDG unavailability, the licensee examined sensitivities for individual out-of-service or failed EDG. This resulted in CDF between approximately 4.8E-5 to 6.2E-5 events per reactor year, depending on the train and the EDG which were assumed to be out-of-service. Single EDG outages with a 72-hour time limit result in

CDF increases of less than 1.5E-7 events per reactor year. The licensee determined that this CDF increase is not considered risk significant.

2.2.2 EVALUATION

The proposed changes to EDG battery testing only affect the EDG battery system and do not in any way affect the vital battery system or safety system loads supplied by the vital battery system. The EDG battery system is a support system for the DGs; it provides power for diesel engine and generator controls and field flashing. The changes do not modify the design or function of the EDGs or the EDG battery systems. The EDG battery subsystems supply only the control and field flashing power to support a single EDG and do not supply any other unrelated system loads or functions so that there is no credible means of perturbing the vital power distribution system and challenging safety systems. Testing of a required EDG battery or charger results in inoperability of the EDG DC electrical power subsystem, with a required action to restore the system to operable status within 2 hours in accordance with Action C.1 of TS 3.8.4. If this cannot be achieved, the associated EDG must be declared inoperable in accordance with Action D.1 of TS 3.8.4. Once declared inoperable, the affected EDG must be returned to operable status within 72 hours in accordance with Action B.4 of TS 3.8.1.

Additionally, the EDG batteries and chargers are not tested frequently. The battery charger and battery service tests are performed every 18 months and the battery performance discharge test is performed every 60 months.

To ensure the batteries could be restored within the 72-hours allowed outage time, the licensee reviewed the results of a previous performance of the SRs. From this review, the licensee determined that the batteries could be restored within 72 hours to a point where the charging current is less than 1 ampere. In accordance with LCO 3.8.6, Table 3.8.6-1, Note c, achieving this charging current for the EDG batteries is acceptable for meeting specific-gravity limits after a battery recharge.

The staff concludes that the proposed TS changes to permit performing the EDG battery charger and the battery service test and performance discharge test during Modes 1 through 4 are acceptable.

2.3 Summary

On the basis of the preceding evaluation, the staff concludes that the proposed TS changes are acceptable. The Bases have also been revised consistent with these TS changes. The NRC staff finds these changes to be acceptable.

3.0 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.

4.0 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, 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 (63 FR 40561 dated July 29, 1998). 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.

5.0 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.

Principal Contributor: D. Nguyen

Date: October 19, 1998