From:	Schaaf, Robert
To:	Gordon Arent; Wells, Russell Douglas
Cc:	Edmondson, Carla; Daniels, Desiree L; Riste, Gerald O
Subject:	Watts Bar - Request for Additional Information Regarding Request to Extend Completion Time for an Inoperable Diesel Generator (CAC Nos. MF7147 and MF 7148)
Date:	Wednesday, August 03, 2016 1:37:00 PM
Attachments:	WBN EDG LAR for 14 day CT RAI 08 03 16 Final.pdf

Gentlemen,

By letter dated December 8, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15342A477), as supplemented by letter dated March 11, 2016 (ADAMS Accession No. ML16071A456), the Tennessee Valley Authority (TVA) submitted an application for a license amendment request to revise portions of the technical specifications for the Watts Bar Nuclear Plant (WBN), Units 1 and 2, to extend the completion time for restoring an inoperable diesel generator to operable status.

The Nuclear Regulatory Commission (NRC) staff is reviewing TVA's submittal and has determined that additional information is required to complete its review. The specific information requested is attached to this e-mail. The proposed questions were provided to TVA via e-mail on July 20, 2016, for clarification, if needed. The staff provided clarification of the attached questions by telephone on July 25, 2016. TVA agreed to provide a response to this request by September 3, 2016.

Please reply to this e-mail to confirm receipt of this request. Please contact me if you have any questions regarding this request.

Regards,

Robert G. Schaaf

Robert G. Schaaf
Senior Project Manager, Watts Bar/Bellefonte

Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Stop O-8G9A
Washington, DC 20555

301-415-6020 (o)
Robert.Schaaf@nrc.gov

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
REQUEST FOR ADDITIONAL INFORMATION
LICENSE AMENDMENT REQUEST TO REVISE
TECHNICAL SPECIFICATIONS FOR DIESEL GENERATOR COMPLETION TIME
EXTENSION FOR TECHNICAL SPECIFICATION 3.8.1, AC SOURCES – OPERATING
(TAC NOS. MF7147 AND MF7148)

The license amendment request (LAR) for Watts Bar Nuclear Plant (WBN) Units 1 and 2, dated March 11, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16071A456) proposes revision to Technical Specifications (TS) 3.8.1, "AC Sources – Operating," to extend the Completion Time (CT) for one inoperable Diesel Generator (DG) from 72 hours to 14 days based upon the availability of a supplemental alternating current (ac) power source (i.e., a 6.9 kilovolt (kV) FLEX DG). The changes are requested to provide operational and maintenance flexibility. The LAR states that the proposed CT will allow sufficient time to perform planned maintenance activities that cannot be performed within a 72-hour CT.

REGULATORY REQUIREMENTS

General Design Criterion (GDC) 17, "Electric power systems," of Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10 of the *Code of Federal Regulations* (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 to safety. 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 to minimize, to the extent practical, the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions.

GDC 18, "Inspection and Testing of Electric Power Systems," requires, in part, that electric power systems important to safety shall be designed to permit appropriate periodic inspection and testing of important areas and features, such as wiring, insulation, connections, and switchboards, to assess the continuity of the systems and the condition of their components.

GDC 5, *"*Sharing of structures, systems, and components" requires *s*tructures, systems, and components important to safety shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units.

GDC 44 "Cooling water" as related to ultimate heat sink requires, in part, that 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.

10 CFR 50.36(c), “Technical Specifications,” requires, in part, that TSs include(1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; (5) administrative controls; (6) decommissioning; (7) initial notification; (8) written reports. 10 CFR 50.36(c)(3) requires in part that TSs include SRs relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

10CFR50.63 “Loss of all alternating current power” requires in part that each light-water-cooled nuclear power plant licensed to operate under this part, must be able to withstand for a specified duration and recover from a station blackout as defined in § 50.2.

10 CFR 50.65, “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 (SSCs). It also requires that before performing maintenance activities, the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities.

RELATED GUIDANCE DOCUMENTS

NUREG-0847, "Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Unit 2," and Supplements (Supplement 27 ADAMS Accession Number ML15033A041).

RG 1.9 Revision 3, “Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants.” This RG provides guidance acceptable to the NRC staff for complying with the Commission's requirements that DG units intended for use as onsite emergency power sources in nuclear power plants be selected with sufficient capacity, be qualified, and have the necessary reliability and availability for station blackout and design basis accidents.

RG 1.155, “Station Blackout,” describes a method acceptable to the NRC staff for complying with the Commission regulation that requires nuclear power plants to be capable of coping with a Station Blackout (SBO) event for a specified duration.

NUREG-1431, Revision 4, “Standard Technical Specifications Westinghouse Plants,” This NUREG contains the improved Standard Technical Specifications (STS) for Westinghouse plants. The changes reflected in Revision 4 result from the experience gained from plant operation using the improved STS and extensive public technical meetings and discussions

among the Nuclear Regulatory Commission (NRC) staff and various nuclear power plant licensees and the Nuclear Steam Supply System (NSSS) Owners Groups. The improved STS were developed based on the criteria in the Final Commission Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors, dated July 22, 1993, which was subsequently codified by changes to Section 36 of Part 50 of Title 10 of the Code of Federal Regulations (10 CFR 50.36) (60 FR 36953).

Branch Technical Position (BTP) 8-8 “Onsite (Emergency Diesel Generators) And Offsite Power Sources Allowed Outage Time Extensions” was developed by NRC Staff to provide guidance for reviewing LARs for Allowed Outage Time (AOT) or CT extensions for the onsite and offsite power sources to perform online maintenance of the power sources. The BTP provides guidelines from a deterministic perspective for reviewing such amendment requests. The BTP was developed based on a typical single unit nuclear power plant designed with redundant (each 100% capacity) onsite power sources with each source capable of supporting plant shutdown following a single failure. For plants with multiple units, it was assumed that each unit has redundant independent onsite sources such that planned maintenance on one onsite power source related to one unit will not impact the operating and safe shutdown capability (licensing basis) of the other unit(s), i.e. the Units are expected to be in compliance with GDC 5 such that any Anticipated Operational Occurrence or accident condition in one unit does NOT adversely impact the other unit(s) under ALL operating modes. In other words, the licensing basis of other units is maintained while an onsite or offsite power system for one unit is in TS related LCO for an extended duration. The BTP follows the defense-in-depth concepts and recommends minimum duration for AOT and provides guidelines for compensatory actions that should be implemented for reducing plant risk.

NRC Generic Letter 96-01 “Testing of Safety-Related Logic Circuits” states that the failure to adequately test safety-related actuation logic circuitry is safety significant in that inoperable essential electric components required for automatic actuation of post-accident mitigation systems may be undetected for extended periods.

NRC Generic Letter 80-30 “Clarification of the Term "Operable" as It Applies to Single Failure Criterion for Safety Systems Required by TS” states in part **“**NRC's Standard Technical Specifications (STS) were formulated to preserve the single failure criterion for systems that are relied upon in the safety analysis report. By and large, the single failure criterion is preserved by specifying Limiting Conditions for Operation (LCOs) that require all redundant components of safety related systems to be OPERABLE. When the required redundancy is not maintained, either due to equipment failure or maintenance outage, action is required, within a specified time, to change the operating mode of the plant to place it in a safe condition. The specified time to take action, usually called the equipment out-of-service time, is a temporary relaxation of the single failure criterion, which, consistent with overall system reliability considerations, provides a limited time to fix equipment or otherwise make it OPERABLE. If equipment can be returned to OPERABLE status within the specified time, plant shutdown is not required. LCOs are specified for each safety related system in the plant, and with few exceptions, the ACTION statements

address single outages of components, trains or subsystems. For any particular system, the LCO does not address multiple outages of redundant components, nor does it address the effects of outages of any support systems”

BACKGROUND

As documented in NUREG-0847, "Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Unit 2," Supplement 22, (SSER 22) published February 2011, the licensing basis of Watts Bar Nuclear Units is:

1) Dual-unit trip as a result of an abnormal operational occurrence
2) Accident in one unit and concurrent shutdown of the second unit (with and without offsite power)
3) Accident in one unit and spurious ESF actuation in the other unit (with and without offsite power)

On March 12, 2012, the NRC issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12054A736). This order directed licensees to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities in the event of a beyond-design-basis external event (BDBEE). Watts Bar has installed two (one for each Unit) 225 kiloVolt-Ampere (kVA), 480 Volt (V) ac FLEX DGs to power the 125 V direct current (dc) vital battery chargers and allow energizing critical loads such as required motor-operated valves, dc components, and desired ac instrumentation and two (one for each Unit) 6.9 kV, 3 Mega Watt (MWe) FLEX DGs that will power the existing electrical distribution system in each Unit.

The proposed amendment revises WBN Units 1 and 2 TS 3.8.1, “AC Sources – Operating,” to extend the CT for one inoperable DG from 72 hours to 14 days based upon the availability of an alternate ac power source (i.e., one 6.9 kV FLEX DG) installed for compliance with BDBEE. The LAR states that the changes will provide operational and maintenance flexibility. They will allow sufficient time to perform planned maintenance activities that cannot be performed within a 72-hour CT.

The WBN Units 1 and 2 have shared power sources and shared fluid systems such that loss of one power source can require dual-unit shutdown if the power source in not restored within the TS required CT. The design and licensing basis of WBN Units does not align with assumptions and basis used for development of guidance provided in BTP 8-8. As such, the guidance provided in the BTP has to be considered with the risks associated with dual unit operation and shutdown when one DG is under maintenance for an extended duration.

By letter dated August 31, 1992 (ADAMS # ML073230184) TVA provided the response to requirements of 10CFR50.63 related to the SBO rule. Enclosure 2 of the letter (ADAMS #

ML073620394) provided the details on the SBO coping strategy for WBN Units 1 and 2. The Enclosure has the following excerpts:

- Section 1.4.1 states “This enclosure addresses the SBO scenario as if both Units 1 and 2 were operating. By assuming that both WBN Units 1 and 2 are in operation, the analysis applies to an SBO on either unit; one unit is in an SBO condition, and the other unit has lost one of two EDGs, and is in a non-blackout (NBO) condition. For the purposes of the analysis, one SBO unit is analyzed without any dependence on the ac-power potentially available (for common systems/areas) from the NBO unit.”

- Section 2.2.2 states: “An SBO is then postulated for WBN as follows: A total LOOP is postulated concurrently on both units; one unit (the SBO unit) also suffers a total loss of the ac emergency power system (i.e., a loss of two EDGs), and the other unit (NBO unit) must be able to achieve a SBO safe shutdown assuming a single failure (non-DBA). The single failure assumed on the NBO unit is a loss of one of the two remaining EDGs normally available. This SBO condition is postulated to last for the duration determined on a plant-specific basis (see Section 3.0 below).”

- Section 3.5.2 discusses the number of necessary EDGs for SBO and states: “The SBO event requires that the SBO unit and the NBO unit must achieve the SBO safe shutdown/hot standby functions described in Subsection 1.3. The WBN design of shared fluid systems is such that, with three EDGs available (for example 1A, 2A and 2B), shutdown of Unit 1 and/or Unit 2 would require the use of EDG 1A and 2A. Normal shutdown on Unit 1 or Unit 2 could not be obtained using EDG 1A alone, nor could it be obtained using EDGs 1A and 2B. The EDGs normally available are four EDGs. The number of necessary EDGs for SBO is three, since a random selection of any three EDGs ensures that at least the "A-A" or the "B-B" EDGs are in that random selection. A random selection of two EDGs would not ensure the specific EDGs required. Therefore, to obtain two specific EDGs, any three EDGs are necessary for SBO.”

Section 3.5 “Station Blackout Capability” of Enclosure 1 of the LAR dated March 16, 2016 provides an overview of the Station Blackout (SBO) assessment for dual unit operation and impact of proposed DG CT extension. Section 3.5.1 has the following statements “The existing shared design of the WBN fluid systems, in particular the ERCW system and the CCS, requires certain components to be energized from the common or Unit 2 power sources to achieve and maintain hot standby on Unit 1. Similarly, certain components need to be energized from Unit 1 sources for Unit 2. Furthermore, to achieve hot standby, both Train A DGs or both Train B DGs must be operable. For example, hot standby on Unit 1, with only DG 1A-A available, requires that DG 2A-A (not DG 1B-B or 2B-B) also be available. The converse is true for DG 1B-B. Thus, hot standby for Unit 1 (or Unit 2) requires power from both DG 1A-A and 2A-A, or from both DG

1B-B and 2B-B, and cannot be achieved from DG 1A-A or 1B-B alone. For SBO coping duration analyses, the determination of how many DGs are necessary must account for the *need of two specific DGs* (emphasis added). The 6.9 kV FLEX DG is a defense-in-depth measure for SBO and is not credited in the SBO analysis." This clarification is similar to the shared system considerations discussed in the SBO Enclosure 2 discussed above.

In view of the unique design of the WBN Units, the NRC staff has determined that the following additional information is needed to complete the review of the LAR:

QUESTIONS

1) BTP 8-8 specifies that licensees must provide justification for the duration of the requested completion time extension, based on plant-specific operating experience. The NRC Staff notes that at WBN, each DG set is furnished by Power Systems (a Morrison-Knudsen Division) and consists of two 16-cylinder engines type EMD 16-645E4. The staff notes that some plants with similar design and DGs supplied by the same manufacturer have DG allowed outage time (AOT) or CT of 7 days.

   TVA provided information in Section 2.3.2 regarding planned DG maintenance activities in Table 1 and actual DG maintenance activity completion times in Table 2. The information provided in Table 2 regarding actual maintenance completion times indicated that the longest duration activity (VLF cable testing) was 179 hours (7.5 days). TVA did not indicate whether the subject longest duration activity represented an outlier from typical estimated and actual completion times for performance of the subject maintenance. The staff notes that Table 2 indicates that the actual completion times for this testing on the other 3 DGs was in the range of 132 to 145 hours (5.5 to 6 days). The staff also notes that Table 2 does not indicate the estimated duration for VLF testing, unlike the line-items for the 4- and 12-year inspections. The data in Table 2 and the information presented in Section 2.3.2 do not provide sufficient information for the staff to assess whether these completion times are representative of typical actual completion times, or are outliers relative to planned and actual maintenance completion times. Please provide the following information:
   a) The estimated and actual time taken for all 6-year, 12-year and/or 18*-year maintenance activities at WBN Unit 1 (and 2) for each of the four DGs, other than the values provided in Table 2 of the LAR.
   b) Explain why WBN needs up to 14 days for 6-year, 12-year and 18*-year maintenance related activities compared to 7 days at other plants with similar DGs.

   **As applicable if the 12-year overhaul frequency has been changed to 18 years*

2) At WBN, the safe shutdown loads are divided into load group A and load group B for dual unit operation. There are electric motors powered by the onsite distribution system of one unit that drive safety-related motors (such as essential raw cooling water (ERCW)

pumps, component cooling system (CCS) pumps) required for safe shutdown of the other unit. The ERCW system is arranged in two headers (trains) each serving certain components in each unit. The current licensing basis (CLB) of WBN Units 1 and 2 requires support systems such as ERCW and the CCS in each train to be operable. According to current licensing basis (CLB), the minimum combined safety requirements for one accident unit and one non-accident unit or two non-accident units are met by two pumps on the same plant train. With one unit in a shutdown mode and the other unit in Mode 1, some or all the 'common' loads may be operating and can potentially impact the testing of systems/components associated with the shutdown units. The electrical ac and dc systems have common buses, and safety-related loads are fed from Train 'A ' or Train 'B' power supplies. In view of the shared systems for dual unit operation, if the WBN units are in Modes 1, 2, 3 and 4, TS LCO 3.8.1 requires four operable DGs. With one or more DGs in a train inoperable, TS 3.8.1 Condition B currently requires the inoperable DG(s) to be restored to operable status within 72 hours to avoid entering TS 3.8.1 Condition F, which requires a plant shutdown. If both units are at power and the inoperable DG(s) was not restored within the 72-hour CT, a dual-unit shutdown would be required. Please clarify the following:

a) The LAR states that the CT extension will "allow sufficient time to perform *planned* (emphasis added) maintenance activities that cannot be performed within a 72-hour CT." Please confirm that the proposed CT extension time will be used for preplanned 6-year, 12-year/18-year maintenance activities ONLY; and for routine testing and maintenance activities, the extended CT will not be invoked.
b) The LAR also states that "TVA *anticipates* (emphasis added) that the above planned maintenance activities will be performed with one or both units in Mode 4 or above." From a defense-in-depth perspective, clarify if the preplanned 6-year and 12/18-year maintenance activities on the DGs, <u>one at a time</u>, will be performed with the associated Unit in Mode 5 or Mode 6.

3) Based on the information provided in Enclosure 2 of letter dated August 31, 1992 and the LAR Section 3.5 related to coping with SBO:
    a. Please explain the sequence of events of a LOOP (both Units) when Unit 1 DG 1A-A (or 1B-B) is under maintenance, the redundant DG 1B-B (or 1A-A) fails to start (SBO Unit 1) and a Unit 2 DG has a single failure.
    b. Please explain if the response is also applicable for SBO in Unit 2 and single failure of a DG in Unit 1
    c. According to the Watts Bar licensing basis, safe shutdown is considered as placing both units in a hot standby (Technical Specification MODE 3) condition and maintaining such a condition. However in view of proposed extended maintenance on one standby DG, BTP 8-8 recommends that the supplemental AC source, used to support extended CT, have the capacity and capability to bring the Unit to cold shutdown. Please confirm that one 6.9 kV FLEX DG

coupled with one standby DG is adequate to place both units in cold shutdown and maintain cold shutdown conditions.

4) Section 4.3 of Enclosure 1 of the LAR provides an assessment of DG completion time extension and has the following statements “Each of the four DGs can supply one of the four separate Class 1E 6.9 kV shutdown boards. Each DG is started automatically on a LOOP or LOCA. The DG arrangement provides adequate capacity to supply the ESF and protection systems for the DBA, assuming the failure of a single active component in the system. Because the standby power systems can accommodate a single failure, extending the CT for an out-of-service DG has no impact on the system design basis. Safety analyses acceptance criteria as provided in the UFSAR are not impacted by the changes.” With the proposed 6.9 kV FLEX DG as a replacement for a DG under maintenance, please explain if the conclusion is applicable for all postulated events (coupled with single failure) that are considered in the licensing basis.

5) In its LAR Section 2.3.2, TVA stated, “By procedure, the 6.9 kV FLEX DG will power only one 6.9 kV shutdown board (and associated 480 V shutdown boards) and will have sufficient capacity to bring a unit to safe shutdown in the event of a LOOP concurrent with a single failure during plant operations (i.e. Modes 1 through 4).”
The NRC staff notes the following:

- The single failures to consider are a complete loss of A train (DG 1A-A and 2A-A) or B train (DG 1B-B and 2B-B) as stated in paragraph 3.4 of the LAR and FSAR sections 9.2.1, 9.2.2, and 9.2.5.
- The regulatory guidelines of BTP 8-8 specify that the supplemental power source for an inoperable EDG must have the capacity to bring a unit to safe shutdown (cold shutdown) in case of a loss of offsite power (LOOP) concurrent with a single failure during plant operation.
- The 6.9 kV shutdown boards are shared between units.
- Each unit has individual technical specifications and the supplemental power source (FLEX DG), which would power one of the shared 6.9 kV shutdown boards, must serve both units in complying with their respective TS 3.8.1 when both units are in Modes 1-4.
- The licensee’s LAR did not clearly include analysis of a LOOP and a single failure

Considering a single failure of ‘A’ train power after a dual unit LOOP, the ‘B’ train power must be able to bring both units to cold shutdown to comply with BTP 8-8 and General Design Criteria (GDC)-5. Likewise, considering a single failure of ‘B’ train power after a dual unit LOOP, the ‘A’ train power must be able to bring both units to cold shutdown to comply with BTP 8-8 and GDC-5.

Based on analysis, demonstrate that the FLEX DG will perform its intended function of serving as the supplemental power source for an inoperable DG while satisfying the

guidelines of BTP 8-8 and the requirements of GDC-5 in the following scenarios and for all the unit Mode combinations (1-4) allowed by the proposed TS changes:

a) The FLEX DG is substituting for a Train 'A' EDG and a dual unit LOOP and dual unit cooldown with loss of emergency power Train 'B', such that both units are relying on Train A power.
b) The FLEX DG is substituting for a Train B EDG and a dual unit LOOP and dual unit cooldown with loss of emergency power Train 'A', such that both units are relying on Train 'B' power
c) In the above scenarios, identify which loads on the shutdown switchboard powered by the FLEX DG would not receive power because the FLEX DG cannot supply the same power capacity as the DG and explain why that would be satisfactory in each of the above scenarios.
d) In the above scenarios, discuss which ERCW pumps and CCS pumps are running and what heat exchange function each CCS heat exchanger is performing.

6) Please provide details of DG loadings for the scenarios considered in question 5 above. In view of the differences in DG loadings, please indicate which case is the limiting case. Also, provide a time-line based on plant procedures, for connecting the proposed 6.9 kV FLEX DG to the associated safety-related bus/busses in the above scenarios.

7) Please clarify whether the FLEX DGs have been (or will be) tested to start and run loads that will be required for scenarios listed in Questions above.

8) Section 3.7.2 "FLEX DG Implementation" of Enclosure 1 of the LAR provides steps associated with 6.9 kV FLEX DG alignment and states "These actions would be the same actions the operators would take if the FLEX DG were needed to operate when a DG is inoperable for maintenance during the DG extended CT." Action #2 states "Align and place 480 V FLEX DGs in service." According to the Watts Bar response to NRC Order EA-12-049, during the first phase of an extended loss of ac power event, WBN will be relying on the Class 1 E station batteries to cope until additional power supplies (i.e., FLEX DGs) can be aligned and connected to the Watts Bar electrical distribution system (Phase 2). Transitioning to Phase 2 includes aligning and placing into service the pre-staged 480 V FLEX DGs and the 6.9 kV FLEX DGs. Based on the information provided on the FLEX DGs, the Staff requests following additional information:

a) Please confirm whether the 480 V FLEX DGs are part of the proposed extension request for DGs and will have the same requirements for testing and availability checks as the 6.9 kV FLEX DGs.
b) Assuming that it takes the proposed TS allowed time of 2 hours to establish the availability of the 6.9 kV FLEX DG, please provide a time line, using current plant procedures, for connecting the proposed 6.9 kV FLEX DG and the 480 V FLEX

DG (if required) to each of the associated safety busses if an unplanned DG maintenance was being conducted and a LOOP event is experienced.

c) For the event postulated in item b) above, please confirm if the Unit with DG undergoing maintenance will first enter SBO procedures if the associated DG fails to start.

9) LCO 3.8.1 proposed Required Action (RA) B.2 uses the word 'evaluate' when assessing the availability of 6.9 kV FLEX DG. However this wording apparently disagrees with the basis written for RA B.2 which states that it is necessary to 'verify' that the availability of the FLEX DG. Per 10 CFR 50.36(a)(1) the basis is a summary statement or reasons for the specification. The proposed reasoning and basis used in the LAR is that the FLEX DG be available during the longer proposed CT for the standby DG. Propose a reworded RA B.2 that agrees with the proposed basis.

10) In the LAR new wording is proposed for SR 3.8.1.19 for Unit 1. The existing wording indicates that all DGs of the same power train must auto-start from a standby condition, permanently energize connected loads in ≤ 10 seconds, energize auto-connected loads through a load sequencer, achieve steady state voltage and frequency within a range and supply connected loads and auto-connected loads for ≥ 5 minutes. Proposed wording removes the plural form of DG and the words of the same power train. While the proposed SR more closely matches that in NUREG-1431, Rev. 4, the wording in the NUREG is based on typical plant design where a single DG has the capacity and capability to supply all necessary accident and safe shutdown loads for the specific Unit. At Watts Bar both DGs of the same load group are necessary to supply all necessary accident and safe shutdown loads.
    a. Explain how the proposed wording results in a SR that is equivalent in purpose to the existing SR.
    b. In your answer address the question of whether both DGs of the same load group will be simultaneously started and loaded during surveillance testing at WB for SR 3.8.1.19 and if not why not?
    c. Explain how both DGs of the same load group start if there is an accident and a LOOP event in one Unit only.

11) Table 2 in Enclosure 1 of the LAR provides an overview of historical record of DG Maintenance Activity Completion Times (hours). The staff notes that VLF cable testing has consistently taken longer than maintenance activities associated with the DGs. If future cable testing is projected to take longer than the 6-year or 18-year maintenance testing, please provide a listing of cables and associated equipment that render the respective DG to be inoperable and the corresponding estimated time for each cable testing.

12) Section 3.12 "Work Control and Scheduling" of Enclosure 1 of the LAR provides the TVA method of risk assessment and work control. TS Bases Table 3.8.1-2 in Attachment 2 and 4 the LAR provides additional precautions that will be taken during the proposed

extended CT for DG maintenance. Please provide a succinct summary or listing of all compensatory actions (such as protected train concept, allowable entry and maintenance of offsite power system switchyard, elective maintenance activities, etc.) that have been considered and incorporated into procedures for extended DG outages.

13) In general, the LAR refers to the 6.9 kV FLEX DGs as “3 MWe FLEX DG 6.9 kV FLEX Generators.” Section 3.8 of the LAR states “Each FLEX DG is a 6.9 kV, 3-phase, 60 Hz synchronous machine with a continuous rating of 4062.5 kilovolt-amp (kVA) at 0.8 power factor, from MTU Onsite Energy” indicating that each DG has a continuous rating of 3.250 MW at 0.8 power factor. Please clarify the rating of the FLEX DGs and output power available from each DG to support safe shutdown of the Unit(s)